# Humanistic futures of learning

## Perspectives from UNESCO Chairs and UNITWIN Networks

# Foreword

One of the missions of UNESCO as a knowledge-based organization is to act as a global think tank and a laboratory of ideas in the various domains of its mandate. In the area of education, this includes leading the global debate on the futures of education and learning.

This volume is a contribution to this role, in particular through the *Futures of Education* initiative which aims to generate an agenda for global debate and action on the futures of education, learning and knowledge in a world of increasing complexity, uncertainty and precarity. Acknowledging that all voices must be heard in order to shape and transform education, the initiative is based on a broad and open process of engagement involving a range of stakeholders at global, regional and local levels.

The mobilization and contribution of the network of UNITWIN/UNESCO Chairs is a key part of this process of engagement. Comprising over 800 institutions and affiliates, the global network is an essential resource for the generation and mobilization of interdisciplinary knowledge. The think pieces by over one hundred authors from 65 institutions presented in this volume were selected from the numerous submissions received in response to the call for contributions to the *Futures of Education* initiative.

*Humanistic Futures of Learning: Perspectives from UNESCO Chairs and UNITWIN Networks* presents diverse views on the aims and purposes of education, as well as on learning content and methods within increasingly complex learning systems. The publication represents the first consolidated volume submitted to the International Commission on the *Futures of Education*, chaired by Her Excellency Ms Zewde Sahle-Work, President of the Federal Democratic Republic of Ethiopia. The Commission is mandated to steer the debate and lead the development of a global report on the futures of education to serve as a platform for policy debate, research and action for the years to come. This is in the spirit of previous reports published at key historical junctures of societal transformation, including *Learning to Be: the world of education today and tomorrow* (1972), *Learning: The treasure within* (1996), and, more recently, *Rethinking Education: Towards a global common good?* (2015).

A humanistic approach to education and development is the common thread that weaves together the diversity of contributions into a rich tapestry on learning. The approach is grounded in a vision of development that is economically inclusive, socially just, and environmentally sustainable. A vision that acknowledges the diversity of knowledge systems, of worldviews, and of conceptions of well-being, while reaffirming a common core of universally shared values. It is a vision which promotes an integrated approach learning, acknowledging the multiple personal, social, civic and economic purposes of education. The collection presented in this volume provide fresh multidisciplinary insights for a re-purposing of education that inspire hope for the future as we address increasingly complex development challenges and as we strive to transform the future.

UNESCO would sincerely like to thank all those who enthusiastically responded to the call for think pieces on the futures of education. The pieces featured in this volume represent only a fraction of those submitted.

It is only by leveraging our collective intelligence that we can repurpose education and learning for alternative futures of humanity and the planet. This volume is one contribution in this direction.

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# Acknowledgements

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# Introduction

Our planet is growing ever more fragile – with accelerated climate change making this reality increasingly apparent. Persistent inequalities, social fragmentation and political extremism have driven many societies to the brink of crisis. Although advances in digital communication, artificial intelligence and biotechnology harbour great potential, they also raise serious ethical and governance concerns – especially as promises of innovation and technological change have an uneven record of contributing positively to human prosperity. In a world defined by increasing complexity, uncertainty and precarity, we must urgently re-examine and reimagine how knowledge and learning can best contribute to the global common good.

UNESCO's *Futures of Education* initiative is generating global engagement and debate on education, learning and knowledge to inspire the multiple possible futures of humanity and of the planet. Based on the assumption that the complex challenges of today's world requires innovative solutions beyond established sectoral approaches and disciplinary boundaries, the UNESCO Chairs and UNITWIN Networks from all disciplines and scholarly fields were mobilized to contribute. The network was invited to prepare think pieces in any of the six United Nations official languages to help advance a shared vision for the future. *Humanistic Futures of Learning: Perspectives from UNESCO Chairs and UNITWIN Networks* presents the first curated contribution to this global debate.

This first volume is organized into five sections, each containing eight to twelve independent think pieces that address important dimensions critical to re-purposing education for the future. It calls for greater focus on the role of culture in strengthening social and environmental sustainability; the values and attitudes needed to shape future generations; the need for robust public education and alternative learning spaces; human creativity and capability in a digital era; and the role of higher education, research and innovation in generating knowledge to transform the world.

## 1. Culture and the environment:
### Harnessing customs and knowledge for planetary survival

The think pieces in this section foresee a possible future with planetary stability enabled through the mobilization of education, diversity of knowledge, customs and culture. They posit that embedding a deep attachment to landscapes and tangible heritage instills a sense of stewardship for the world. This results from an understanding that heritage is a manifestation of transformation and survival despite changing times. The authors suggest that the study, preservation and appreciation of diverse languages, knowledge and customs enrich our collective consciousness through an understanding of the relations between past, present and future societies. This section envisions the evolving role of education to include sustainability studies as a means of driving planetary survival. It proposes that curricula include Earth science and environment studies under the framework of humanism to help

enable learners and communities to become more cognizant of the world they inhabit and leave behind. This awareness leads to a deeper affinity to land, heritage and culture, and, ultimately, to greater environmental stability.

## 2. Responsible citizenship:
### Cultivating a generation at peace with itself and the Earth

This section recognizes the potential of education as a socialising process to build equitable and sustainable societies. A particular emphasis is placed on the integration of philosophy, human rights, visual learning, socio-emotional competencies, media literacy and the humanities in school curricula – in particular in subject areas that focus predominantly on acquiring scientific knowledge. It also suggests that the practice of storytelling can encourage a model of hybrid thinking that takes into account local challenges and their global impacts. Interdisciplinary knowledge is introduced as key to inclusivity and social justice. The authors foresee the role of education across all levels as a means to create a shared global future through the inclusion of a visioning component in teaching and learning about societies. This approach aims to foster a future generation that is conscious of the vital need for planetary sustainability and focused on solving global challenges, including food shortage and planetary health.

## 3. Rethinking learning systems:
### Strengthened public education and integrated learning networks

This section calls on the need to rethink learning systems. It touches on the blurring boundaries between public and private education. It also emphasizes the need to create cross-cutting digital and physical spaces that facilitate the sharing of knowledge. Such collaborative learning spaces are proposed as a means to explore math and art education while fostering collective imagination. Authors in this section call for a democratization of knowledge through greater inclusivity in and accessibility to higher education as well as to make common the use and availability of open educational resources. It is assumed that these new internationalized learning systems will cultivate a culture of responsible citizenship and equity that legitimizes different ways of knowing – particularly those that lie outside of traditional Western paradigms.

## 4. Science, Technology and Innovation:
### Building the capacity to aspire in a digital era

The pieces in this section acknowledge the changing facets of teaching, learning and knowledge production in a future characterized by increasingly developed artificial intelligence technology. While many claim that artificial intelligence can play a significant role in solving the global learning crisis, they stress that its governance should incorporate the principles of humanistic learning in scientific study. The think pieces highlight new digital competencies and media literacies and call for a gender transformative approach to the digitization and utilization of AI. Higher education reform is broadly seen as a means of preparing learners to engage meaningfully in this change. There is also a call for unlocking digital barriers through open educational resources to enable global online learning and facilitate education for all.

## 5. Knowledge and Transformation:
### Setting the stage for the futures of education

This section sets the stage to envision the futures of education through transforming how we view education and the role of learning institutions. The pieces touch on the transformation of universities, the benefits of fostering transdisciplinary teaching and of encouraging innovation, as well as of stimulating creative imagination. The section also explores how the teachings of futures literacy can prepare learners to become more open and ready to face an unknown future. There is a call to reimagine the possibilities of vocational education and training to fulfill human needs and which reaches beyond industrial work and the provision of income. The pieces also highlight the importance of lifelong counselling to support people in their careers and personal endeavours so they can become constructive agents of their own reality. Finally, it calls for co-creating the future by shifting inter-generational relations, and for the revamping of higher education to account for life-long learning opportunities for changing global demographics patterns, in particular the increased longevity of humans. One think piece specifically calls on UNESCO to spearhead and guide this collective imagination by encouraging knowledge democracy.

# 1. Culture and the environment

## Harnessing customs and knowledge for planetary survival

# Creating communities of knowledge and connecting to landscape

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The author proposes that science education incorporate elements of philosophy to help us rethink our relationship with the land on which we live. The author foresees that such an education will result in communities of knowledge that will create an affinity to our landscape and shared values for a more sustainable planet.

Scientific research has produced some of the most useful hypotheses on humans and the universe that support the restructuring of our beliefs and the building of a new paradigm of human development. For instance, twentieth century physics and chemistry as well as more recent brain studies have helped us extrapolate some useful ideas to restructure how we situate ourselves in the world and inform our daily actions. Twentieth century physics has shown us that space and time are not distinct entities, and that bodies are at once matter, waves and energy. The reality that we believe we see and touch is only one perception as the 'solidity' of matter represents only one form of 'reality'. Quantum mechanics informs us that electrons exist only when they interact with something else, or that an electron is a set of quantum 'jumps' as they pass from one interaction to another. Every interaction is an exchange of information and the 'jumps' do not occur in a predictable manner. Thus, in this sense, reality is only an interaction, an exchange of information, and it is probable not deterministic. The study of particles helps us see the world as a continual and restless proliferate of entities that appear and disappear, and that combine together with infinity – a world in continuous evolution (Rovelli, 2014).

Recent biochemical research has shown that receptors and their binders act as 'information' molecules through which cells relay communication within an organism. The study of receptors, that transmit messages to cells, which then sparks a chain reaction of biochemical events reveals how this infinitesimal physiological phenomena that occur at the cellular level can be translated on a global scale to drive an organism's behavioral changes, both in physical activity and in their mood. It follows the idea that the brain can control actions that occur throughout the body and the idea that the chemistry that occurs within an organism forms the biological basis for emotions. Thus, chemistry is related to our individual perception of the world and to our way of being in the world. Our view of the world and our physiology are therefore connected as the external world and the inner world lives in continuous reciprocal reference (Pert, 1997).

Neuroscience hypothesizes that the particular lateralized architecture of the human brain is the result of an evolutionary thrust. Research in neuroscience tells us that the two specialized hemispheres of the brain are connected by the corpus callosum, allowing for communication between both sides, which enables the emergence of new capacities and improvement of our capacity for decision-making.

To face the great global challenges of our time – especially, given the complexity and rapidity of these changes – we can deepen our knowledge of scientific research and let these ideas inform our daily perception of reality. In doing so, we grasp the idea that there is both impermanence and interdependence; information exchange; reality is not deterministic but probabilistic; the external world and the inner world are continuous mirroring each other; and that our brain is plastic and its architecture can evolve.

## Incorporating philosophy and science into education

To help us expand our understanding of the many ways we could perceive the world, one strategy could be scientific dissemination through philosophical counseling in schools and university programs; in professional and work-related programs; and in non-formal and informal educational settings. In today's world, we need critical tools to help us digest the vast amounts of information available and evaluate what is central and what is peripheral to helping us solve global challenges. We need tools to help us frame phenomena and our choices in a broad view.

In a more recent shift, science has begun to restructure its view and accept the idea that the observer can reside within the observed field, and that two can mutually influence each other. In this age, 'learning to become' entails first overturning the basic assumption of Western knowledge systems that the transference of objective knowledge necessitates the stability and passivity of the observing subject. This shift entails 'metanoia' (i.e. a fundamental transformative change) to replace this basic assumption with a knowledge paradigm that supports the transformation of the subject through the process of knowing the object.

## Human beings and our relationship with nature

For a radical reconfiguration of our paradigms, it is necessary to confront the complexity of our time with a holistic perspective and to find creative solutions to achieve sustainable development. Ultimately, the future of knowledge cannot be separated from self-knowledge, from a knowledge that involves the transformation of oneself – the 'metanoia'. (Paoletti and Dotan Ben Soussan, 2019)

In our time, the skills to manage change are largely strategic and entails mental flexibility and emotional balance. To guide change, we need awareness, perception of ourselves and of the whole – in essence, creativity. Fortunately, the orientation we need for the evolution of humanity to live in harmony with the planet that hosts us has been precisely defined by the sustainable development goals of the 2030 Agenda. In this context, 'learning to become' our potential is the new perspective and it will require experimental research through immersive practices and experiences of active listening to foster the growth of

self-awareness and awareness of the whole. The meditative practices required to gain this awareness is contained in the heritage of certain cultures in particular, some of which are not completely foreign to the Western world. In Greek and then Roman antiquity, the essential task of philosophy was not to construct or expose a conceptual system, rather the different philosophical schools transferred systems of practices to work on themselves and bring about their own transformation – practices that involved not only thought but also imagination, sensitivity and will (Hadot, 2002; Mortari, 2019). Today, meditative practices can serve as a tool in formal educational systems to strengthen the necessary skills to root the individual in the journey to navigate emotions, perceptions and understanding of the global challenges as a whole as well as awareness of the choices available for oneself and for the whole.

We know that we have neuroplastic brains that can evolve to face the challenges of our time. To secure the future of education, we need to incorporate knowledge of practices that foster the transformation of one's mind, some of which already exist within recognized educational forms. The landscape as an experience of nature can be used to shift education in this direction. The landscape refers to the relationship of humans with nature, to our point of view on nature and our feelings towards it. In this sense, the experience of the landscape is also an experience of oneself. In the industrialized world and in city life, nature's experience is mostly marginal. In this environment, an immersive experience in the landscape and in direct contact with natural forces can play an educational role, not only to develop an ecological conscience, but also as a practice of sensory perception and listening to oneself in relation to the whole of which we are a part.

Experiencing the landscape and having sensory contact with nature are needed to practice 'embodied' knowledge. Art can be an effective educational tool for this purpose (see for example, the "Teatro Natura – O Thiasos" by Sista Bramini). Neuroscientific research teaches us that both our auditory and visual systems have an innate preference for natural sounds and landscapes. In addition, aesthetic pleasure probably plays a role in helping us process information about the world as an evolutionary advantage (Gazzaniga, 2008).

## Creating communities of knowledge

Michael Jakob (2009) maintains that our age is decidedly the 'landscape's age,' or rather the "omni-landscape" due to the predominance afforded visual perception typical of this so-called "image civilization". With globalization, every place can be reached and displayed for our appraisal. In the capitalist world, the landscape becomes an object of consumption while the experience of the landscape becomes less and less direct and authentic.

Since the landscape is also an expression of the relationship between places and communities, Joan Nogué (2010) associates the landscape with the soul of a country. He stipulates that the traumatic loss of the sense of place can cause serious malaise in individuals and in society. Nature and culture are connected in the landscape, and ethics is associated with aesthetic, which is precisely connected to a specific landscape and its ability to manifest and generate the kind of relationship that the community maintains with nature.

Hence, the relationship between places and communities is an expression of cultural identity.

The industrial era and then globalization have modified the practices of making sense of the landscape by settled communities, affecting the way in which collective memories and territorial identities are produced. With globalization, the relationships of communities and individuals with places are more complex than in the past, so new forms of dynamic and multiple, fluid and crossbred identities are being defined. In today's world, there coexists conditions and characters generated by the paradigm of modernity, with others coming from the new ecological paradigm. Along with the outcomes of the de-territorialization process that has undermined the traditional relationship between communities and places as well as the effects produced by the process of homologation of many local contexts, there are signs of new forms of social aggregation. New ways of belonging have arisen to connect individuals to more places and contexts simultaneously at different scales; from the local to the global; and in the use and production of the territory.

There are new forms of relationships in which identity processes are built and in which new practices of dialogue emerge to produce a sense of place. This opens up a new perspective with new opportunities to rethink our relationship with places. That shift ultimately supports the ability to keep the relationship between communities and landscape alive, constantly renewing cultural identity. Identity production becomes a dynamic and continuous project in which we can re-elaborate the memories (i.e. subjective and stratified) of places to draw on different forms of knowledge – from specialized to widespread. The real asset to be exchanged is knowledge.

The current transformations relating to the processes of identifying identities can be oriented – according to our sustainable development mandate – towards the construction of social ties based on the exchange of knowledge; and listening and appreciating individuals and groups. These transformations can be supported and facilitated by more open, direct and participatory democratic practices. To achieve this goal, it is useful to expand on the theme of better management of knowledge within groups and communities as a strategic skill to develop a knowledge society that is realized through the contribution by all (Authier and Lévy, 1992). The ethics of collective intelligence puts individuals at the same level to facilitate its full expression. It is based on a model of cooperative learning where the exchange of knowledge becomes a new form of social bond as every human being and member of the community is considered a source of knowledge for the others. In this sense, knowledge is not only the primary wealth of the contemporary world, but also one of the places of solidarity among humans.

A 'community of knowledge' is one in which the responsibility of being a 'knowledge keeper' is returned to everyone. This paradigm shifts the focus from the perspective of 'stakeholder' and changes our way of contributing to knowledge, with the ultimate goal being to achieve sustainable development. For the future of education, it is necessary to support the cognitive practices of the groups and communities that continuously recreate the values of their landscapes through the practices of cultural appreciation and symbolic recognition of places. From this perspective, an educational system can adopt the strategy of 'generative narration' of landscapes to facilitate individual and collective processes of finding their own paths to

enhance, symbolize and attach memories to places, where co-constructions of meaning are realized.

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# Knowledge democracy: Opening our doors to all knowledge systems

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The authors argue that acknowledging the diversity of knowledge customs and cultures or knowledge democracy is no longer just an issue of cultural justice but rather a matter of human planetary survival.

- The following is a list of knowledge stories that illustrate the common thread of the power of local experiential and land-based wisdom:
- Around 1910, Japan 'discovered' Korea's rice fields – nearly 1,400 varieties of rice were being cultivated in different ecological zones and seasons.
- In ancient India, the Ayurveda system of health care developed a holistic body-mind-heart approach using natural herbs and plants.
- The Coast Salish Indigenous communities in western Canada developed multiple ways of catching, storing and consuming salmon thousands of years ago.
- The Maasai pastoralist communities in northern Tanzania have long understood the relationship between themselves, wild animals, cattle herds and the ecology of the region, allowing them to move and live on the land in harmony.
- The Indigenous communities in Oaxaca, Mexico have preserved the biodiversity of tropical forests by adhering to a set of cultural practices evolved over generations.

Each of these knowledge stories tell of local communities – farmers and Indigenous groups – who developed systems of food production, medicine and health care and ways of living in balance with the rest of nature. In each of these stories, knowledge paid integrated attention to body, mind and/or heart or spirit as a whole.

## The devaluation and decline of local knowledge systems

The knowledge accumulated through the practice of generations around the world was used locally and served the entire community. Such knowledge was gained 'by doing' and transmitted across generations orally in mother tongues. Community elders became 'knowledge-keepers'.

Nearly five hundred years ago, as colonial occupation of the world spread from Europe, 'modern science' also developed. This 'western' system of science systematically devalued local, existing knowledge systems by labelling them 'traditional'. Domination over territories and its people over these five centuries was sustained through the destruction of local knowledge systems. In the process, local cultural practices and local mother tongues have gradually disappeared.

By basing the foundations of 'modern' education predominantly on the limited epistemological foundations of what is called the 'Western Canon' or 'Eurocentric' knowledge, we have promoted one knowledge system to the exclusion and demise of others. This cultural injustice poses myriad challenges to the very survival of humanity itself. To help correct this long-standing inequity, learning to become in the future needs to be premised on 'knowledge democracy'.

## Correcting knowledge inequities by promoting diversity

'Knowledge democracy' implies acknowledgement of a diversity of knowledge systems and cultures. It entails fostering the growth and spread of a diversity of languages, cultures and practices. Just as we recognize the critical importance of biodiversity to the health of our planet, it is now imperative that we recognize that a diversity of knowledge systems is vital to our survival. Knowledge democracy recognizes the epistemological privileges of ancient and land-based knowledges as well as the knowledge of people pushed to the margins of our societies. It further means that knowledge – a critical part of transformation and action for a better life – should be made available to be harnessed for the larger public good and not for private gain.

Marginalized knowledge practitioners, including the farmers of Korea and Thailand, the healers of India and Uganda, fishing communities, forest dwellers and indigenous peoples, are now being 're-discovered' for organic foods and holistic healthcare. Currently, attempts are being made to reverse the consequences of this epistemicide over five centuries. However, this cannot be done without acknowledging the premises of knowledge democracy. The future of knowledge relevant to the peaceful co-habitation of humanity on planet earth should entail respectful co-construction and co-habitation of a diversity of experiential, practical, local and indigenous knowledge systems with 'modern science'.

Education required to support 'Learning to become' for citizens of the future needs to promote respect for one's own knowledge, language and culture while simultaneously acknowledging the diversity of these systems and practices. Critically, valuing one's own knowledge is the building block for learning new knowledge and skills to become citizens of the future.

## Incorporating knowledge democracy into existing educational systems

Knowledge democracy principles can be readily incorporated into the futures of education. Essentially, this practice translates to learning to respect learning in the classroom as well in everyday life. There are practical ways that knowledge democracy can be promoted within existing education systems. In primary levels of education, it will entail a further push to incorporate interactive learning in the real world (i.e. learning from life). At the secondary level, education syllabi can be framed around clusters of societal challenges. In post-secondary education, both teaching and research can be directly linked to developing socially responsible professionals and experts. The use of community-based participatory research methodologies by students and teachers can promote respect for local knowledge and co-construction of research. This approach to research may contribute to generating locally relevant knowledge solutions, including for the Sustainable Development Goals.

The perspective of knowledge democracy seeks to integrate formal systems and institutions of education with learning in everyday life. Learning to become an active future citizen can be facilitated by practical measures to blur rigid boundaries between the classroom or laboratory with everyday life. Learning from oral traditions of knowledge can be creatively integrated with learning from written texts. Cognitive tools of thinking can be seamlessly mixed with arts-based, affective methods as well as with the practice of skills. As thinking, feeling and acting beings, we can also nurture our capacities to learn by thinking, feeling and acting. Such an integrated perspective of knowledge democracy can be foundational in the future design of educational systems and methodologies.

The perspective of knowledge democracy also encompasses the explicit recognition of the public purposes of education. If the futures of education are to promote universal learning to become, then education has to be seen as serving the public and the well-being of humanity as a whole. While individuals do benefit from all systems of education as they learn to do, earn and prosper in their own lives, learning to become active future citizens of humanity requires education to serve a greater holistic purpose. It is the public purpose of education alone that will prepare humanity for sustainable futures. Such a commitment to the public purpose of education needs to be societally embedded and not merely dwell amongst 'educationists' alone. The perspectives and principles of knowledge democracy will help to embed this societal commitment in the futures of education.

# Enhancing cultural resilience by learning to appreciate change and transformation

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The author argues that shifting the narrative on cultural heritage from one of conservation and loss to a continuous process of change and transformation can build cultural resilience (i.e. the ability of cultural systems to absorb adversity). This change in perception can help us develop an appreciation of the transformative and evolving nature of the world – an understanding that can help us manage relations between present and future societies as well as inspire us to prepare for different possible imagined futures.

Our world is currently being transformed by a number of profound changes. Human societies will need to find ways of adapting to new conditions that are going to affect all lives. These changes are the consequences of myriad phenomena, including climate change, demographic shifts and movements, longer life-spans, technological progress, the developing globalized economy, and continuing or newly emerging social and cultural divisions. Many of these developments cannot – and, in some cases, should not – be stopped or controlled. Nonetheless, some of these changes jeopardize the preservation of the global cultural heritage and may even lead to losses.

Archaeological sites may end up under rising sea levels; distinct folk traditions may be forgotten as populations move and popular culture spreads globally; historic buildings may be replaced by modern apartment blocks; quickly evolving technological changes may threaten the accessibility of previously digitized documents; and religious sites may be deliberately targeted in bloody cultural conflicts. As Giovanni Boccardi, Head of Emergency Preparedness and Response at UNESCO, pointed out, "the battle to preserve the existing remnants of the past is sooner or later going to be lost, as nothing lasts forever" (2015, p. 93). Yet people are often emotionally very attached to what reminds them of the past.

## Increasing cultural resilience

In many cases, cultural heritage remains close to people's hearts, sometimes even defining their identities. Many of the global changes set in motion have and will continue to erode our cultural heritage. Thus, global learning institutions are needed to enhance people's resilience,

help them avoid despair and navigate the uncertainty in the human capability to preserve what is dear to so many. The challenges of contemporary transformation processes are not adequately met by anticipating risks of loss and by sentimentality about these losses. On-going processes of change call for a creative re-invention of approaches to heritage and new learning outcomes about the human past (Turner, 2016).

Resilience is the capability of a system or process to absorb disturbance (Folke et al., 2010). Cultural resilience is the capability of a cultural system (consisting of cultural processes in relevant communities) to absorb adversity, deal with change and continue to develop (Holtorf, 2018, p. 639). Resilient culture systems are more sustainable as they harbour an increased capacity to persist over long periods of time – without undermining their own preconditions. We can promote and enhance cultural resilience by learning to embrace and adapt to change, loss and transformation in cultural heritage. Like precious few other elements in our surroundings, cultural heritage illustrates the significance and impact of gradual change over time. Cultural heritage consists of legacies from the past that have persisted to the present day. They contain detailed stories on the impact of historical transformations and the human capability to adapt to them. Indeed, regarding cultural heritage, "the question is not whether some of it is gone, together with the times that are gone, but how much of it has developed and adapted to new realities" (Holtorf, 2018, p. 647).

## Learning about heritage change and transformation

The heritage we value and enjoy in the present is in many cases evidence of the opposite of continuity over time: a manifestation of changing interpretations, values and uses which are reflected in comprehensive transformations and ever new adaptations, including partial loss (Holtorf, 2015). The remains of the past illustrate how human communities repeatedly imagined and created new futures for themselves in which they could draw creatively on their heritage, transforming it into something new. Acquiring knowledge of these changing interpretations, values and uses of global cultural heritage can help shift our perceptions of heritage as solely precious evidence of the past that has become precarious in the contemporary world and must be saved. Heritage may equally well serve as a teaching aid to illustrate the inevitability of gradual change over time and the astonishing global human capacity to adapt and move on. This is one of the most significant ways in which heritage can contribute to managing the relations between present and future societies (Holtorf and Högberg, forthcoming; Harrison et al., forthcoming).

When it comes to heritage, a shift in learning goals is needed from understanding past processes to helping facilitate future adaptations. This shift may contribute more to social sustainability than mere reassurances of imagined continuities from the past that harbour the risk of disappointment in the consequences of the changes we witness now or expect to happen in the future. For that reason, learning about the histories and indeed futures of comprehensive change and transformation connected to heritage and making peace with the idea of decay and loss of heritage over time will ultimately benefit the future of humanity more than efforts to improve the conservation of heritage (DeSilvey, 2017).

There are multiple possible futures for humanity today, based on our choices and preferences. The heritage that reminds people where they come from does not provide

much direction for a future that we know is uncertain. However, learning to appreciate the history of the changing interpretations, values and uses of heritage will encourage communities to adapt creatively to their surroundings and imagine their own futures today. Education on the global heritage of change and transformation has the potential to inspire confidence in the surprising human capacity to rework our surroundings in creative ways and adapt successfully to a great variety of changing circumstances.

## Heritage embracing the future

Cultural heritage is one way of promoting changes and adaptations in society that improve peoples' lives under new circumstances. This viewpoint can help us use heritage to enhance cultural sustainability. This is the context in which we should view current debates on reconstruction, renewal and indeed reinvention linked to heritage – whether we think of the missing roof on the Cathedral of Notre Dame in Paris or of the Bamiyan Valley in Afghanistan featuring the empty niches of two giant Buddha statues (Holtorf, 2018, p. 642-3). As different architectural solutions are explored and discussed in these places and elsewhere where the conservation of heritage has been jeopardized, it's important to remember that the real issue at stake is how cultural heritage can best contribute to future society under new circumstances. It may require something different from what was there before. Cultural heritage in all its rich variety manifests change over time. Learning to understand cultural heritage increasingly in those terms will facilitate our capability of adapting legacies of the past to changing circumstances both today and in the future. It is time for heritage education to embrace future change and thus contribute to building a better future for humanity.

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# Reforming educational systems with sustainability at their core

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In this thought piece, the author makes the case to reconfigure the traditional education system to break the boundaries between disciplines. He explores the nature of sustainability and advocates for a multidisciplinary approach to solve the global crises endemic to our times, specifically climate change.

The basic notion of sustainability in different forms exists in various cultural traditions. In India, for example, children were taught from a young age to conserve resources. Waste of food in any form was considered bad. Similarly, wasting resources, such as water and electricity, was discouraged. The ideas of reuse and recycle were commonly practiced. The concept of sustainability in modern times developed during the 20th century along with an awareness of the degrading environment and life support systems of the Earth primarily due to increased economic activities and population growth. The concept took centre stage in modern intellectual discourse with the publication of the report of the World Commission on Environment and Development (Brundtland, 1987). The report defined sustainable development as development that meets the needs of the present without compromising the ability of future generations. Use of renewable energy in place of excessive use of fossil fuels (i.e. petroleum, coal and gas) is a prominent example of sustainable development.

## Scope of sustainability

The concept of sustainability need not be limited to environmental degradation only. It is relevant in different walks of life. The overarching goal of human society is happiness and well-being of all people on the planet, necessitating environmental, economic, social and political sustainability. The practice of sustainability requires integrated or systems thinking (i.e. consideration of the impact of an action in totality, in both space and time). A good example of this from India is the burning of crop residue by farmers in the state of Haryana after their annual harvest. The resulting smoke and pollution are carried by the atmosphere to the far-off capital city of Delhi, where it causes serious chest and health problems for the city dwellers. Another example is economic development. To address the issue of poverty, the world became obsessed with economic growth and gross domestic products (GDP) in the past few centuries. Constantly growing these numbers became the mantra of the world, until the realization that unlimited growth is impossible (Meadows, 1972). Economic

growth combined with population growth would stretch the limited resources of the planet. Moreover, the by-products of the consumption of resources were polluting the environment which, left unchecked, threaten our very existence.

Apart from environmental and economic sustainability, society needs social and political sustainability as well to avoid social unrest, violence and upheavals. Minimising economic inequities, upholding human rights and keeping social cohesion are some of the goals used to maintain overall sustainability.

## Disciplinary focus breeds unsustainability

Great philosophers of ancient times practiced interdisciplinary thinking. The Greek philosopher Aristotle was one of the greatest philosophers and scientists the world has ever known. Leonardo da Vinci was one of the most diversely talented individuals with interests in painting, architecture, science, music, mathematics, engineering, anatomy, geology, astronomy and botany. However, as the volume of modern knowledge has grown in the last few centuries, educational systems became increasingly specialised and compartmentalised with the formation of the distinct disciplines of sciences (biology, chemistry, mathematics and physics), law, economics, medicine and agriculture. This gave rise to the rapid vertical growth of knowledge in individual disciplines leading to industrialisation and economic growth. However, this happened at a cost. Generations were produced that could focus on one discipline to astonishing depths, providing valuable knowledge and insights to the world, yet here too there was a cost: the loss of an interdisciplinary, integrated and holistic or systems approach. We knew in great detail how every single part of a system worked but failed to understand how the collection of parts in the system behaved.

## Climate change marks a dire need for sustainability

Climate change is a glaring example of unsustainable living that arose out of the disciplinary approach. Fossil fuels were deemed to be cheap and convenient energy sources and thus, became the backbone of rapid industrialization since the 18$^{th}$ century. Initially, it was not a matter of concern, yet as economic growth and populations increased, so did the burning of fossil fuels, which gave rise to an increased accumulation of greenhouse gases in the atmosphere. This chain of events started disturbing the climatic balance of our planet by making the planet warmer.

Climate change is the greatest environmental/developmental threat facing mankind today. The Earth has warmed up by about 1.1°C compared to the preindustrial era. Over the past 140 years since modern record-keeping began, 18 of the 19 hottest years on the Earth have occurred since 2001. This global warming is already causing widespread disruption in climatic patterns, including the increased intensity and frequency of extreme events, such as heat and even cold waves, storms, tornadoes, floods and droughts.

In light of the serious threat of climate change, the Intergovernmental Panel on Climate Change (IPCC) was established in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) to periodically assess the state of climate science and advise the policy-makers and governments of the world. High-level national government officials meet every year to discuss and implement measures

to mitigate and adapt to climate change. The latest such agreement, the Paris agreement, stipulates that the global rise in temperature should be contained within 2°C above pre-industrial levels and efforts to limit the temperature increase to 1.5°C should be pursued (IPCC, 2018). In addition, the agreement aims to strengthen the ability of countries to deal with the impacts of climate change. However, the commitments from national governments so far fall well below the aim to contain the rise in Earth's temperature within 2.0°C, let alone the desired target of 1.5°C.

The results of these imminent changes in our climate system will be far reaching. Sea levels rise will expose millions of people at risk of migration and at this point, will continue beyond 2100 – even if global warming is contained within the target of 1.5°C. Some devastating changes like the loss of ecosystems may be long lasting or irreversible. Further, these changes don't appear linear with the temperature rise but instead are increasing more rapidly with the increase in temperature. One instance of this rapid change is the areas at risk of ecosystem transformation will double at 2.0°C compared to at 1.5°C. Sadly, some irreversible changes may take place between a 1.5°C and 2.0°C increase in the Earth's temperature. Changes in agricultural patterns will likely force millions of people to adapt to alternative crops or migrate or perish.

## A multidisciplinary approach to education

Climate change is potentially a great global destabiliser and threat to sustainability. Accelerated global efforts are needed to meet the ambitious targets to mitigate greenhouse gas emissions on the one hand and join forces to adapt to the impending disruptions on the other. These efforts need to be durable, lasting over periods of decades, centuries or even millennia. Meaningful change will require the diverse human race to come together for the single purpose of minimising the damage to human society. Such a cohesive force can only be created by instating fundamental reforms in the current educational system to produce new generations with different thought processes and mind-sets. Future generations need to be sensitized to the causes of climate change and suffering that human beings in some parts of the world will undergo due to its impacts. New generations will need to develop sufficient empathy for such sufferings and have a willingness to address them by helping the ones affected adapt to these changes.

The concept of sustainability will need to be embedded at the core of future educational system at all levels so that it is firmly ingrained in people's minds. The world's population will likely peak around 10 billion by the year 2100 from the current level of about 7 billion. However, the Earth's resources are limited. There is an ever-greater need for us to learn to live together, to share and use Earth's limited resources sustainably, equitably and judiciously, and take responsible actions based on their impact on the people and the planet. Integrating and building on UNESCO's Education for Sustainable Development (ESD) programme can help impart the knowledge, skills, attitudes and values necessary to shape a sustainable future. Understanding and experiencing life, nature and Earth's life support systems (i.e. air, water, rivers, oceans, soil and biodiversity) is the key to this transformation. From a young age, children should be exposed to nature so they can appreciate and experience it closely. Linkages and connectedness with natural systems will need to be explained, demonstrated and experienced. More outdoor life and physical activities will need to be encouraged and supported. As a co-benefit, this will also enable a healthier (and sustainable) life style, which is

needed in this modern age when mobile phones and TVs are creating a sedentary generation, increasing the risk of life-style diseases (e.g. diabetes, heart diseases and hypertension).

Concepts of oneness of the planet, equality of all human beings and the upholding of human rights will need to be inculcated from the beginning. Earth and its resources are a common heritage for all human beings to share and cherish – equitably and fairly. The need for social, political and environmental cohesiveness for the benefit and sustainability of all mankind will need to be ingrained for the next generation of learners. Relevant concepts and knowledge from different cultures and religions should be adopted to bring about this change.

The concept of sustainability cuts across disciplinary boundaries. Economic growth leading to pollution and environmental degradation requires that the disciplines of economics, science, and social science all come together to understand and resolve the problem. Insights and important findings from different disciplines need to be incorporated into human thinking. The latest research in neuroscience has shed light on why the brain thinks in a particular way that induces apathy when it comes to climate change (Duhaime, 2019). While the human brain is capable of solving highly complex problems, it can fail to perceive the overwhelming scientific evidence for climate change when constantly bombarded with the same facts. This is because the brain craves new things and is hard wired as a survival mechanism to find novel solutions in an ever-changing world. Such insights can provide ways of influencing the human brain in the right direction. Our current educational system is currently too compartmentalized and thus, will need to be infused with multidisciplinary thinking and studies to solve global problems. While interdisciplinary studies will need to be encouraged in various traditional departments, new institutes and centres of study should be constituted to focus on goal/problem-oriented study, bringing together expertise from different disciplines relevant to the problem.

Ultimately, a reformed educational system built to ensure the future of sustainability should advocate for these three pillars (i) climate change and sustainability; (ii) study, outdoor activities, experience and respect for life, nature and life-support systems, oneness of the planet and human beings; and (iii) broadening of the educational system and the adoption of a multidisciplinary approach at all level. If the broadening of the educational system requires increasing the number of years of schooling, so be it. It will produce a happier, healthier generation at peace with itself and the Earth.

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# Reinventing the world through landscape reading

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The author proposes that we adopt a 'landscape reading' of a place to reimagine, in a structural manner, the environments in which we live and bring sustainability practices to territories through education. The piece advocates that learners be taught to develop a sense of affinity with places and territories which will translate into a sense of belonging in order to improve the conservation of global cultural and environmental resources.

Given the fragility of global ecosystems and climate change, how can we reinvent or adapt and promote an education that provides viable responses to serve the common good of the living world? There is an urgent need for action in all parts of the world. This issue is linked to our behaviours and attitudes in our contemporary societies, where experiencing places (i.e. discovering landscapes and places in the world) is an increasingly important and positive vector for new generations who are themselves committed to well-being, dialogue and the desire to rebuild collective societies. It seems essential, therefore, that we focus especially on values that are supported and shared by all, which constitute a potential for the reconfiguration of democracy and social cohesion, without losing sight of the fact that this attitude must focus on the intergeneration of knowledge, expertise and cultures.

## History of travelling as a means to learn

The quest to experience places motivates new generations. It is part of a historical continuum reminiscent of the slow initiatory journeys of nineteenth century writers, painters or travellers, who contributed to the origination of mountain landscapes in Europe and then the innovation of seascapes. Occupying places and employing perspectives that help root us there to change perceptions and shape new representations of territories and societies will help to reinvent, preserve, enhance and develop the world.

This experience of the places in question is not one of the bewildered traveller on a frenetic journey, constantly on the move in search of multiple selfies. The experience that we wish to promote is that of the investment of the body in the territory, whether it is plural or singular. This stems from the idea that the inclusive reconnection of all the human and biophysical components of a space requires time and patient commitment. It can be exemplified in our

daily lives, whether urban or rural.

In our increasingly nomadic societies, places and lifestyles are manifold and fleeting. The superficiality of the knowledge of our living environment has become the norm. Particularly since urbanization, the architecture of cities around the world has become banal. We live in an era where generic and insipid architectural and urban forms and expressions are all too common. This has the effect of erasing territorial singularities, or even their identities – one of the many consequences of globalization.

## Reclaiming our knowledge of places

In the wake of the industrial era, we have witnessed a breakdown of knowledge of territories. Societies have forgotten about their places as over time, their memories have faded. Owing to unbridled urbanization, the reading of territories is proving to be unintelligible in most cases. The intelligence of places is being rapidly lost and no region is spared. This is a global phenomenon that is increasing daily. It is particularly evident in recurrent flooding incidents experienced by some riverside or coastal communities owing to current climate change phenomena. The development of urbanization in flood-prone areas is a striking illustration of the lack of knowledge of hydrological systems – and more broadly of ecosystems – and the commodification of the land tenure system in these vulnerable areas in many regions of the world.

Intelligence must be revived in regions to solve local and global environmental problems in a sustainable manner. This involves education and research in schools and universities. However, it must be conducted in a sustained and intergenerational way with the involvement of elected officials, economic decision-makers, indigenous knowledge keepers and environmental experts.

It must also be creative and inventive. Our capacity for wonder is surely a means to focus our attention on the quality of a place and decide if it is to be preserved or enhanced. We must develop our ability to read the territory and understand its palimpsest. We must imagine what it might have been, what it is and what it could be. We must evoke, draw, narrate, tell, write about and transmit it. We must also become attached to the place, to feel a part of it, for a while or for a whole lifetime. We currently lack close contact with territories where a universe of polysensory and emotional sensitivities can be tapped.

Essentially, what is required is a landscape reading of the territory – i.e. a qualification of our viewpoint. In doing so, we are participating in building social and cultural representations to renew our perspectives in a changing world. From this point of view, there is no limit as it becomes a matter of creativity. Thus, by paraphrasing the extreme point of view of the famous landscape architect Bernard Lassus, we can make (or imagine) artificial constructions that approximate the natural or can be perceived as such. Such statements demonstrate the infinite and sometimes dual interpretations of our relationships with nature and Others, which can be multiple and varied. We must accept a wealth of viewpoints as this

diversity reflects our plural world that we must safeguard and promote. It is one of the key characteristics required to gain a fuller understanding of the place. This approach makes the process a melting pot and a tool to imagine and provide answers to local and global environmental issues.

## A collective project to reinvent living environments

This landscape attitude that we are evoking carries with it the prospect of a collective project as it also relies on the social and cultural aspirations that we have for a place. The idea of landscape as a structural element of our values and projects in the territory is one of the key tools used to accompany the transformations and fundamental shifts of our contemporary societies.

We must promote an educational future that encourages wonder, the development of diversified and shareable imaginations of the territory and our living environments that contribute to the development of a viable future. In light of this, the fields of the arts, sciences and humanities are invited to engage in a meaningful interdisciplinary and intercultural dialogue reflecting on teachings open to humanist values in order to reinvent the world.

# Humanism and environmental ethical frameworks

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This piece calls for a re-evaluation of consumerist post-industrialisation socieities. It proposes a return to nature – a spiritual connection with the environmental and human elements – as a path towards a sustainable future.

The main imperative for education for sustainable development is "to study to become human." Interpreted in this way, education for sustainable development is the only way to save the world. As the Oriental sages used to say: "A man has all beginnings and all ends." It is commonly understood that environmental degradation results from the distortion of human values – in particular when material and consumerist ambitions dominate. In the modern consumerist society, people strive for possession of things and as coined by Johann Goethe "Their whim turns to frenzy, and Frenzy rages on limitless" (Goethe, xxxx ). The "reluctance to possess" becomes an outstanding moral deed worthy of aesthetic admiration. No convergent technologies will save us if the process of dehumanizing a human continues. We must come to the understanding that the reconstruction of the "humanity of the human" (i.e. his or her spiritual rise) is a fundamental ontological precondition for the sustainable future of humanity.

Our position is described here. New concepts must be found. On a new conceptual foundation, one must build a novel paradigm of education for sustainable development with new civilizational endeavours. We suppose that a new spiritual-hermeneutic concept of humanism can become such a foundation and we consider it an alternative to a technocratic understanding of humanism as the supremacy of man. This new eidos of humanism presupposes the overcoming of egocentric individualism, the cult of consumption, and social atomism; realization of the cosmic predestination and responsibility of man; evolution of man as a spiritual (i.e. ethical, environmental, aesthetic) being.

## Sustainable human development demands a shift from a material to a spiritual civilization

The quintessence of new humanism is an understanding of the world. According to philosophical hermeneutics, understanding of the world is the "transcending movement", a process of expanding the human conceptual horizon (Heidegger, xxxx ). The newly acquired meanings construct new conditions and forms of being of a man-in-the-world. The technocratic humanism of the contemporary West is excessively concerned with the productivity and control over nature. Meanwhile, spiritual humanism that originated from a non-Western philosophical tradition accentuates the harmonious interaction of man and nature as well as a compassionate, empathic and cognate attitude of man towards the environment and all living things on Earth. In particular, the role of shaping and consolidating a new understanding of humanism belongs largely to Confucianism (Tu, Weiming, 2010). Confucius assumed that the project of human making can best be expressed in the language of "continuity and changes" and "incessant generation-creation." Using the terminology of modern political philosophy, it is exactly the project of sustainable human development.

We consider sustainable human development as a civilizational imperative that demands a transfer from the material to a spiritual civilization (Mantatov, 1998; 2016). In the early 20th century, the newest revolution in physics was marked by Lenin's point on the inexhaustibility of electron (matter). However, in the early 21st century, the newest technological revolution raised the issue of the inexhaustibility of the creative human spirit. The sustainable development of humankind now depends on the degree to which we master human spiritual energy. We will not develop this theme further in this document as it is beyond the scope of our mandate. Instead, we will limit the discussion to a hermeneutical formulation of the issue of the increase in the ontological status of the human spirit and the noospheric consciousness.

At the 24th International Congress of Philosophy (Beijing , 2018), a question was raised "How can we strive for a better life, if we do not know where we are going? How can we change the situation?" The dialectic and hermeneutical answer to this question is as follows: one should restore confidence in the humanistic tradition and, at the same time, experiment with new forms of life that we can accept.

## Environmental ethics and a moral-aesthetical paradigm

To choose the right direction for sustainable human development, we should return to the origins of the world's humanistic traditions. Here, we encounter environmental ethics contained in the cosmological myths of Maya Indians, African legends, Taoist treatises, Homer's creations, the Buryat-Mongolian heroic epic "Geser" and so on. In all these instances, human ontology is interpreted in environmental-ethical terms, which testifies to a deep monism of the humanistic tradition of the peoples of the world. The dialectics explain movement through its final value, proceeding from the initial conditions. The problem of the beginning is the problem of monism. In this respect, environmental ethics represents the beginning and the end of the monistic spiritual tradition – the most complete manifestation of the spiritual-hermeneutic concept of humanism. We consider environmental ethics as

philosophical teachings on harmonious interactions between man and nature. The specificity of environmental ethics as a philosophical theory is that it is not only a deed of thought but also a deed in the form of thought's implementation.

The pragmatic purpose of environmental ethics is to support the sustainability of the Holistic System of Life and the conservation of diversity and beauty of all ecosystems of planet Earth. The vitality of the Holistic System of Life is the main condition for the existence and integrity of all its constituent elements, including human life. At the same time, it depends on them. Such a dialectical-holistic perception of nature and man offers hope for a better solution to the problem of sustainable development.

## The protection of nature and man is inextricably linked

Acknowledging the priority of the ontological status of the idea of man, environmental ethics simultaneously asserts the idea of moral dignity and the inherent value of nature. From the viewpoint of environmental ethics, nature is not simply an object of human activity, but a subject of co-evolution of man and nature. Consequently, it takes into account not only the interests of man but also nature's well-being. Alienation of man from nature is a distortion of the very idea of man. Human interests of a living being coincides with the interest of the conservation of life in general. We must not treat the world merely from the human perspective. Instead, we must study and understand nature's perspectives. Environmental ethics expands the care afforded human existence to the scale of caring about nature as a whole. Nature is the basis of human existence and its destruction threatens the existence of humankind. Thus, the protection of nature is the protection of man.

Environmental problems and human problems are interlinked. We are unable to separate the solution of environmental problems from the solution of human problems and vise versa. Hence, human perspectives and nature's perspectives must not be mutually exclusive. In our view, they may be combined within the frameworks of the aesthetic horizon of environmental ethics. Equitable social relations and harmonious environmental relations are intertwined. They also have aesthetic value. The aesthetic perfection of man and nature are internally linked and unified. This type of unity may be characterized as a shared beauty of natural and human existence.

Environmental ethics is higher and broader than the moral sphere since, like aesthetics, it is rooted in nature itself unlike morality, which is of social origin and may be artificial. Back in his time, Lao-tzu paid attention to this. Environmental ethics traces its origins from the aesthetics of nature. *Cum grano salis*, the existential meaning of environmental ethics may be expressed by the following imperative: "To build life according to the laws of beauty, because it is the beauty that will save the world." In this respect, the concept of "Beautiful China" is of exceptional interest. It presupposes the formation of an "aesthetically natural, poetically free person" and the building of a socialist ecological civilization. We also know that in this way, Chinese society faces many obstacles and difficulties. However, we believe in the Tao of Chinese eco-socialism since the future of global civilization depends on it. China is the only country known to offer the world a new model of civilization based on sustainable development principles. The path to a sustainable future of humankind runs through the "live aesthetics" and "live ethics" principles.

## Environmental ethics for sustainable development is rooted in the educational strategy of the Republic of Buryatia

From the viewpoint of geoecology, the Republic of Buryatia is very specific as it is situated in the basin of Lake Baikal, a UNESCO World Heritage Site. Nationalities and ethnic groups of Buryatia have an understanding that the environmental protection of Lake Baikal is their historical mission. Moral and aesthetic upbringing occupies a central place in the system of education for sustainable development of the Republic of Buryatia. It is based on the sacralization of the aesthetics of the Baikal nature and the enthronement of the Buryat-Mongolian heroic epic "Geser" that rhapsodizes the nobleness and beauty of human deeds.

Lake Baikal is a unique ecological and aesthetic system that inspires a reverential emotional state in anyone able to behold its beauty and grandeur. Sacralization of the lake sparked the creation of educational courses in social philosophy, history of Buryat literature, folklore studies, social ecology, ethnic pedagogy, ethnic poetry, and many other disciplines. Its main vector is the formation of a respectful attitude towards this world's natural heritage. Reverence for the sacred nature of Lake Baikal is shaped on the basis of understanding the inherent value of its ecosystem and a deep understanding of its meaning from a scientific, ethical and aesthetic viewpoint.

The geopolitical peculiarity of the Republic of Buryatia is its location on the crossroads of global East-West, Russia-China, Christian world-Buddhist world axes. Historically, this is a place where heterogeneous traditions synthesized and the cultural influences of Europe and Asia crystallized. Therefore, it naturally follows that the dialectic-hermeneutical discourses based on this intercultural dialogue play a significant role in the ethical and aesthetic upbringing of students.

Mythological discourses based on the enthronement of "Geser" – the epic with a millennium long history – are exceptionally valuable resources for the environmental-ethical upbringing of students. The core motif of the epic poem is the unity of man and nature. The "Geser" epic is spiritual, aesthetic and communicative. It depicts nature's functions vividly and monumentally in a way that is congenial to modern beliefs of the co-evolution of man and nature. Through the understanding of the environmental-ethical ideas in "Geser", it is possible to realize the values of the noosphere and sustainable development.

It should be noted that in general the educational strategy of the Republic of Buryatia is based on the noospheric model of sustainable development. The *Concept of Transfer of the Russian Federation to Sustainable Development* reads: "The movement of humankind to sustainable development will, in the final analysis, lead to the formation of the sphere of the reason (noosphere) foreseen by V.I. Vernadsky, when spiritual values and knowledge of Man living in harmony with the environment will become the measure of national and individual wealth" (Decree of the President of the Russian Federation No. 440, 1996). The concept of the noosphere is the Russian variant of the idea of the "common fate of humanity" and the idea of the "citizen of Earth" – the main value orientation for the strategy of sustainable development. At its deepest roots, sustainable development of the society coincides with noospheric evolution as well as the spiritual and moral perfection of man rooted in the transcendent foundations of being and ascending to the cosmology of spirit.

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# Geology for Society: Earth science for sustainable development

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This think piece suggests that the study of geology could deepen our understanding of sustainable development as an Earth science. Additionally, meaningfully integrating geology within curricula as a more significant area of study will produce a generation that is more aware of the need for and science behind planetary stability.

Almost two and a half centuries ago, the so-called 'father' of modern geology, James Hutton, began his seminal treatise on 'The Theory of the Earth' with the remark:

> 'This globe of the earth is a habitable world, and on its fitness for this purpose, our sense of wisdom in its formation must depend'. (Hutton, 1788)

Today, most would refer to that concern for the enduring well-being of humanity's relationship with the planet as 'sustainable development', and most geologists would contend that geoscientific knowledge, experience, and guidance is critical for addressing many of society's most acute challenges (American Geosciences Institute 2011, Geological Society of London 2014). The modern world is using more and more natural resources and the way we are utilizing those resources has started to affect our ecosystem more perceptibly and more irreversibly than ever before. All this has the potential to impact our ability to maintain the economy, protect national security and preserve the natural environment.

## Geology in the sustainable development discourse

Despite such Huttonian wisdom, most geologists have little or no direct involvement in sustainability science and the topic of sustainable development rarely features in most geology education programmes (Mora 2013). This is ironic given that much of the momentum for modern sustainability thinking comes from the recognition that humans are now a major geological force themselves, sufficiently dominant to earn our own bespoke epoch: the Anthropocene. The fact that the cumulative impacts of some anthropogenic changes are now significant enough to be comparable with events in the geological past means that, more than ever before, many of the central tenets of Earth science bear directly on society. In this burgeoning 'human age', the applied aspects of economic geology, petroleum geology, engineering geology, hydrogeology, and geohazards assume even greater importance, alongside the geological facets of climate science, land management and disaster risk reduction. Added to these traditional concerns are more novel aspects of economic

development that draw from natural geological capital, such as geo-heritage and geo-tourism.

The under-representation of geologists in sustainable development discourse is also surprising given that several attributes make modern geoscience well placed to make critical contributions to contemporary sustainability issues (Stewart 2016, Stewart and Gill 2017). As 'Earth System Science' (Maslin and Lewis, 2015), it grapples with the complex linkages between the atmosphere, hydrosphere, cryosphere, biosphere, and lithosphere, giving a unique whole-planet perspective. Those inter-linkages have ensured that Earth has maintained itself as a sustainable system over hundreds of millions, even billions, of years, recycling the vital components for a habitable planet. Geologists, therefore, possess a valuable synoptic and temporal conceptual framework for evaluating Earth's sustained viability for life. Moreover, many of the limitations inherent in geological investigations - incompleteness of data, lack of experimental control, agencies operating too gradually for direct observation or measurement - are equally intrinsic to sustainability science. Finally, geologists are trained in a range of specialized problem-solving skills that would seem ideally suited to those developing more sustainable environmental practices. Indeed, as Gosselin et al. (2013) contend:

Almost two and a half centuries ago, the so-called 'father' of modern geology, James Hutton, began his seminal treatise on 'The Theory of the Earth' with the remark:

> 'As a historical and interpretative science, geology can inform society about interactions in coupled human-environmental systems because our skills and proficiencies allow us to recognize the varying manifestations of phenomena at different spatial and temporal scales.'

## Geology as sustainability science

The broad holistic nature of geoscience is another reason why it is well suited to addressing sustainability issues. The science behind sustainability emerged initially as the study of the interactions between human and environmental systems but has evolved more recently into a diverse applied science that seeks societal action to preserve environmental integrity through the use and application of scientific knowledge (Bettencourt & Kaurc 2011). It is recognised that the 'science strategy to meet the challenge of finding the resources to meet increasing demands and to predict and, if possible, mitigate the adverse impacts that we are having on our planet needs to be broad and multidisciplinary.' (Geological Survey of India 2011). Delivering this strategy will require geologists to work on integrated projects with engineers and planners. However, if we are to usefully confront societal threats to an ecologically sustainable planet, geologists will also have to collaborate with biologists, zoologists, ecologists, agronomists and environmental scientists.

Such cross-disciplinary collaborations are already becoming an integral feature of modern Earth System Science. What is far less widely accepted, however, is the contention that, in order to fully appreciate the intricacies and nuances of contemporary human-environment relations, geoscientists will need to draw also from the social sciences, particularly those human and behavioural sciences such as geography, anthropology, psychology and sociology. That is because, in the context of many of the geoscientific issues that test society, it is not a lack of geological understanding itself that is the problem, but rather

our ability to convey our geoscientific knowledge to those 'stakeholder' groups that we feel most need it. Those groups may be policy makers, civic authorities, business leaders, the media or the public at large, but all too often the frontline of societal engagement is a complex, chaotic and contested information battlefield in which scientific concerns get subsumed into and lost within wider social, economic, political concerns. For decades, social scientists have recognised this dilemma and have developed methodologies and strategies for deconvolving public attitudes, motivations and perceptions about scientific and technological issues.

## Integrating geoscience in education

Developing 'sustainable geoscience' and communicating its significance ,requires meaningful integration of geology in education and professional development. After all, the ultimate goal is to prepare a workforce and citizenry that can meet society's looming resource and environmental challenges. An important dimension of this education is ensuring that our emerging geoscientists understand the ethical implications arising from their professional practices. That is because, increasingly, society will look to the geosciences not only for sustainably providing its resource fix (Lambert 2001) but also resolving the impact of developmental projects on the environment, the severity of natural hazards, and human health.

Building sustainability into Earth science curricula and professional development training seems critical for the emergence of a new generation of geo-professionals well-versed in understanding and addressing sustainability issues.

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# Strengthening our connection to nature to build citizens of the Earth

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The authors elaborate on the dangers of rampant consumerism and attempt to explain why most humans are disconnected from the realities of our depleting planet and are not taking action to instigate change to ensure a more sustainable future. They argue that education for sustainable development will play a key role in transforming citizens of this Earth to assume fully their roles as environmental stewards.

The Sustainable Development Goals adopted in 2015 encourage socio-economic transformations while protecting the environment. However, governments, corporations and citizens are slow in answering the call for transformative changes to reduce environmental degradation in any significant way. Most are aware that the current way of living is unsustainable, yet very few are willing to make drastic changes, favouring instead the status quo, which focuses on economic growth and profit. Changing lifestyles – especially in industrialized countries – also poses a barrier as most people have grown comfortable in their current mode of living.

What are the reasons for inaction? Scientists working on sustainability have been reflecting on this for quite a while and have proposed solutions that mainly focus on the external world of socio-economic structures, technological advancement and/or policies. We claim, however, that changes need to be more fundamental. As James Gustave Speth states "The top environmental problems are selfishness, greed and apathy… and to deal with those we need a spiritual and cultural transformation." This implies that we need to change the mindsets of citizens and their current worldview that is materialistic and purely economic. We acknowledge that a large portion of the world population is still struggling to ensure their survival and are thus not able to partake in materialistic pursuits. However, we contend that their fate is ultimately connected to the materialist mindset that drives consumerism and economic pursuits dominating the thinking of those in positions of power in the business and political spheres. As long as consumption and growth are the guiding principles of the decision-makers in power, significant transformative change will not occur.

## The disconnect between humans and nature

Along with the increased importance given to economic growth and consumerism, the disconnect between humans and nature has been growing. The intensifying advancement of technologies and industrialization has led to the damaging belief that we can fix every problem we face with science and technology – be it deforestation, desertification, soil erosion, climate change, etc. Our faith in our technological skills and scientific know-how leads us to think that we need not worry about the health of our ecosystems as they currently stand. This blind faith is dangerous as it leads us to ignore concrete actions we could undertake now to limit the escalation of existing problems and the development of new ones.

In May 2019, the draft report of the United Nations' Intergovernmental Platform on Biodiversity and Ecosystem Services entitled the *Global assessment report on biodiversity and ecosystem services*, captured strong media attention. Headlines such as "One million species at risk of extinction" populated the media. However, as shocking as the data of the report may have been to the media and audiences, the effect was short-lived. After a few days, the message lost momentum and the media moved on to other ones. People resumed their daily lives and preoccupations. The disconnect between humans and nature is felt by most people and when combined with the pragmatic concerns of daily life lead us to overlook the extent of the crisis we are alerted to in the report. Most people are unable to appreciate the critical functions that biodiversity and the natural environment play in their lives and grasp the extent to which their well-being is directly impacted by ecosystem degradation.

What is the cause of this alarming disconnect? Many factors come into play. A major factor is the materialistic life championed by social media along with pressures to consume more. Entrenched in our value systems among family and friends and embedded in industrialized societies is the strong belief that a life guided by consumerism and economic growth is the only valid path. We lend credence to the belief that more economic wealth constitutes more power and therefore, higher social status. At an early age, we learn very rapidly about fulfilling our needs. The first needs children learn to fill are basic and relate to survival, such as nourishment and shelter. However, they are soon brought into the fold of consumerism as they build non-basic needs, such as having the best toys and any possession that may please them. Families attempt to fulfil those needs as much they can but as soon as children start connecting to others and go to school, their demands increase as they compare their belongings to those of their peers. As a result, greed, individualism and materialism rapidly become the guiding principles of their own world. These children adopt attitudes, mindsets and behaviours that are difficult to unravel. Unless children learn to value the natural world instead of material possessions at an early age, it will become increasingly difficult to undo the damage caused by consumerism, and to truly reshape their appreciation and value for their relationship to nature. We need to rediscover ways of engaging with nature that are not merely exploitative and must nurture our connection to the ecosystems of the Earth in which we live. In this endeavour, education is fundamental to transforming the current destructive path.

## Becoming advocates for transformative change

The question is pressing: given how early in life one acquires fundamental beliefs and values, how do we shift the current mindsets and values to avoid exhausting the planet's capacity to support us? The answer is education for all – and especially starting at a very early age. We argue that without a new way to educate children while still trying to change the attitudes of older people through lifelong learning, it is very doubtful that we will succeed in implementing meaningful change. We need a new educational approach that focuses on nature, our place in it and a mindfulness of the interrelations among all living organisms. Curricula and learning activities must be built and geared toward this goal.

As acknowledged by Leicht et al., "education must change to provide the knowledge, skills, values and attitudes that empower learners to contribute to sustainable development" (Leicht et al., 2018, p. 7). However, there are obstacles that challenge us along the way that must first be removed. Teachers are trained in post-secondary education institutions where emphasis is rarely placed on reflecting on their own lifestyles and values as well as the fundamental linkages between humans and nature. Under most current systems, the focus is on technologies and their use with little reflection on what it means to be techno-dependent and the dangers of our over-reliance on technologies. Unfortunately, unless teachers themselves relearn their connection to nature and embrace the use of pedagogies to enhance the experience of children to connect with nature and learn about the current world, these changes may not occur rapidly enough. To effectively transform the educational system, teachers will have to embrace changes in their instructional practices, pedagogies and even the way they guide students to interact with the school surroundings and its environment. The new generation of teachers must be trained completely differently. This requires postsecondary institutions to move beyond slightly modifying the current curriculum to accommodate a connection to nature and calls for fundamental change in the way teachers are trained, adding courses in subject such as the environment and global mindfulness to encourage stewardship.

Norms and rules currently dictate that children often do not go outside to connect with their environment and understand their relationship with and dependence on nature. While this shift may appear difficult to implement in urban settings, many alternative modes of teaching, such as bringing nature to the classroom or the classroom to nature, can be adopted. Access to the outdoors alone may not be sufficient to bring about changes in attitudes, hence other activities should be integrated to enhance student interest and engagement to foster environmental stewardship. Indeed, "there is an important difference between lack of nature experiences (a decrease of time outdoors) and low levels of connectedness (the psychological construct)" (Enrst and Theimer, 2011, p. 595). We argue that both are needed to instigate transformational changes.

## Becoming citizens of the Earth

Since education is considered a public good, it has primarily and initially been placed under the jurisdiction of the state. However, with a greater diversification of education systems (e.g., private, home-schooling), it may be time to rethink education as a common good (UNESCO, 2015). Under this condition, all of us have a role to play and share in the responsibility to learn and educate for the common good of the planet. "[Education for sustainable development] is not confined to schools but applies to all levels of formal, non-formal and informal education as an integral part of lifelong learning" (Leicht et al., 2018, p. 8). This must extend to the media as well. Indeed, for most people, nature is not directly experienced but mediated. Media coverage of natural disasters often present nature as a threat. Nature documentaries often portray it as distant and even alien to us. Thus, the media have a huge role to play in changing how we think and value nature. "Disconnection begins young," argues Weston, "In a recent survey of U.S. fifth and sixth graders, 53 percent of the children listed the media as their primary teacher about nature, 31 percent cited school, and only 9 percent cited learning at home and actual experience outside" (1999, p. 172). While this survey and its numbers are somewhat dated, there is no compelling evidence that much has changed. Weston's ensuing call to seek direct experiences with nature is even more urgent now.

Unfortunately, education for sustainable development (ESD) is often premised on improving awareness of sustainability issues with the hope that people will change their behaviours. Meanwhile, the proponents of greater environmental awareness tend to adhere to the traditional growth model where the term 'green consumption' is promoted while retaining the same market mechanisms. Decoupling well-being and quality of life from current rampant consumerism will require a monumental effort and commitment to truly educate on the human-nature relationship through the development of mindfulness and spiritual development. In essence, a much-needed critical analysis and overhaul of the current socio-economic norms are called for. ESD programmes must accept the fact that the traditional growth paradigm cannot continue. This, we argue, will have to be grounded in a radically transformed educational approach.

Transformational changes require rethinking the entire education system from pre-school to lifelong learning as well as ensuring that intra- and intergenerational equity is rooted in values and mindsets that do not perpetuate traditional consumerism based on infinite economic growth, which has been our guiding principle thus far. Indeed, there is only one planet Earth with finite resources and infinite growth is an impossibility. Environmental stewardship is the responsibility of all – from children to elders. Through a new educational approach, we can help remove potential intergenerational conflicts and individualistic views as people gain a new appreciation and understanding of their relationship to nature. Truly becoming responsible citizens of the Earth means transforming the 'I' to 'we with nature'.

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# 2. Responsible citizenship

## Cultivating a generation at peace with itself and the Earth

# Participatory learning as a socializing process for global peace

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This piece articulates the socializing process of education for global peace based on participatory learning. It argues that focusing education on recognizing, strengthening and developing 'relations of reciprocity' between the individual and society, including the planet and world at large, will aid future learners to *become* in a manner that fulfills their individual aspirations whilst upholding ethical values for the common public good.

Education is a dynamic act filled with intricacies, nuances and even mystery that are mapped by culture and society. It is a great civic vocation with a goal not only of private accomplishment but public contribution and an exercise of shared values. Learning and teaching, formal and informal, in any milieu are not decontextualized, insular, unpolluted, singular and individual rational assets as the conventional education paradigm pretends. When it is conceptualized as such, education creates separation – within people; between people and knowledge; between 'pure' knowledge and practice; within areas of knowledge; and between education and common good. It neglects reciprocity and potentially cultivates an asocial and selfish society. In such a process, all connections to civic virtues are dangerously dissolved. Consequently, an individual's self-actualization should not be the sole objective and locus of educational attainment. Instead, education should be understood primarily as a means to foster meaningful connections that promote public happiness and global peace. Taking this into account in our aspirations, the *futures of education* are based on participatory learning and the attainment of global sustainable values as we enter a new era of interest in the interpersonal dimension in education.

## Participatory learning dismantles the hierarchy between teacher and student

Participatory learning entails a form of education where those involved (i.e. students, professors, mentors, family members, staff, community) learn from each other through the sharing of ideas and together create the learning and teaching world. Viewed in this light, learning is not a means to an end, but an end in itself. In the relational approach, we

see education as a process based on dialogue that deconstructs the hierarchy within the conventional teaching and learning relationship and instead encourages more collaborative and interactive practices.

In current educational practices, hierarchies are constantly stressed through grading, tracking, assessment, discipline and other evaluations, which override the relationship between teacher, student, trainees and other stakeholders. Students often fail to transfer knowledge learnt to real life because they are separated by the way education happens. Demotivation, anxiety and alienation are frequently the results of the weight of content and performance evaluation over the relationship. Teachers, mentors and instructors feel powerless and discouraged to go beyond the required curriculum or traditional procedures. The current process only serves to mine a destructive civic culture.

Participatory learning focuses instead on supportive relationships and emphasizes shared (and sometimes conflicting) learning experiences where students and trainees become active participants in the creation and discovery of their own unique selves, other's narratives and practices, and their role in a benevolent world. Thus, this approach is ultimately about finding 'us' while 'becoming me' where personal and collective co-constructed meaning-making is crucial.

## Learning to become requires building meaningful mutual relationships

Individuals should not be separated from the world they are learning about, nor estranged from their affective experiences. Knowledge should not be culturally, politically, ideologically or historically decontextualized nor dehumanized. Ultimately, hierarchies that favor a strict order among human beings in the educational realm do not serve our pressing social demands for dignified leadership, a sustainable future, equity and justice. While there may still be a place and time for a teacher-centered model, a shift towards a participatory learning approach is essential to building a more active, non-reductive and holistic education.

Participatory learning also harbours benefits through the formation of support networks within the classroom, where affection, trust, caring, compassion, authenticity, mutual support, an allowance to be vulnerable and the promotion of interdependence are key. Healing, strong, reciprocate and meaningful mutual relationships between all stakeholders can provide the learner with a background for what fruitful and healthy relations look like, as well as an emotional and social foundation that can foster quality education and a better society. (Re)connecting with self and others should be a priority in our current world and is one of the most powerful tools of education – especially if we want to build a society concerned with global peace.

## Global peace through participatory learning

Global peace and sustainability are pit against the granule of today's privatized and consumer versions of 'happiness.' Jean-Jacques Rousseau invokes the notion of 'public

happiness' (*le bonheur public*) to distinguish the free participation of the citizen in political matters from both the natural pleasures of human beings and from happiness founded solely on self-interest. Happiness invariably involves interpersonal relationships and the experience of reciprocity.

When education provides space for dialogue, interaction and joint meaning-making, we stand to gain something truly valuable. Aristotle proclaims that wealth, health and other goods are simply means to accomplish eudaimonia (i.e. happiness or welfare), which is only attained indirectly through the practice of relational virtues of intrinsic value, such as friendship, benevolence, sympathy and participation in civic life. To attain global peace, these virtues cannot remain external to education.

There is no happiness unfamiliar to society and there is no society without civil virtues and intentional love for the public good. Relational goods "which cannot be produced, consumed or acquired by a single individual, because they depend on interaction with others and are enjoyed only if shared with others" accentuate the role of the realization of an individual's potential, but only when aligned with reciprocity, trust, fairness, appreciation, esteem, true open dialogue and other interpersonal facets (Bruni, 2006, p. 124). Therefore, education for public happiness extends beyond the conceptual and physical to the moral and civic realm as well. It implies the cultivation of an ethics of care and of living life as a moral quest, a longing for goodness that transcends a craving for individual or secluded nationalistic greatness or excellence. In this vein, reciprocity and participation in education are suggested as new directions necessary for the common good, public life, public harmony, equity, a sustainable world and ultimately, global peace.

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# Infusing philosophy in education from early learning onwards

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The author argues that teaching philosophy from an early age will help develop values of empathy and open discourse, which in turn would help shape global citizens who are mindful and respectful of the diversity of opinions, ideas and ways of being in the world.

The tragic current events of terror attacks and the rise of populism have alerted all democratic public authorities to the need to educate future citizens from an early age about critical thinking, humanist values, equality between men and women and the need for a peaceful and respectful dialogue among all cultures. A democracy requires its citizens to practice openness, goodwill and independent thinking, qualities that can only be achieved through the building of critical and empathetic capacities. These capacities are developed and taught by the arts and humanities. More precisely, they are central to a certain practice of the humanities: philosophy. Not only does philosophy promote the transmission of content characteristic of a culture, but it also cultivates a collective intellectual practice that forms emotions through a diversity and intensity of experiences. The practice of philosophy with children aged 4 to 18 years – which has been in experimental development everywhere in the world for more than four decades – can address this need.

## Abandoning philosophy in education cripples democratic society

The challenges of democratizing philosophy teachings are very closely linked to UNESCO's objectives and values: too often reduced to secondary or university education, and hence to the elite, philosophy is nonetheless one of the essential drivers of democratic life. In 2007, the report entitled *Philosophy: A School of Freedom*, already highlighted UNESCO's concern for the development of philosophy teaching from an early age: "The very mission of UNESCO, dedicated to serving the intellectual and moral solidarity of humanity, is to embrace and promote knowledge as a whole. In an open, inclusive and pluralistic, knowledge-oriented society, philosophy has its rightful place. Its teaching alongside the other social and human sciences remains at the heart of our concerns" (Goucha, 2007).

In the same line of thinking, the philosopher Martha Nussbaum refers to the legacy of her peer John Dewey when she denounces in *Not for Profit: Why Democracy Needs the Humanities* a "silent crisis" of education, which is reflected in the fundamental transformation of Western school policies (and therefore philosophies) that abandon the humanities along with the

need to form lucid citizens who can think critically. She posits that the education crisis aims to develop a technical vision of knowledge and skills that only serves to adapt the individual to social life and especially to a liberal economy. "Radical changes are occurring in what democratic societies teach the young, and these changes have not been well thought through. Thirsty for national profit, nations, and their systems of education, are heedlessly discarding skills that are needed to keep democracies alive. If this trend continues, nations all over the world will soon be producing generations of useful machines, rather than complete citizens who can think for themselves, criticize tradition, and understand the significance of another person's sufferings and achievements. The future of the world's democracies hangs in the balance" (Nussbaum, 2011).

## What unites us is stronger than what divides us

Philosophy teaches students how to accept the necessary uncertainty inherent in life's great metaphysical questions, where there is no one correct definitive answer. Faced with the questions of liberty, happiness, love or morality, we must be prepared to say to ourselves, "I don't know", "maybe", "several ideas exist". Children learn in philosophy workshops offered in schools, libraries, associations and cultural venues both to accept the uncertainty and to develop reference points, particularly through dialogue with others as well as through authors and their works. The absence of a single definitive answer does not mean that there are no ideas or convictions from which we can draw to shape our experience of the world in order to act. By participating regularly in research communities, children gradually understand that in philosophy, we should not be afraid of not knowing and that uncertainty is even necessary. Without lapsing into relativism, philosophy workshops make it possible to develop an interpretative stance on fundamental human questions.

There are initiatives in the works to help children develop these civic practices through research, teaching, training, the dissemination of educational tools in schools and society, and the international cooperation of stakeholders. One initiative is to coordinate and link the different teams and structures already working on this subject to consolidate cooperation between researchers and practitioners in the context of North-South relations. In addition to the training of facilitators and the development of research, the initiative also aims to engage children in dialogue in the context of North-South exchanges. Building on relationships among children from all over the world (e.g. France, Benin, Mali and Quebec), the idea is to raise awareness of a universal fraternity – both through the similarity of the questions they ask themselves as human beings as well as through the common use of stories (tales from all over the world) and reason (the common ideas developed in workshops). In this manner, it is hoped that introducing children to philosophy can help to put into action the secular ideal of fraternity that comes from the Enlightenment – i.e. what unites us (questions, reason, stories) is stronger than what divides us.

## Dialogue, goodwill and collective reflection is needed to empathize with the Other

One of the most critical challenges of postmodernism is to consider and create an education that encompasses the person. Thus, an education that cultivates ethics and values as

much as it develops knowledge and skills without ignoring imagination, emotions and relationships with the Other. To achieve this, it is important to continually combine critical thinking, creative thinking and vigilant thinking. The distinction made by the philosopher Hannah Arendt between 'intelligence' and 'thought' is particularly enlightening in this respect. She posits through her concept of 'the banality of evil', that pure rationality or encyclopaedic knowledge will in no way save us from barbarism. The sublime and inordinate faith of the philosophers of the Enlightenment that instruction can save the world from war and fanaticism was crushed by the Auschwitz scandal as it proved that cultivated, rational, intelligent people are not immune from committing acts of barbarism. According to her, learning to judge – allowing us to act justly in the world to make it a better place – must be based on the ability to understand the Other's point of view. It is thus important when meeting the Other to attempt to understand his or her point of view and engage in sympathy. Well-founded judgment is only possible within a research community where dialogue, goodwill and collective reflection take place.

This ambitious learning process transcends academic disciplines and is embodied in the praxis of all philosophical practices with children. When pondering metaphysical questions where entertaining doubt along with the acceptance of one's own vulnerability and of one's ignorance is a prerequisite, children need to patiently learn how to construct ideas; propose counter-examples; detect the assumptions and consequences of preconceived opinions or ideas; decipher the coherencies and incoherencies of discourse; highlight value systems; and build bridges between their worldview and those of others. Ann Margaret Sharp suggests that the key to sound judgment requires each participant to build bridges between the various points of view, understand the feelings of those whose opinions and worldviews come from their context, empathize with them and care for their development, while remaining oneself and using one's critical faculties (Sharp, 2014).

In this sense, the philosophical research community gives substance to what Arendt called "oases" – i.e. the creation of a time and space away from the busyness of the world where participants can take some distance and think together (Arendt, 1977). These spaces of joint construction of critical, creative and benevolent thinking are the key to a better world.

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# Humanistic and ethical values in higher education

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The author proposes that more emphasis be placed on humanities subjects in conjunction with technology related disciplines to engender more critical and creative thinking. She argues that this humanistic focus in higher education will equip learners with global social skills for the future as well as the foresight to help resolve the inequities of unchecked globalization that threaten sustainability.

Globalization, modern capitalism and technological development have created an individualistic, competitive society in which everybody must fight to survive and little importance is given to community as a whole, producing instability, uncertainty and social and economic inequality. Further, the emphasis on industries and technology combined with the model of consumption that has become a goal in itself has led to the plunder of non-renewable resources, such as hydrobiological energy sources, for example. In light of this, the future holds various challenges that must be resolved, including intercultural, social, economic and political conflicts, climate change and the unforseen consequences of artificial intelligence. Consequently, the notion of education, its processes and methods can serve as a response to this contemporary historical period.

## The mission of higher education has been corrupted by market values

The mission of higher education in this context is to produce citizens of the world and create a cosmopolitan, innovative and enterprising way of thinking that is open to the upcoming demands of the second decade of the twenty-first century. Education must then transmit knowledge and values, and contribute to finding solutions to the our social and environment needs. This entails transmitting knowledge linked to the production system through innovative ideas generated from a space where the environment and society are central values. Knowledge is an indispensable and vital means to ensure society's sustainable development. Research practices, fuelled by universities, thus contribute to strengthening better global academic integration that benefits education networks through information and exchange. A transversal and multidisciplinary learning process can ensure the strengthening of research that targets wide-reaching goals, not only in science but also in the humanities. Unfortunately, contributing to the current education crisis, financial support

for the humanities in higher education is progressively drying up (Nussbaum, 2010).

The situation is dire as the aforementioned emphasis on consumption has also spread to universities, where the focus is on goals, indicators and satisfaction levels. Even though these indicators are designed to 'improve the quality of education', they have become goals and values themselves as part of a race among higher education institutions to climb in the rankings and gain a better 'position.' Increasingly, universities are placing less value on and devoting fewer resources to building courses that fulfil the needs of people and society, and more to those of the market. This is clearly reflected in the gradual decrease in the social sciences and humanities programmes in favour of exact sciences and technology programmes.

## Incorporating a humanistic culture in research

Humanistic culture has been left behind, hindering the development of critical thinking. Screens have defeated books, the Nobel laureate in literature has declared sententiously, because we have not been able to bridge the gap between images and education (Vargas Llosa, 2019). It is reading that makes further knowledge and openness possible. There are neither art nor poetry courses in universities, despite the fact that they "cultivate the inner world and nurture the capacity for emotion and imagination. Games are enlivened by a spirit of affectionate reciprocity. Dance, theatre and music promote participation and experience in different life roles" (Leuridan, 2019, p. 333).

As a pillar of vocational training, higher education must bear the responsibility of developing students' knowledge; values such as tolerance and respect for peers, colleagues, family and the community from a multicultural perspective; and recognition for the value of coexistence. This means that higher education will have to provide ethical, socially and environmentally responsible training. There is no doubt that science and technology in particular have undergone significant and considerable development, resulting in the creation of useful tools for people. However, all the evidence points to the fact that these benefits are not available to all. This is the challenge that universities must help overcome instead of solely focusing on education for the world of work within the parameters of teaching and learning. To achieve this, the university must provide perception and understanding of the country's social reality in an all-encompassing and multicultural way.

Thus, the future of higher education is to reach out to society, while training competent and committed professionals. The mission should be to produce new ideas to be at the service of the community, and hence meet the demand of both local and global social needs through concrete solutions in an environment of inclusion, sustainability and equal opportunities between men, women, minorities and marginalized groups.

Education must be based on intercultural respect and understanding in the context of globalization – whose main characteristic is to 'culturally equalize,' ignoring the importance of cultural diversity, which is the common heritage of humanity. In this scenario, this approach fulfils a fundamental role as a factor of identity and an accompaniment to vocational training that is useful for human beings and the development of society. Often, it is at school that it becomes possible to "develop interest in others, not distance ourselves from minorities, teach

about other social, sexual and religious groups, foster a sense of responsibility and promote critical thinking" (Leuridan, 2019, p. 333).

Faced with an abundance of digital information, we need to know how to process it, from its selection to its organization and conversion into new knowledge. Students, who are highly exposed to images and screens and do not tend to consume literature (i.e. reading in general) could find important elements for research work in this information flow. Research is afforded particular importance at universities and the development of projects typically entails a taxing effort by teachers and students in training and investment in time and resources. For this reason, from the outset of vocational degrees, interest must be sparked in research projects that both are sustainable and contribute to finding solutions to the problems faced by the community. It is important to note that this should be a multisectoral undertaking in which the common good must be the priority. Research should promote society's cultural development and not solely its socioeconomic development. Provoking reflection, analysis and evaluation to promote research and innovation can make a substantial contribution to a sustainable future.

## Transcendence as a value

The future of education must be centred on humanistic criteria that enable transcendence. Faced with the dynamics of a constantly changing world, this can be achieved through the promotion of high standards of values (ethical and moral) that drive research and technology. We must rise to the challenge of innovation and reinvention in situations such as these when known solutions no longer work. A new humanistic education model must seek transcendence in its students to whom it not only transmits knowledge, but also contributes through its training. Higher education institutions should promote the value of entrepreneurship with high levels of scientific and technological preparation based on ethical values that serve society. These institutions should help students develop skills to confront complex situations in personal, social and professional relationships.

Thus, the academic environment requires new methods, permanent dialogue and links between resources, and must seek points of intersection with the working world, especially in students' personal development (emotional intelligence) and its link with information technology. Institutions should place more emphasis on the importance of a higher education that promotes tolerance, creativity, cooperation, reflection and culture, as well as democratic values for peaceful cohabitation, including dialogue, civic duties and citizenship education. In addition, the model must nurture the development of critical thinking for solutions to the abstract, consequential and significant problems of humanity through disciplines such as philosophy and ethics. These are the essential elements of a higher education model strengthened by research and innovation capacities to contribute to a sustainable future.

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# Sustainability as a purpose on the new path of learning for the future

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This piece argues for a new vision of education that gears learning towards building an equitable and inclusive society in a possible future with planetary stability and well-being as the main goal. The authors call for education to include new literacies to enhance critical thinking in an information intensive age; build up socio-emotional and affective dimensions in learning to achieve an inclusive and equitable future society; focus on reciprocity in teaching and learning pedagogy; and emphasize an appreciation of biodiversity and respect for indigenous knowledge to ensure sustainable development.

Globally, inequalities and conflicts deprive millions of people of the opportunity to live a decent and humane life. These existential crises are increasing in frequency as populations grow, the climate changes, habitats of numerous (often yet unknown) species are encroached or eradicated, and massive human migrations are in motion. In this nascent era of the Anthropocene, we still use descriptors of futures that are rather fearful. Yet, with sustainability, a positive global vision has emerged for a just and safe future, with sustainable development as a pathway and education as a catalyst for change. However, we are far from achieving such sustainable development and are limited in imagining well-being as we lose balance within economic, natural and societal domains.

Our future will crucially depend on our ability to learn to live within planetary boundaries, decrease disparities and care for "the other", a term that applies not just to humans. To achieve this, we are in need of radical changes in education to focus on new paradigms of development and well-being that embrace all forms of life. Today´s and future challenges require different approaches to education. Education should prepare learners for the world as it exists and acknowledge the past, yet teach perspectives, values, norms, skills and competencies to address a world as it could be tomorrow. Education should support visions of futures while critically questioning and further improving the concept of sustainable development both globally and locally. An education that is purposed towards building an inclusive and equitable future for all is needed. Thus, our vision should require a humane idea of education that is not limited to the supply of skilled workers but is also concerned with individual human potential for knowing, being, doing and living together sustainably.

Educational change is often compared to turning around a large ship – it requires a decisive act, concerted efforts and prolonged periods of time to change course. Nonetheless, the consequences of unsustainable collective lifestyles require us to define a new trajectory for the purpose of education: the collective well-being of all living and animated beings. The path to overcoming the (re-)building of education systems based on rigid school curricula and core disciplines is through learning to design and continuously improve a collective vision of multiple possible futures and ways of being both individually and collectively. Learning in the broadest sense must address the fundamental challenges of our time. What should or can we know? What should we do? And what do we do? What may we hope for?

For what purpose do we strive? Within this document, we provide key insights that will help guide the formation of a new purpose of education.

## Forming knowledge, acknowledging the unknown and facing the information explosion

Humanity has never before had access to such a wealth of information. We have seen tremendous success in expanding educational content in many nations around the globe. This could be a moment of great potential for public discourse, awareness raising and the birth of new forms of education. This exponential growth of information as well as dynamic interactions of knowledge sub-systems contain opportunity if understood and put into use.

However, the range of available information and enhanced levels of public education do not automatically lead to the development of a knowledge-based society or improved public deliberation. On the contrary, it often lacks wisdom and contextualisation in nature. Currently, truth as a shared standard for the acceptance of information as knowledge has come under fire with the advent of post-truth, fake news, alternative facts, etc. With the simultaneous diversification and harmful use of media, we experience a homogenization of media reception, supported by standardized algorithms and artificial intelligence. Media literacy has become a crucial competence. Enhancing critical thinking capabilities to synthesize information into knowledge and eventual wisdom are seminal societal skills to be taught.

The demand for sustainability as a new purpose of education requires intensified efforts to address the socio-emotional and affective dimensions of learning beyond the cognitive focus. In essence, the reimagining of education should answer questions such as: How can we learn to deal with discomfort from being exposed to information and opinions that do not initially support our current worldviews? How can we learn to better understand and accept the limitations of what we know, and accept that what we believe to know today is likely to change in the future? How can we learn to appreciate the diversity of ways of knowing, including indigenous and spiritual knowledge, and engage systemically and respectfully with existing knowledge and wisdom?

**Insight 1:** Learning to know is learning about the unknown, understanding the dimensions of known and unknown, the diversity of ways of knowing, and the socio-emotional dimensions of living that are crucial to the formation of knowledge.

## Developing solutions and experimenting with change

Despite progress made in the past 25 years, educational engagement with the idea of a possible future that is both inclusive and equitable is still largely problem-oriented and geared towards predetermined learning outcomes. Where this concept has entered educational settings, it remains mostly at a level of teaching about sustainability, rather than engaging all aspects of our education systems to address the purpose of education for multiple possible futures. Knowledge about natural, social including cultural and economic systems and their interaction is crucial as is understanding both individual and collective needs, wants and resulting behaviours.

The process of envisioning, exploring and negotiating well-being for all within the natural limits of our planet means taking into account future generations. Education cannot be limited to communicating our understanding of the world today. It must play an active role in the search for solutions and paths into the future that we do not yet know. Learning in this context means not only knowing but being capable of taking an active role – both as an individual and a citizen – in the search for a sustainable future. This will entail engaging with others with differing worldviews and perspectives in discourse about how to achieve it. Education for sustainable development as a purpose of education respects yet intentionally goes beyond the ideas, concepts and worldviews that we inherited.

**Insight 2:** Learning to do means being engaged for an inclusive and equitable future with education as a common public and global good. It is learning to be engaged as an individual and a citizen.

## Pursuing planetary stability as a purpose of education

Educational approaches traditionally focus on the development of the individual: our ability to develop our knowledge, talents and capabilities to emancipate and liberate ourselves from the living conditions into which we were born, to lead a self-determined life in participation, solidarity and dignity. The development of these capabilities is linked to preconceived conditions of planetary stability that no longer exist for the expanding population. Collectively, we must address the abject poverty of so many humans, while recognizing the pressure we exert on climate change, biodiversity and the recognition of a looming unsustainable future for all. New human worldviews that are concerned with learning and well-being for all must therefore put planetary stability at the heart. These must be inextricably linked to the advancement of the common good for an equitable, collective and peaceful development trajectory.

Within this understanding, education is not solely limited to act as an instrument to achieve specific formal individual needs and levels, but to serve as the integrated process and operating mode of a sustainable path of life. How would we meet well-being in ways that are less harmful to others and the planet that sustains us? Many cultures and Indigenous societies have existing insights to share. How future societies could sustainably function is a goal that requires collective yet diverse pursuits. We have to question together as societies how we can best sustain the planet while striving for development individually and collectively. We have to learn to trust and engage with others in deliberative discussions over values, ethics, goals and ideas. We each need to contribute our knowledge to help us understand systems and gain an understanding of how transformation occurs. Education systems must discover, produce and transmit these multi-fold talents and foster the best of collaborative skills if we as humans are to develop the necessary solutions. This will also require thorough re-examination of existing testing, assessment and grading schemes.

**Insight 3:** Learning to live together today means to coexist peacefully and in balance with all life on the planet, and it means learning to become sustainable in an ever-changing world.

## Education for an equitable future for all

In closing, new visions of education for an inclusive, equitable and positive future requires us to rethink education fundamentally. To achieve this new purpose of education, we need to:

- Build on cognitive learning to gain a comprehensive understanding of learning in all its dimensions, including socio-emotional, behavioural and spiritual aspects;
- Explore, anticipate and learn to live with the unknown in complex systems on the basis of secured knowledge;
- Expand formal learning spaces to fluid non-formal learning settings, engaging the world;
- Create testing systems that are culturally appropriate and include locally relevant and meaningful indicators of human development and well-being;
- Expand on traditional transmission pedagogies to achieve full participation in appropriate transformative learning processes; and
- Focus on holistic, relational and Indigenous models of learning that are intergenerational and intercultural.

Giving voice and stakeholder status for the learning and teaching process back to students, teachers and community members to serve both as learners and teachers in seeking a sustainable future. Education must enhance such opportunity for all to contribute in a lifelong process. Addressing sustainability in its many forms ranging planetary stability to equity and inclusiveness should evolve as a purpose of education. This means to fundamentally redesign educational institutions into places that offer culturally appropriate place-based, solution-focused, real-world learning experiences (e.g. living labs, Kominkan). It is time to effectively address the roles and responsibilities in education that rigorously ensures that all learners will have the necessary knowledge, skills, values, perspectives and motivation to act. Any new vision of education must purposefully work towards an inclusive and equitable future for all with individual, collective and planetary well-being at its heart.

# Visual literacy in the age of the image

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In an era where significant information is transmitted through pictures, signs and symbols, this think piece draws attention to the importance of incorporating visual learning into education. Visualisation of learning content is especially important for verbally challenged, disadvantaged youth. The author makes the argument that visual competency is a necessary component in education to build a responsible and empowered global citizenry.

Children of the twenty first century are visualizers. They not only retrieve and process, but also create dozens of still and moving images each day to depict events, their moods and their perception of the world around (Darras, 2016). However, once they enter the classroom, they encounter a world where speech and written text still dominate. Those who easily understand a sophisticated concept or process through images may fail to cope with a lengthy written description. This verbalizing nature of learning has to adapt if we want to reach the unreached and facilitate the integration of socially disadvantaged groups, especially minorities and immigrants with language acquisition challenges.

Vision strongly influences the way we perceive the world, along with the quality of our aesthetic experience. Thus, it is important to be visually literate to fully function as responsible and empowered citizens. However, there is a huge discrepancy between the importance of this domain and its marginal position in education. Developmental programs based on visualisation in art and science education show impressive student progress and increases learning motivation in both domains (Kárpáti, Molnár and Munkácsy, 2014).

## Visual learning: A missed opportunity in education

The study of 'child art' (i.e. drawings, paintings and sculpture produced by children and youth) began as a branch of art history, continued as a form of psychological investigation and became, by the middle of the twentieth century, a research area on the visual language of children and youth, focusing on the interpretation and production of visual signs and symbols. On visual skills and competencies, John Debes, founder the International Visual Literacy Association (IVLA), noted that "a human being can develop by seeing and at the same time having and integrating other sensory experiences. … they enable a visually literate person to discriminate and interpret the visible actions, objects, symbols, natural or man-made, that he encounters in his environment. Through the creative use of these competencies, he is able to communicate with others. Through the appreciative use

of these competencies, he is able to comprehend and enjoy the masterworks of visual communication" (Debes, 1969). The communicative aspect of the domain soon became the focal point of research, based on Hortin's definition of visual literacy as "the ability to understand ('read') and use ('write') images and to think and learn in terms of images, that is, to think visually" (Hortin, 1983). The major contemporary model for art and design education, 'visual culture,' makes creative use of the imagery of our environment to express the concerns of contemporary young citizens (Tavin, 2009).

Cognitive and social skills and visual competencies are intertwined. With the description of the 'iconic mode of representation' in children and adults, Gestalt psychologist Rudolf Arnheim (1969) moved away from art history-based interpretations and lay the foundation of a theory of "creative vision" that establishes the relationship between thought and visual perception. He described the perceptual-cognitive symbolic behaviour, which is manifest in the iconic mode of perception and creation. He proved that visual images – symbolic or realistic – convey a meaning that cannot be formulated in any other mode, not even lexical. Contemporary educational systems, however, do not capitalise on this natural gift that is practiced voluntarily by hundreds of thousands of adolescents and youth in Visual Culture Learning Communities worldwide (Freedman et al., 2013).

The *Common European Framework for Visual Literacy*, the result of an international innovation project in which 25 authors from 19 countries collaborated to find new common grounds in the domain of visual learning, integrates cognitive and social skills with the dominant mode of communication of the twenty first century: visual language (Wagner and Schönau, 2016). Appearing in curricula around the world as art and education (i.e. *Kunsterziehung, beeldende vorming, éducation plastique*, etc), this discipline encompasses visual communication, handicraft, design, photography, textile art, media education, cultural studies, audiovisual art, art history and other forms of learning through and with images. The framework synthetizes the main competencies of 37 art education curricula from 22 European countries.

## Defining visual literacy

Visual literacy is not limited to visual information. It also addresses our other senses as well as linguistic information processing (i.e. in film, video and multimedia). This framework is based on the definition of 'visual literacy' as "A group of acquired sub-competencies for interpreting and composing visible messages. A visually literate person is able to:
(a) discriminate, and make sense of visible objects; (b) create static and dynamic visible objects effectively in a defined space; (c) comprehend and appreciate the visual testaments of others; and (d) conjure objects in the mind's eye" (Brill, Kim and Branch, 2001).

We define visual competencies and their constituting sub-competencies in three levels (basic, intermediate and expert) for 15 (partially) visual activities: analysing, communication, creation, description, drafting, empathising, experiencing aesthetically, experimentation, interpreting, judging, perceiving, presentation, realisation, using, and valuing. Through school-based experiments, teachers and researchers of the European Network of Visual Literacy and their partners from all over the world are working on projects that foster these sub-competencies and showcase their relevance in different areas of education – from arts and science to sports.

Experts from five continents: America, Africa, Australia, Europe and Asia undertook a review of the framework in the journal of the International Society for Education through Art (InSEA), a UNESCO-affiliated non-governmental organisation (NGO) (IJETA, 2019). The reviews indicate that the socially sensitive, competence-oriented framework holds relevance for educational systems all over the world. The structure for visual competencies, related to basic cognitive and affective skills, may serve as a basis to integrate visual language in all areas of the school curriculum. Experts from vastly different educational cultures unanimously expressed their conviction that creative imaging and scientific visualisation may advance teaching and learning and help societies face the challenges of twenty-first century education – a century labelled as the 'age of the Image,' where visual literacy is a key skill to survive and thrive.

## Teaching visual literacy

'Being visually competent' only makes sense in real-life situations. Teaching the visual language will only be authentic if it has a personal, social or practical relevance. Authentic assignments and learning situations eliciting expressive, interpretive or documentary visualisations may turn art education that is marginalized in most educational systems today into a key discipline to make meaning of a world of knowledge and emotions. The role of the educator is to redesign the learning process and when possible, substitute verbal explanations with situations that invite experimentation and creation. A situation can be defined by six key factors: place, people, time, image/objects, actions and interests. In the visual competency framework previously briefly described, some of these key factors are more specific, such as context (e.g. religion, issues of copyright and privacy, economy), visual rhetoric (e.g. decorative, variety, entertaining), materials and techniques (the way things are made), and genre (e.g. documentary, portrait, advertisement). A learning situation can refer to the personal, public or occupational domain and reinterpret them for the educational domain. Educational situations are created in a 'protected' environment and support the successful learning of competencies. A system of assignments for visual learning should relate to a situation that is relevant to a learner's personal development; social and cultural interaction (citizenship); and preparation for the world of work (Billmayer, 2019).

"I study Mark, sitting on the floor, with crayons in different colours scattered around him. His face is red with delight and he is obviously in a flow of creation. His mother comes in and asks: 'What are you drawing?' 'God!' – he says, in an authoritative tone. 'But we do not know how He looks like!' – replies his mother. 'You just wait! – says Mark, a bit irritated. I will soon finish and then we will know!" (Egger, 1991). This little story vividly illustrates the essence of visualisation, characterised by rich symbolism and motivation to give shape to anything and everything learnt, thought or imagined. As visual symbols are formed easier than verbal ones and symbolic codes are often more sophisticated in drawing then in speech, education in the twenty-first century should incorporate and capitalize on the visual language of children and youth to make the teaching and learning process more accessible, up-to-date, motivating and effective.

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# Education to create a sustainable global food system

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This paper argues that education is key to solving the problem of creating a sustainable global food system. The authors advocate for education at all levels on the interlinked concepts of food availability, economics, policy and culture as this increased awareness will help create conditions conducive to resolving this 10,000 year-old problem.

The world is an uncertain, complex and precarious place as we are faced with the fragility of our planet and its ecosystems. While the solution to the problem has yet to be found, it will doubtless be complex and involve many paradigms shifts and technological changes. These new and complex challenges require a change in mentality, awareness-raising and a great deal of training. Common and aligned fronts are required to take action in highly diverse environments, including the intellectual, political, artistic, scientific, business, journalistic and educational spheres. In our efforts to drive change, however, the citizen – who is at once both the subject and the agent of these changes – must not be forgotten. For such shifts and changes to be effective, it is essential that we have consistent and supportive education programmes rooted in all areas of human activity.

## Global food systems require urgent restructuring

With the birth of agriculture, the Neolithic Revolution 10,000 years ago marked the beginning of a slow and intricate structuring of society and of its relationship to food. Society has been adapting and evolving towards an ever more complex system. If we consider the four concepts central to the food system – availability, economics, policy and culture – we see that food has a profound influence on each one, and vice versa (Triptolemos Foundation, 2016). Their interaction affects the development of concepts, including the right to food (a consequence of the right to life); wars and food blockades; individual poverty; famines and

revolutions; technical innovations; schools of philosophy; religious norms; production; the relationship between food and health; and gastronomic pleasures. History is full of examples of such interactions and of its attendant mistakes.

The main challenge is finding a harmonious solution to the global food system, which is very much at the root of our planet-wide crisis. Humanity, engaged in all its complex activities, depends on the planet and global sustainability will be achieved only when balance is achieved among humanity's and the earth's respective systems. We need to reimagine critical but forgotten factors to adequately respond to a fundamental, millennia-old challenge that humanity has not yet overcome yet is crucial to successfully dealing with new challenges for the common good. Otherwise, any efforts made will be in vain and their results, rather uncertain.

A human being is a living, heterotrophic biological system. Survival is the primary biological drive of the individual and of the group of which the individual is a part, and securing access to food is the only way to ensure survival. The food environment is as complex as life itself. Its complexity encompasses both biological and psychological structures, and it is for this reason that its proper functioning cannot depend solely on the matter of food availability.

## Food systems for sustainability must be taught at all levels of education

The importance of the food system for political stability was already described by a prescient politician of the seventeenth century, Thomas Hobbes, who noted that "the nutrition of a Commonwealth consisteth in the plenty and distribution of materials conducing to life: in concoction or preparation, and, when concocted, in the conveyance of it by convenient conduits to the public use" (Hobbes, 1651). This simple definition illustrates the complicated situation that we have to address. Two factors are central to the equation. On the one hand, since humanity's right to adequate food is a basic right that is not yet universally enjoyed, new technologies and attitudes must serve to ensure universal enjoyment of this right. On the other hand, new challenges cannot be addressed by an at-risk human population with weak global structures.

As an important strategic consideration for the future, it must be borne in mind that the problem of feeding humankind has yet to be resolved. Indeed, this is a problem which has been unresolved for more than 10,000 years. It affects our future and is a fundamental issue as solving this problem means figuring out how to provide the energy necessary to sustain life itself. In the context of the history of humanity, finding this solution would be the single greatest achievement of the twenty-first century.

The influence of the global food system must ultimately consolidate its strategic value in society. We must be aware of this, and the concept must be introduced at all levels of education. We must teach about not only the concept and the associated need, but also its predictive evolution in harmony with the evolution of all the other challenges faced. Humankind's viability on this planet that sustains it does not pose a strictly technical problem, but a global planet/human-development problem in that both entities need to be simultaneously sustainable. Human sustainability, in accordance with UNESCO's objective

for the common good, relies on the proper functioning of the global food system, and this proper functioning requires pertinent education at all levels and in all categories.

## Education on global food systems is complex but necessary

Education planning must focus on the evolutive interpretation of history – and not on its repetition – to teach about specific challenges within a global context. These challenges should not be studied in isolation but rather as part of a system. They should be associated with reference points that enable an understanding of the context as a whole. Ultimately, education about the global food system is specific and complex. Unlike other fields (religious, cultural, emotional and so forth), it involves many attitudes which arise spontaneously within the citizen. Many lack a basic scientific knowledge of food, which makes them vulnerable to false, biased or inaccurate information on the topic.

Biased or inaccurate information on food products and diets constitute the most prevalent type of fake news about food. Moreover, these news items are the most widely accepted and they generate a significant amount of business. Any future approach to solving the global food sustainability issue should take into account the need for a well-grounded education on food at all levels of instruction – in higher education to establish solid scientific knowledge; education for middle-management training; and civic education. Trust in unbiased science and education will be key to the scientific-technological future. In all its spheres of activity, education must take into account participation and influence when considering the global system.

The harmonious functioning of the global food system, however, will likely come at the expense of time and resources. Thus, solving the global food system should not be just an isolated goal. Rather, it should be approached in conjunction with other facets of development, establishing the strategic relevance of balancing the sustainability of humanity's dietary fuel and the sustainability of the planet. Education must follow evolutionary progress through the theoretical and practical consolidation of this concept. The implementation of this method if done effectively would provide a golden opportunity to deal with a problem unresolved for millennia and create an essential condition to co-create a stable solution for still-pending issues (i.e. social violence, gender-based violence, public education, war, democracy, uncertainty, etc.) as well as the resolution of new issues (i.e. sustainability/the circular economy, artificial intelligence, automation, big data, education and culture for the new era, etc.).

Education in all areas of knowledge should contemplate the complexity of human nutrition as a system. All educational fields should detail and explore its links to the environment. The approach to this education should be achieved through an exploration of the paths of cooperation. This view was already held by former director-general of UNESCO, Federico Mayor Zaragoza, in the early twenty-first century (2001) when he noted, "In addition to the global view, it is essential that we tackle the vast complexity of surrounding circumstances. Simplifications are not appropriate because they do not adequately reflect the intricate, compact warp and woof of the matter. It is therefore advisable, from the very outset, to provide basic knowledge and to accustom to an interdisciplinary approach, to teamwork. Know in order to foresee, foresee in order to prevent. To my mind, foresight – prevention – is

another of the great responsibilities of the human species. There is no greater victory. We must permanently adopt the sentry's attitude; we must keep watch so that we can sound the alarm on time in order to prevent, to the extent possible, the tragedies, the events which do the greatest harm to human dignity. In my opinion, today, at the dawn of the century and of the millennium, development of this capacity for foresight is one of the major roles which higher-education and scientific-research institutions must fulfil" (F. Mayor, 2001).

Future education should give us a broad understanding of the concept of the global food system and of its interrelationships. It should give rise to common strategies that lead to solutions for future challenges so that humanity can achieve its objectives for well-being in a sustainable setting that is in harmony with the planet.

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# Challenges and opportunities for human rights education

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The author argues that any education for the future must contain a component dedicated to understanding human rights, specifically to develop paradigms of identity, peacebuilding and a role for science in democratic societies.

Over the past 25 years, human rights education has established itself as a pedagogical approach to learning about, through and for human right. It is also a means of personal empowerment and a tool for promoting social responsibility, inclusiveness, tolerance and peace. The conceptual foundations for human rights education can be found in the Universal Declaration of Human Rights of 1948, which was meant to serve as a common standard of achievement to which everyone should strive – a process that presupposes awareness of human rights. In 1993, the Vienna World Conference on Human Rights considered states to be duty-bound to ensure that education is aimed at strengthening respect for human rights and fundamental freedoms (Vienna Declaration and Programme of Action 1993, Art. 33). Since knowing about human rights is the precondition to understanding, promoting and defending human rights, human rights education has itself gained the status of a human right. As emphasized in the 2011 United Nations Declaration on Human Rights Education and Training: "Everyone has the right to know, seek and receive information about all human rights and fundamental freedoms and should have access to human rights education and training" (para. 1). UNESCO considers human rights education an integral part of the right to education and argues that knowledge of rights and freedoms is considered a fundamental tool to guarantee respect for the rights of all (UNESCO Strategy on Human Rights, p. 8).

## Learning to become in human rights education

Within any future global framework of learning, human rights education must thus continue to occupy a special place as it helps in the attainment of specific educational goals. As a practice and process, human rights education empowers individuals, groups and communities through fostering knowledge, skills and attitudes derived from internationally recognized human rights. It promotes values, beliefs and attitudes that encourage everyone to uphold their own rights and those of others, and to develop a sense of common responsibility to realize human rights and prevent human rights abuses. Beyond this purpose, human rights education serves the broader goals of promoting tolerance and cross-cultural understanding; developing personality and a sense of dignity; enabling effective

participation in a democratic society governed by the rule of law; building and maintaining peace; and promoting sustainable development and justice in line with the Sustainable Development Goals. It is also a foundational element of global citizenship education and is ultimately geared towards building a universal culture of human rights (Kingston, 2014, pp. 190-192).

The challenges identified in UNESCO's *Futures of Education* project – i.e. inequalities, violence, exclusion, strained social cohesion and weakened trust in established institutions – have to be countered by resorting to the law, language and spirit of human rights. Human rights need to have their place in the educational sector as universally accepted guiding beacons. It can provide a backbone for UNESCO's approach to imagining the future of education as *Learning to Become*. In the years ahead, three particular challenges to human rights education will deserve attention within the broader considerations for the future of learning. First, it is important to understand human rights as indispensable to constructing open, democratic and inclusive societies, which at the same time means rejecting a distorted narrative of human rights as an elitist project. Second, human rights education needs to assist in reclaiming the role of science, scientific research and scientific facts as the basis for informed and responsible decision-making in democratic societies. We need to remind ourselves that access to science and benefitting from scientific progress is a human right. Third, attacks on academic freedom, institutions and research need to be countered as they constitute fundamental threats to the future of learning.

## Open minds for open societies

Human rights education needs to be at the heart of all learning activities, which are geared towards creating open, democratic and inclusive societies. Human rights need to be featured as an essential element of all forms of citizenship education. Open societies require open minds, and human rights education provides the means to build the necessary "critical human rights consciousness" (Tibbits, 2002, pp. 163-164). Human rights education must be preserved as an essential cornerstone of learning initiatives, which seek to ensure that learners become responsible citizens who understand the linkages between individual rights, the public good and their collective duties. Human rights education enables learners to recognize the human rights dimensions of a problem; critically evaluate the potential of human rights; be aware of their own position; and recognize responsibilities (Meintjes, 1997).

Human rights education enables the achievement and securing capabilities necessary to build a life of human dignity – i.e. bodily health and integrity; obtaining the education and freedom to express oneself; and posessing the self-respect and non-humiliation to be treated with dignity (Nussbaum, 2011). At the same time, it must be able to respond to questions of identity and belonging in a fragmented world; to critiques of human rights as elitist, Western and a-historic; to shortcomings and failures within the human rights system; and assist in reclaiming human rights as universal and applicable to various grievances, including the socio-economic concerns of alienated sectors of society. Essentially, human rights education needs to make the relevance of human rights obvious to all.

## Defending human rights means defending science

Human rights has suffered from backlash by populist and nationalist approaches to global and local concerns. Human rights education can help counteract this backlash by challenging distorted historical narratives and legends that underpin populist nationalist claims of supremacy, racism, sexism and discrimination (Pike, 2008). Through a value-based critical approach and through appropriate teaching and learning strategies, human rights education can transcend national boundaries and established experiences to challenge hegemonic narratives. It can assist in the search for a global ethos and highlight the shared responsibility to address global challenges in an interconnected world (Kingston, 2014, p. 13). In a time of anti-scientific populist politics, human rights education also needs to emphasize that science is a human right. It can acknowledge the role of scientific research and facts as the basis of education, as enshrined in Art. 15 of the International Covenant on Social, Economic and Cultural Rights, which allows everyone to benefit from scientific progress. Science-driven human rights education can servas as a counterforce to the current trend to neglect, downgrade and ridicule scientific research, and resort instead to 'alternative facts' and 'fake news.'

## Academic freedom and the duty to protect spaces of learning

Academic freedom must be recognized as an intrinsic part of the right to education and a corollary of the right to enjoy the benefits of scientific progress (Vrielink et al., 2010). Academic freedom is central to the conservation, development and diffusion of science and culture in general. It is the individual right of teachers, researchers and students to enjoy freedom of thought, opinion, speech, expression, assembly and association. It allows researchers to freely acquire knowledge, inform others and be active within political and community contexts. Importantly, it enables learners to claim access to education, participate in the generation of knowledge and develop their own opinion rather than be indoctrinated. Academic freedom also has a collective dimension as it constitutes the core of the autonomy of institutions of learning. Despite its key role in education, academic freedom as a human right is under increasing threat in many countries – the future of learning itself is under threat. The future of learning cannot be discussed without taking into account the rights and freedoms of spaces of learning and learners, and without emphasizing the role and responsibilities of states to guarantee individual and institutional academic freedom; refrain from interference; preclude others from endangering academic freedom; and protecting teachers, learners and researchers.

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# Toward a vision for arts education

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The authors argue that arts education has the potential to make a substantial contribution to the lives of learners as a means to communicate, heal, construct culture and build community, irrespective of the context and the new technologies that may emerge.

UNESCO and advocates around the world have long called for universal access to quality arts and learning experiences for children, youth and lifelong learners, citing a range of personal, social and academic benefits to learners, the environments in which they learn and the communities in which they live. Such advocacy continues to be imperative within existing educational structures and under the economic conditions that sustain the status quo. At the same time, the world in which we live and the channels through which we learn are changing radically and irreversibly.

The era in which teaching and learning could be confined to a prescribed and linear curriculum delivered within a closed system is approaching the point of irrelevance. Such a curriculum can no longer adequately reflect the diversity of student experiences nor the overwhelming impact of proliferating technologies. Thus, educators must prepare for a future in which the arts will inevitably play a key role within a technology-enabled educational process that will take shape under uncertain economic, societal and environmental conditions. At the same time, the field of arts education will need to look beyond merely advocating for itself to intentionally and thoughtfully re-conceptualizing its goals and methods in ways that will realize its full potential.

## Shifting education goals in a world defined by rampant technological innovation

If our planet continues to warm at the current rate, governments will be confronted with unprecedented levels of mass migration and accompanying civil unrest. As automation and artificial intelligence continue to supplant human labour, young people are likely to be left to build personal and social identities in the absence of sufficient permanent or reliable employment. Further, as digital technologies increasingly dominate the ways in which people live their daily lives, the relevance of our current, industrial model of schooling will continue to diminish.

Not all aspects of technological progress foretell a bleak future. On the bright side, we can look forward to positive developments in medicine, communications, travel and other aspects of human life. Knowledge in every field of scientific study will expand and deepen. Isolated communities will gain access to amenities that are currently available only in urban areas. The potential for intercultural exchange and appreciation will be facilitated by improvements to communications and sustainable means of transportation. Nevertheless, even these advances will bring fresh challenges. As human life expectancy increases, so will demands on geriatric services. As machine learning continues to assist in medical diagnosis, public safety and fraud detection, so will it increasingly challenge concepts of privacy and human agency. For some, the advantages of technologically-mediated living will be compromised by increased social isolation, cyber-bullying and the digital facilitation of socially destructive activities.

Taken together, these changes will be powerfully disruptive. The status quo will not endure. Educators at all levels and in all contexts must ramp up efforts to develop new ways to provide learners of the future with the knowledge, skills and resilience they will need to succeed in whatever conditions they find themselves. Given the opportunity, arts education could make a substantial contribution to the lives of these learners not only as a source of personal satisfaction but as a means to communicate, heal, construct culture and build community in whatever context and using whatever technologies may emerge.

## A place for the arts as outlined by the Seoul Agenda

Arts educators already have at their disposal a universally recognized plan of action, one that identifies priorities for the sector and offers a range of strategies to achieve these objectives. *The Seoul Agenda: Goals for the development of arts education* was unanimously endorsed by the General Conference of UNESCO in 2011. The *Agenda* outlines specific action items designed to achieve three overriding goals: 1) ensuring universal access to arts education; 2) ensuring high quality in arts education programs; and 3) applying arts education to help solve serious social and cultural problems facing the world. Given its comprehensiveness and global acceptance, the *Seoul Agenda* provides an excellent foundation on which to build a vision of arts and learning for the future.

While recognizing that arts education must achieve its objectives within the context of a rapidly changing world, the *Seoul Agenda* is by no means intended as a futuristic projection. Rather, it assumes a level of stability within educational and social structures, offering concrete actions whereby arts educators can make a contribution to issues of access, quality and relevance within those structures. A vision of arts and learning for the future will need to address these same issues – not from the perspective of how they may be made manifest in the schools and community initiatives of today, but rather with a view to pursuing these intentions in a world that will be vastly different from our current reality. In developing such a vision, stakeholders will need to ask how arts education can make a difference in a world that may be untethered from the institutions and practices that anchor our current understanding.

Some salient questions to consider and guide the stakeholders of today as they envision the status and role of arts education a full generation into the future include:

- In twenty years, how will arts education be accessed?
- In twenty years, what will quality in arts education look like?
- In twenty years, how will arts education be applied to resolving social and cultural challenges facing the world?
- In twenty years, what will be the role of the arts educator?
- The arts hold the key to adapting to an unforeseen future

In charting a route through these untested waters, it will be useful to review the ways in which forward-thinking countries, districts and organizations have introduced innovations that suggest a progressive route for arts education. We will need to see how they have stretched the perception of education to embrace digital and out-of-classroom experiences along with lifelong learning. We will be interested to study the impact of individualized, holistic and cross-disciplinary learning. It will be important to seek out examples of increasingly interactive, student-directed and intergenerational pedagogies. Equally important will be to discern how learning in the arts can contribute to sustainability goals related to physical and mental health and well-being; social justice and reconciliation; intercultural understanding; social cohesion; democracy; and conflict resolution. Moreover, we should look for ways in which arts education can contribute to the articulation of a humanistic world view – one that will reflect our changing context and bring the clarity and conviction needed to validate newly constructed identities and to guide the ethical behaviour of citizens of the future.

The conviction that arts and learning must inevitably play a central role in any future educational paradigm derives from evidence that the roots of artistic practice stretch deep into human evolutionary prehistory – as illustrated by discoveries of flute fragments in Neanderthal settlements dating from 43,000 years in the past. We are, in an essential way, an artistic species. For millions of years, we have communicated and learned through the arts. We have turned to the arts as a way of ritualizing and thereby mythologizing human experiences. Also, through the arts, we have explored our deepest humanity and our highest spiritual aspirations. A world without the arts would be a world without humanity.

While specific examples of artistic practice clearly reflect the cultural and economic conditions in which they are created, it is equally true that the arts have the capacity to adjust to changing circumstances; to speak to future generations under previously unimagined circumstances; to serve as a model of interactive, learner-directed pedagogy; to promote a deep and lasting development of social and emotional skills; to enhance learners' well-being; and to foster the kind of creative capacity needed by all those who will be coping with issues and opportunities that cannot yet be foreseen.

## *Note from the authors:*

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# Engaging contexts and citizenship skills: Steps towards an 'engagement paradigm'

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The authors propose that education is instrumental in developing citizenship skills, which will in turn foster meaningful community engagement and build democratic cultures for societies of the future.

Today, rapid changes characterize social and political contexts all around the world, bringing into question fundamental notions, such as citizenship and public engagement. There is an erosion of trust in institutions, leading to civic disengagement, individualism and social fragmentation. More broadly, people are detached from and dissatisfied with, public life. The concept of national citizenship is also changing, impacted by multiple processes related to globalization – i.e. growing access to information and knowledge through digital media; increasing migration and cross-border mobility; and urgent environmental issues related to climate change. Social relationships currently expand well beyond any national border while connections and interdependence intensify between local and global levels (UNESCO, 2018; Tawil, 2013).

At the same time, the space and time of citizenship and public engagement are being called into question due to the disruptive changes brought about by the exploding use of new technologies, which has created a proliferation of identities and virtual communities. New forms of association and participation thus emerge – although they are mainly "unorganized organizations" that have yet to generate proper collective acknowledgement and identification. These experiences allow people to 'take part' but offer little in the way of 'being part of' a collective. This is crucial as 'being part of' is indeed the fundamental goal of citizenship. In this context, citizenship skills are a pressing necessity that needs to be strengthened.

## A new engagement paradigm

Citizenship skills allow citizens to actively and critically take part in society while feeling like they are an integral part of it. Social bonds become increasingly important in a context marked by growing fragmentation, loneliness and uncertainty. Human and existential sustainability should thus become priorities on equal footing with environmental and social sustainability. Empowering factors and strategies should be sought, studies and experimented on in this domain. Essentially, we need citizens to engage in shaping society.

What do we mean by 'engagement'? Answering this question is a challenge in a fast-changing social world – a challenge which must be addressed through education. Education is the key to adopting and promoting an engagement paradigm capable of realizing social inclusion and community building. How can democratic participation be favoured, and what goals will drive it? Again, we turn to education to develop citizenship skills in formal and non-formal contexts as not only a necessary precondition, but also necessary to the realization of the paradigm. This emphasis on education, learning and training – combined with analysis of the contemporary globalized and techno-connected world – points to the idea of new 'engaging contexts' with structures and boundaries that are very different from those found in traditional learning contexts (e.g. the class, course, task).

How can the new engaging contexts be conceived and generated? Some reflection is needed on this point. Engagement is generally defined through a set of actions that attest that an individual is indeed taking part in a community. Stepping inside a school, sitting on a bench and executing a task allows a student to take part in a school community. Signing up to a social network, uploading files and writing comments allows an individual to take part in a digital community. While this notion of engagement appears simple and clear, it runs the risk of conveying an atomized, utilitarian and partial view of it as the mere sum of various actions an individual performs while community is correspondingly defined as the number of people acting in it. Moreover, the above cited yet narrow vision of engagement is insensitive to the goals that inform engagement itself. A different view of engagement is therefore necessary – one which frames it as an 'enabling condition' rather than a mere set of actions and processes (SDSN, 2016).

## Expanding the definition of 'engagement'

'Engagement' in the context of building citizenship skills is better defined as a 'feeling of belonging,' a condition that enables mutual recognition, responsibility and freedom. As a constitutive dimension of community, engagement leaves room for individuals to experiment with their capacity to improve their own lives along with the lives of others. Conversely, community cannot exist without engagement. Hence, engagement in this sense constitutes a culture, imbuing actions and processes; behaviours and social rules; contexts; environments where communities take shape, and the very goals of learning. This new engagement paradigm emphasizes certain capabilities, including dialogue; tolerance (i.e., living with others who think differently from me); listening, turn taking; the ability to win, lose, forgive, respect others and the self; accepting other people's motives, inclinations, goals and feelings; knowing how to share goals; and mastering decision making as well as taking on the responsibility for the ensuing collective effects of said decisions.

Within these preconditions, individuals can learn to live together with others. In turn, such preconditions turn into engagement and citizenship skills. A new engagement paradigm allows for a new look at the Delors' pillars of education: "learning to be" and "learning to live together" (Delors et al., 1996). These two pillars are often recognized as founding the very concepts of global citizenship education and sustainable development education. In fact, feeling that we are part of the human community and inhabiting the same planet enables us to pay greater attention to and take more ownership of global problems and challenges. Interestingly, engagement and citizenship skills developed in real life can be transferred and extended to digital communities. The latter – when conceived and lived within a new engagement paradigm – can undergo processes of democratization based on the sense of belonging of their members. Pioneering open source projects, such as Wikipedia, founded on community-based service improvement, while not immune from the persistent issue of free-riders show how engagement can produce a sense of shared responsibility for the common good.

## Development of a democratic culture

To ingrain this engagement paradigm and make it systemic, greater attention must be paid to contexts rather than to specific actions. The creation of these engagement contexts, where the 'us' perspective – instead of the 'me' one – is treated as a building block, fosters a democratic culture and the development of different engagement practices and actions. In the field of education, some directions to take a participatory approach and attitude can be related to the work done on latent pedagogies and implicit curricula (including parameters, such as spaces, time, routine and materials). Only with an attention to these aspects can the entire school life be oriented towards participatory democracy, responsibility and continuous sharing. This educational shift could precipitate a move from rules to objectives; from learning processes to relationships; and from organizational choices to building relationships with families.

The emerging Italian network of Didactics for Learning Spaces or DADA (Didattica per Ambienti di Apprendimento) Schools serves as a concrete example of an organic strategy to build engaging contexts. DADA Schools experiment with alternative models of organization for school spaces and time with the goal of fostering the active learning of students as the 'makers' of their knowledge. In terms of educational governance, opening up the school as a physical space to the wider community and citizenship during extracurricular time promotes a positive permeability between the school and the community. This expedient is in line with the principle of collective engagement in education based on the paradigm of "education as a common good" (UNESCO, 2015; Locatelli, 2018). Among the many experimental examples in Italy, the Open Schools Project, originally promoted by the city of Milan, aims at capitalizing on the willingness of schools to serve as a focal point for the citizens of a community. Indeed, a city could be a dispersive environment, yet each school can and should become a centre of aggregation for the whole neighbourhood – essentially, a structure at the service of citizenship. This is what we mean when we describe schools as 'cultural garrisons.'

Whatever the different approaches and tools used, positive examples in the adult population should be the distinctive mark of any community linked to formal and non-formal education. A learning environment is ultimately cultivated by people and nothing is more capable

of positively shaping future generations than the world created by women and men capable of relationships, dialogue and collaborative behaviour with a healthy respect for differences. This approach can help young people learn beyond just prescribed subjects as the example of the adults around them and the quality of their exchanges breeds hope for peace and progress. From the perspectives of educational trainers as well as of public authorities and educational organizations, arenas for dialogue, co-design and the sharing of experiences among adults should be promoted to enable the problematization of practices and behaviours as well as the quest for coherence among different points of view, cultures and values. This plural, collaborative and dialogical environment is necessary for younger generations to flourish, one which holds an invitation to build the communities of tomorrow.

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# Learning to become citizens of the world

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The author analyses the current state of education then explains how some fundamental elements should be modified to adapt to the learning needs of the future.

For a long time now, the main purpose of education has been to serve scientific and technological development. However, not only should not be reduced merely to the transmission of scientific knowledge,[1] as it is no longer the only area in which learning is required – especially following the digital revolution, which has made a huge amount of knowledge available to learners. To reflect on the future of education in the world, it is necessary to first recall, very briefly, some of the elements on which it was based.

## The basis of education: elements of the current system

The modern school is the daughter of the Age of Enlightenment. It demands the *freedom* to think, and to believe, by oneself and it widens the circle of learners. It also considers all people 'subjects' (and not as means) who will learn to be responsible. This idea is the quintessence of the modern philosophy of education, clearly stemming from Rousseau and Kant. It still holds true and must be maintained in the future iterations of education.

The second aspect of the modern school is its *institutionalization*. I do not refer here to institutionalisation as a process of depersonalisation and decontextualization of knowledge –i.e. the educational process of transforming contextualized knowledge into identified knowledge, recognized as such by the institution – but rather to the ever-ambiguous relationship between education, the state and society. What remains of the freedom inherited from the Enlightenment when an administered and state-controlled vision is imposed on education? This state control has taken several forms, the last of which is the professionalisation of education, which is increasingly at the service of capital. It is obviously difficult to dissociate social selection and instruction when the institutionalised education system is built into a structure of 'guidance' and 'care' of children from birth to the world of work. It is not our intention to undermine school. Children must always be taken care of by school and much progress has been made here by many countries of the world. Also, all

1 Several teaching schools inspired by Jean-Jacques Rousseau's *Emile* or treatise on education stresses that the teacher's role is not to transmit knowledge mechanically as if knowledge were poured into empty receptacles (the learners), but to help pupils to assimilate knowledge and build it themselves (Rousseau, 1969)

children must be able to attend school. The challenge is to provide children the opportunity to be themselves and at the same time be citizens in the world.

The third aspect is the *traditionalization* of school, which has always been a thorny issue. Would the future of education require us to free ourselves from the weight of tradition? In any event, school must not fall through the cracks of the culture of the past. This will enable learners to thrive, assert their freedom and create. At the same time, it is the responsibility of school to preserve the cultural identity of learners and allow them to develop their being in the world. Hannah Arendt, in her book *Between Past and Future*, stated that education must be conservative as conservation is the essence of educational activity (Arendt, 1961a). This does not imply a recourse to 'traditional methods.' Arendt denounces, without ambiguity, the desire to turn back the clock to return to the same situation from which the crisis emerged. She simply seeks to give education the role of innovation in the gap between the past and the future. School, in its current version (post-modern) generally sacrifices the collective to highlight the unique and defend the singular individuality of the individual, in the name of personal freedoms.

Lastly, we can add to these principles that have governed modern education so far, the principle of the sometimes-excessive *rationalization* of thought to the detriment of affect. In many countries of the world, everything that is human (human sciences, literature, the arts, etc.) is downplayed and sometimes suppressed to render students and young people more employable. The result is catastrophic. It may well produce competent technicians, although perhaps ones who do not think and who can sink into dogmatism, fanaticism and intolerance. This rationalization is contrary to the principles of freedom, justice and equality that modernity has sought to infuse into education. The learner is currently treated as something that can be shaped according to market requirements to fit into what economists call "human resources."

## The rationale for change

How, then, can we conceive of the future of education while preserving the positive elements of these principles? It seems that the direction we could take would be to educate for citizenship in the world. This formula directs thinking towards active reasonableness that would encompass all the activities of reason and practical ethics that must accompany science and technology. It also calls for otherness and adopting interculturality as self-concern, a fundamental condition for living together in dignity and mutual understanding.

I believe, one of the tasks of the philosophy of education today is to question the events of the present – not to observe and relate the events of everyday life, but to decide on the importance of what happens, determine the conditions of opportunity and locate the reflexive means that we have to improve the part of the world in which we live. However, in my view, the events today lie across the multiple borders between the zones of rights and the zones of no rights, in a fragile state that will erode our sense of humanity and spark the widespread use of violence. This is not only an uneasiness that affects "hierarchically ordered societies", in the words of John Rawls, but also, and above all, democratic societies where the law seems to be rooted in the daily activities of the authorities (Rawls, 1993)). New technologies (computers, media and even artificial intelligence) have not solved these

problems. Their misuse may even deepen this uneasiness.

According to Arendt's analysis, where inequality and violence reign, our present has been achieved by overthrowing the hierarchy within the *vita activa* (active life) in which work, a "pre-political" phase relating to necessity, takes hold of the entire political sphere and dominates creation and action (Arendt, 1961b). Thus, our present is governed by an accountable rationality of economic exchanges, an instrumental rationality of techniques and a violent rationality of policies. The ideals of justice, equality, independence, the spiritual horizons of humanity and the projects of happiness and cohabitation are principles of democratic coexistence that have given way to the 'ideal' of consumption. Economic hyper-liberalism has narrowed the social imagination, common ideals, cultural representations (see Thuillier, 1995) and even political action. This accountable, instrumental and violent rationality produces identity-related reactions and national resistance, including the rise of nationalisms; revival of particularisms and 'regionalisms'; turmoil of fundamentalism; awakening of political religions; multiplication of racist, anti-Semitic and xenophobic aggression; emergence of strong internal and external policies; and so forth. It also produces a new face of imperialism. Alain Badiou showed how the self-centering of the new imperialism was carried out – i.e. the total filtering of what concerns the rest of the world by the very particular system of their interests (Badiou, 2004).

## Elements of the future of education

It is necessary to propose a range of ideas and principles for any future education that would take into account both the previously mentioned elements of humanity's past and the intricacies of its present. Humans are not an abstraction and cannot be reduced to their ideas. They are localised and contextualised. There is no point in seeking to universalise humans without taking into account their roots in their culture as human development certainly requires cultural development. It is also dependent, however, on scientific and technological developments that are unfortunately ill-distributed throughout the world. Thus, if we want to improve on the considerable progress of education, it is necessary, in our opinion, to reconsider the four previously named elements on which education was based and add others so that human beings can truly live in the world with dignity and in a situation of happiness and conviviality.

The principle of rationalization remains necessary, but personally I prefer to replace it with the principle of *reasonableness*,[2] which takes into account all the theoretical and practical (technological) achievements of rationalization but subjects them to ethical judgement. Reasonableness is, according to the philosopher Abu Nasr al-Fârâbî, the ability to deliberate

2 The philosopher al-Fârâbî, a discerning reader of Greek philosophy, expanded upon Aristotle's reasoned and communicative ethics (phronesis). in his *Treatise on Reason* or in its separate fragments, al-Fârâbî made a distinction between *'Aql* and *ta 'aqul* – reason and reasonable. *Al ta'aqul* is defined in a first sense as that which allows the public to consider a person as reasonable. In a second sense, *al-ta'aqul* perfectly reflects the Aristotelian notion of phronesis, that is, a virtue that is "reasoned, and capable of action with regard to things that are good or bad for man." Kant took up this idea of 'reasonable' and Rawls used it in his book *Political Liberalism* (1993).

well and to deduce things well, the best things, so that people can truly obtain great good and achieve a noble and virtuous end, whether it is happiness or something that people cannot live without in the acquisition of happiness. In education, osmosis would then form between the constituents of reason and the expressions of affect. Thus, the humanities (human sciences, literature, arts, etc.) would regain their dignity in the educational curriculum. In addition, through this link between reason and ethics, basic freedom would regain a practical meaning. Humans in the world would be able to defend their culture, the culture of others, and their social and ecological environment. It is practical ethics in balance with reason that allows the learner to be responsible.

The principle of *freedoms* is made possible by the sustained progress in putting the principle of freedom of thought into practice. It is very difficult to conceive of a future of education that does not take care of early learning in school on the culture of human rights and freedoms on the one hand and learning about the culture of democracy on the other.

The principle of *otherness* gives future education a human dimension. Indeed, unless the principle of freedom transforms into the principle of human rights and freedoms, freedom will quite simply become a utopia. It must be said that the utopia of freedom, progress and humanity set in motion by the Enlightenment has been regularly rectified militarily and ideologically by the forces of Western domination. The first results were perpetual massacres, with the imposition of racial, political and economic structures on the non-Western world. Modern slavery itself can be considered a real effect of coloniality. It is therefore possible to explain the uneasiness of cultures that are unable to dialogue through the will of hyper-capitalism to re-colonize, once again, the non-Western world, which is of economic or strategic interest, but through other means and formulas.

Through these two movements, the exclusion of the Other when they are inside the Western world (racism), the empowerment of their being and destiny when they remain at home (coloniality), hyper-capitalist globalization on the one hand and universalism as conceived and practiced by them on the other, reduces the relationship between cultures to total, sometimes bloody, domination. The principle of otherness gives the learner the opportunity to build through thought and praxis a new type of relationship with the Other. The values of openness, creation, futurities and difference must be rooted in the way we approach the Other. This makes the relationship between oneself and the Other inseparable and implies a real institutionalised organisation of the identification processes that assign to the two concepts of identity and difference their own functions in any form of universality.

The principle of *interculturality* allows the learner to participate in the construction of a universality of sharing. In reality, interculturality is the philosophy that makes it possible to respect the structural differences of cultures and their equality in terms of their intrinsic values, and to consider any culture as comprising a universal dimension as well as offering a common good to all humanity. Cultures do not engage in dialogue and it is unnecessary to identify a dialogical order between different cultures. Instead, there is an 'encounter' of cultures, which can take place by way of hospitality, but also by way of hostility and the desire for 'consumption' and destruction. Of course, lack of knowledge can be the cause of harm and conflict. Knowledge of other cultures can, to a great extent, transform any originally violent encounter into thoughtful hospitality. Any future progressive education

must be based on cross-comprehension, which can be expressed in several conceptual forms and which contributes to limiting violence in interhuman and intercultural relations.

Thus, future humans, who will be educated according to these principles, can become not only conscious and active citizens in their country, but also committed and responsible citizens of the world. A magnificent harmony will be created between the local and the universal while the cultural elements of their identities will form part of a humanist commitment to sharing. Citizens of the world are not citizens because they defend both their social and national belonging and their openness to the world. Education in the future would simply be tasked with teaching learners how to become citizens of the world.

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# Global understanding, education and sustainability

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The authors present a paradigm shift in education that will enable learners to understand the present and future world of global interconnectedness that transcends mere increases in communication. This includes a new geographical understanding of the world by acknowledging how events in one part of the world affect another; valuing the diversity of people as well as of knowledge, and viewing climate change as a global phenomenon and challenge. The authors propose an education that inculcates hybrid thinking on local challenges and their global impacts while instilling global citizenship values.

Over the last decades, the world's geography has changed dramatically. Long-established geographical worldviews of regions, countries and continents are losing their claimed social, cultural and economic unity. Rules of time and space no longer apply – it is now possible to a press a button in Alaska to take an action in Iran. Traditional thinking on countries and continents no longer defines geography. "Far away" is no longer a relevant idea as communications technology has collapsed distance as has increased physical mobility. We require a new way to think about geography and geographical education, a new geographical imagination rooted in global understanding.

## The need for a new perspective

By 2100, everyone should be familiar with our new world's largest population centers – all of them in Africa and Asia. We must comprehend issues and opportunities brought about by young populations in these places and older populations in Japan, Europe and the Americas. We must make certain that teachers and students understand why so many of the world's cities are threatened by rising waters and climate change; how and why extreme weather affects many regions of the world; as well as the increasing severity of water crises emerging in India and soon, California. Today's students will soon be adults. They must possess the necessary education to develop policy, vote, save lives and regain control of their futures. A fundamental global understanding will drive politics and policy as well as economics

and public health, education and prosperity. Today's approach to education causes these powerful forces to remain tangential to common knowledge and curriculum. These ideas need to be taught to students all over the world. They must learn to think about space and time, about the map of the world, as interconnected systems. Wind and sand from the Sahara Desert control the severity of storm activity in Florida and the Caribbean a dozen time zones away. The underlying logic and understanding of geography and globalization must shift if we are to surmount the challenges of the new era.

Our current approach remains rooted in 20th century thought. Globalization is still perceived as transferring jobs to regions where labour costs less or opening offices in Asian cities that might produce future business opportunities. This limited view, supported by present day education, is destructive in its naïveté. Today, more than a billion children are connected to information and increasingly, to one another via the internet. When there is a severe storm, a violent event or a football match, they are aware of it – regardless of whether it happens in Indonesia, Brazil or France. They tend to learn on their own as schools and teachers are poorly equipped to provide geography-based education for global understanding. Many adults find globalization disturbing and challenging. Meanwhile, children find globalization fascinating, fun and an inspiration to travel the world. Children find globalization deeply disturbing when governments separate family and friends, sometimes forever.

## Challenges of the present

Worldwide, current political responses to globalization invoke backward 'solution' strategies. Nationalists favour a return to "correct", "natural" society-space definitions of a "nation." Politicians control the narrative, so children are taught old-fashioned ideas, yet massive changes have taken hold. We live and work in a world whose population is moving and communicating in real time, without regard to international boundaries or old ideas of what constitutes a nation, a metropolitan area, a neighborhood or a family. Instead of backtracking, nations must address big questions. The use of English as an international language impacts local reading, writing, communication and cultural tradition. Governments must consider multi-lingual policies to simultaneously protect local cultures and participate in the global marketplace.

Old ideas of the 'national' as a spatially shaped entity based on the unity of natural and cultural dynamics have grown stale as they are tied to the 19th and 20th centuries and are difficult to defend in the 21st. Communications has upended transportation as the primary means for human interaction and connection. Porous boundaries are becoming the rule as people define their lives by digital transactions, regardless of their physical location.

Building a carbon-neutral, just, equitable, peaceful future that is sustainable calls for decisive action and reasonable perspective. Grappling with critical global issues, including climate change, biodiversity loss, unsustainable economic growth and social inequality requires a fresh take on geographical imagination. Knowledge of the world and the manifold ways our lives are embedded in global flows – natural, cultural, social and economic – is required to mobilize change for global sustainability. A fresh approach requires rethinking of what is taught, how it is taught, when it is taught and by whom. In short, we require a global shift in the way we think about global education.

## Understanding the global condition

Humanity's new role on the planet as a global "geophysical force" – referred to as the Anthropocene age – requires hybrid thinking. We commonly observe, think and conduct the business of learning at a local level, where none, some or occasional impacts may be seen in an environment that is seemingly not in the throes of transformation. One must look beyond the local level to perceive the fast-moving, large-scale shifts that affect billions of people who do not live nearby and who are largely invisible via current education and media. In short, we must shift from knowledge dissemination resulting from, for example, misadventures such as natural disasters and political problems, to the nature of daily life throughout the world. Our capacity, desire and willingness to assist others is greatly affected by our familiarity with them. If they are unfamiliar as they are today, there will be little motivation to think beyond one's own neighborhood and its relative safety or its particular security concerns.

Such change of focus sheds light on embedded human activities, and their social and cultural importance. Cultures, micro-cultures, belief systems and social structures remain both powerful and critically important, but sweeping globalization can do and has done tremendous harm to these structures. 21st Century thinking must respect and promote cultural literacy, counteract marginalization while maintaining meaningful progress. The tenderness of this issue is clearly witnessed in the addition of public health, sanitation and clean water in the many locations globally where these progressive developments have been unavailable. The education of girls is an equally powerful example. The world is not a global village made up of a glib and absurdly misleading summary of world affairs. Instead, the world is a collection of micro-neighborhoods, each with its particular geography, economy, acceptable and unacceptable behaviors. Now, even in far-off places, the world is also a connection of internet points of presence where local peoples can see and interact with others throughout the world. Artificial intelligence will provide the language translations and robotic equipment will build the physical bridges and infrastructure, but humans who are well-trained in global citizenship and local cultures must carry the load, often on-site.

## Education for global understanding

Translating global understanding into learning and both formal and informal education requires action on several levels. First, it requires an assessment of available means and systems of distribution. These should include adult and teacher education; community education; school-based education at all grade levels (including higher education); audio on the internet (e.g. podcasts); video on the internet (e.g. YouTube, Vimeo); games and apps; several news feeds for specific audiences (i.e. children of all ages, teenagers, LGBTQ, parents, seniors); and street campaigns, posters and other activities. Second, it requires the development of specific curriculums for each of these target audiences with appropriate orientation towards the development of basic knowledge for each as well as integrated knowledge to enrich understanding. Third, it requires the preparation, production and dissemination of materials throughout the world through a great many international, regional, national, local and school partners.

## Strengthening epistemic diversity

Traditional, formal education tends to be self-limiting in its range and depth. This is no longer the way that people learn. Instead, they learn through curiosity and exploration. With an entire world to explore, we must design systems to take advantage of the transformation and resist the temptation to determine what, specifically, others must know. Instead of a top-down dissemination from one to many, this new education constitutes knowledge construction by many to many. Again, this is a fresh, 21st century approach, no longer restrained by 20th century limitations. Diversity increases exponentially but we must, in parallel, develop and maintain a high standard of correct, accurate and timely information that is neither misleading nor positioned to uphold particular political or business philosophies. In our model, 21st century learning about the world truly belongs to the people of the world, who must participate not only in the learning but also in the teaching. Embracing perspectives from heterogeneous social and cultural locations will not only make solutions to global and local problems more robust, but also reduce knowledge-based inequalities and thus serve a central sustainable development goal. Consequently, education should systematically create opportunities to encounter, acknowledge and critically evaluate different forms of knowledge. Challenging accepted ideas and world views by including marginalized perspectives is another key element for a sustained global understanding.

## Storytelling and participatory culture

In a world of information overload, the framing and narrative structures of information have become enormously important. Storytelling is a popular means to connect ideas as facts and numbers do not speak for themselves. For complex phenomena, such as global climate change – where science can be complicated and the role of individual action can be difficult to assess – storytelling facilitates a deeper understanding and empowers learners to internalize science-based decisions.

Younger people are increasingly willing and able to raise their voices and mobilize collective action. The landscape of civic engagement has diversified and now offers a plethora of topics and formats. This is informal education in action. Schools may be unable or unwilling to harvest their learners' will to shape social change, but the internet provides an alternative means to share information and organize at a community, national or international level. These activities amplify the political power of groups that may otherwise be perceived as secondary or unimportant. Global understanding is thus not just a classroom activity.

## Looking towards the future

Global understanding empowers learners to identify the local roots and effects of global problems, and collectively develop solutions for sustainable futures. Challenging established geographical worldviews, however, requires spaces for unconventional thinking and a form of organization that cuts across many long-standing categories. The 21st century is nearly a quarter gone. It's time to equip the world's educators to teach themselves and their students about the world as is it today, and as it will be in the future.

# Social Design for Health: Ontological vulnerability, life course and planetary health

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While emphasizing the shared human condition, the authors draw on the concept of specific vulnerabilities to promote social cohesion. They identify links between global health issues and the deteriorating health of the planet, and propose changes in education systems to address these challenges whilst keeping in focus increased longevity and aging populations worldwide.

## Social Design for Health

The idea of Social Design for Health as a guiding concept focuses our attention on health as something that is produced socially. It explores ways in which we can design environments that are health producing and sustaining. Health attainment is closely tied to equitable citizenship, democracy, and social cohesion. However, attempts to improve these social and political values at the cost of people's health would not be sustainable in the long term. Narrowly focused interventions that attempt to change people's minds and force a change in behaviour are likely to enhance health inequalities and promote healthism. Envisioning and designing a better environment for children and young people that allows for a positive cycle of interactions to promote citizenship, democracy and social cohesion will also sustain health.

The three ideals around education, health and sustainability under the guiding concept of Social Design for Health are:

**1)** Ontological vulnerability

**2)** Life course approach: education and health in a rapidly ageing society

**3)** Planetary health: beyond global health

## Ontological vulnerability and the potential for transformational education

As living beings, we are vulnerable as a result of our embodied state. Yet, it is through our vulnerable bodies that we experience the world. Should we be so motivated we can attempt to reduce this vulnerability, but not eliminate it. Therefore, this vulnerability should be viewed as a positive aspect of the human condition. As Gibson (2014) clarifies, 'ontological vulnerability is an unavoidable receptivity, openness, and the ability to affect and be affected'. While social movements in the early 21st century are focused on the politics of difference, it is important to remind ourselves of the shared solidarity in the state of ontological vulnerability of human beings, non-human forms of life, and our planet.

To argue for a recognition of our shared ontological vulnerability is not to ignore or downplay difference or inequities. The degree to which we experience vulnerability is determined by 'salient social differences such as race, class, gender and sexuality, disability, nationality and so on' (Gibson, 2014). Gibson (2014) refers to 'situational vulnerabilities, which are 'the specific forms that vulnerability takes in the social world of which we have a differential experience because we are differently situated'. Understanding specific vulnerabilities within the context of ontological vulnerability may allow us to resolve the dilemma of difference that emerges in the discourse of inclusion.

Vulnerability is generally viewed negatively in today's world; a weakness to be overcome. In a desire to protect children, we have ushered in a generation with an unhealthy tendency towards sedentary behavior. A desire to reduce the risk of harm from injury has resulted in far fewer children walking to school; or playing outside after school. Schools in certain locations have moved from being relatively open settings within communities to educational fortresses with advanced security systems and even armed guards (or teachers) deployed to keep everyone out apart from pupils and staff.

The child and adolescent health issues that we face globally today, such as obesity, asthma and food allergies, as well as mental health issues such as depression, anxiety and anorexia are rooted to some extent in how we organize childhood and adolescence, including how we organize schooling. A heightened sense of vulnerability is being produced by practices aimed at reducing it (Boubil, 2018). How would childhood, adolescence and schooling change if we embraced rather than tried to overcome our ontological vulnerability? Would it be a point of departure to understand what we share with those around us?

An understanding of our ontological and situational vulnerabilities can be used in education to mobilize young people to address precipitous planetary ecological decline and climate change. This understanding can provide a positive platform for addressing issues of sustainable development, including those around health, education and equity. This will enable us to better understand the kind of schools, communities and societies we need to create the assets (material, social, spiritual, ecological) needed to sustain and support not only vulnerable human beings, but also non-human living beings and even non-living entities. This ties in directly to an understanding of the vulnerability of the planet and planetary health.

## Life Course Approach: education and health in a rapidly ageing society

The final area that we must focus our activities on relates to thinking of the elderly as resources for the production of social cohesion and sociability. This is essential in a time where many countries have ageing population with societies that have greater longevity.

Age not only brings greater physical frailty, but more socially vulnerability (Andrew et al., 2008). Sociability not only implies the presence of people to people relationships, but also includes non-human connections and social support systems. While all human beings are vulnerable to ill health and, eventually, death, the specific vulnerabilities of the elderly are increasingly tied up in institutions and technologies of welfare.

Social vulnerability is mutually related to physical and mental frailty. While aging physiologically cannot be prevented, we can design social environments where physical vulnerability is experienced differently. However, with rapid "hyper-ageing" and the depopulation of rural communities, formal support systems will not be sufficient. There is a need to construct new spaces for community gathering, built upon the wisdom of the elderly. This wisdom can be mobilised as a resource for the socialization and education of the younger generation. By turning to social design, health care professionals hope to empower the elderly through the sharing of life experiences and knowledge.

## Planetary health: beyond global health

Planetary health, defined as 'an attitude towards life and a philosophy for living' (Horton et al., 2014), has become a key theme in understanding the challenges that human-induced changes to the environment, place on future public health from chronic respiratory diseases to antimicrobial resistance. While considerable inequalities remain, it is fair to say that most global health indicators have improved greatly over the past fifty years. During the same period, however, the health of the planet has sharply declined. Air pollution, shrinking biodiversity and climate change are widely recognized health hazards. The global environment shows signs of vulnerability that we have associated, for long, with suffering human bodies: stress, trauma and toxicity are only few of the most obvious symptoms (Lock, 2017).

What happens if health promotion is reframed as a planetary issue? The guiding concept of 'social design for health' encourages new forms of grassroots engagement on ecologically conscious health promotion to address future sustainability challenges. Changing food systems, or air and water quality around the world signal the planetary scale and character of social justice issues. Activities may include the cultivation of herbal plants in urban gardens, personalized nutritional support for elderly people, and veterinary public health programs. Building on previous and existing approaches such as One Health, the aim here is both to create new spaces for local action and to better understand the shifting landscapes and politics of health promotion from public to planetary scale.

Importantly, the future of health education lies in posthuman critical intervention. Planetary health education has been expanding across university programs and curriculums around the world. To address the dangers of human exceptionalism and open up the question of

ontological vulnerability across living beings, we will need to develop novel theoretical and methodological toolkits and re-embrace popular stories as essential elements of deep and slow learning about health, the environment and the planet. Borrowing the Japanese notion of *kyōsei* (coexistence, symbiosis, togetherness) here, is an attempt to open up new spaces of health promotion in which people, plants and animals come to cultivate and be cultivated by one another. From this perspective, schools are one among many other places to engage in education for sustainability and the social design of planetary health.

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# 3. Rethinking learning systems

## Strengthened public education and integrated learning networks

# Re-imagining universities to democratise knowledge

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This think piece calls for a higher education institutions reform to respond to the demands of a complex, diversified and technology intensive future. The process of restructuring higher education requires the democratization of knowledge and a clear commitment by institutions to an agenda that primarily values equality and sustainability.

The World Conferences on Higher Education, held in 1998 and 2009, as well as their regional preparatory conferences, noted the significantly increased enrolment in higher education in recent decades. Along with the increased enrolment, the institutional supply has diversified, becoming ever more complex as it incorporates new institutional formats and pedagogical models. This process, together with technological transformation and the increased value placed on knowledge, has led to the consideration of higher education as one of the central factors in strengthening inclusion, social progress and human development.

Currently, the complex circumstances that surround higher education have sparked controversy as to its social function and role in global development. Access to higher education is considered a human right (United Nations, 1948) so it must be safeguarded and guaranteed by states as a public and strategic good (UNESCO, 2009). However, the advance of globalization and the implementation of economic, monetary, labour and social policies based on the Washington Consensus have exacerbated social inequalities and injustices. Although there is now greater access for social groups that have never before participated in higher education, millions of people, particularly the most vulnerable (i.e. rural populations, indigenous peoples and people of African descent), are still excluded.

At the same time, the commercialization of higher education encourages a strong tendency towards privatization, facilitating its marketability as a freely available service. In practical terms, this means considering higher education a marketable service like any other commodity. Thus, given that the (uneven) distribution of educational goods depends on the (uneven) distribution of resources with which to 'buy' them, the establishment of education as a citizen's right is not guaranteed and, through the argument of merit-based distribution, inequalities are increased.

## Democratizing knowledge to overcome inequities

Democratizing government statements and stances have proved ineffective at containing the inequitable development of higher education. Such inequalities exist between and within countries, and can be seen in the differentiated distribution of access to, stability of, completion of and quality of services available to different regions, genders and/or social and ethnic groups. The resulting heterogeneity is reflected in the high levels of educational exclusion; the high fragmentation of enrolment; the fragmentation and segmentation of educational services; and the significant disconnect between the university system and social and productive needs (which affects the relevance of the education provided). These inequities are set against a backdrop of severe economic and financial constraints. The situation calls for a reform in higher education – a shift that situates knowledge at the political and economic centre stage to ultimately serve the development of our societies.

Current trends indicate that knowledge and knowledge industries are central to a new stage in capitalism – what Blondeau et al. (2004) and Fumagalli (2010) call "cognitive capitalism" or "informational capitalism". Thus, despite optimism regarding the benefits of the knowledge economy and the possibilities it affords societal development, in reality disparities are exacerbated. While science and technology continue to progress, poverty and exclusion are actually on the rise as are territorial inequalities. In essence, knowledge-based societies and economies can also promote unfair and inequitable treatment for some. Perhaps one of the main obstacles to just social development is normalizing and rendering this knowledge neutral and universal. To achieve this knowledge democracy, we need wider recognition that our societies require knowledge comprising multiple kinds of learning and perspectives, including those of marginalized and indigenous peoples; knowledge derived from the co-creation of original and transdisciplinary knowledge; and from innovative teaching, research and outreach processes. In this context, it is necessary to redefine the role played by higher-education institutions in the production and distribution of socially relevant knowledge.

## Rethinking higher education to serve equality and sustainability

Higher-education institutions can contribute to the development of sustainable futures by establishing close ties with the societies in which they exist and by generating their own capacity for scientific and technological production. This premise must apply to all three of the fundamental purposes of a university – namely, teaching, research and outreach – so that higher education can provide solutions to serious problems, making the university a veritable locus of democratization, innovation and social integration. To create this dynamic, we must first ask some probing questions.

What kind of knowledge is developed or promoted? How are research agendas decided on? How are basic research, applied research and technology development linked? Who benefits from this knowledge development? Who defines what knowledge should be promoted? How should this knowledge be promoted? How is funding policy for science and technology developed? Does the university serve the purpose of ensuring the right to higher education for all, equal opportunity and the fundamental equality of all human beings? Does the university contribute to sustainable development? These questions are raised because higher-education institutions have a fundamental responsibility to shape the future and incorporate

the sustainable development paradigm into their model by creating knowledge that meets current needs yet does not compromise the coming generation's outlook for the future.

To achieve this balance, institutions must be able to create research and development agendas based on the links between a university and its territory. Currently, most such agendas address transnational issues. Thus, the challenge for a university becomes how to collaboratively produce learning, include various kinds of knowledge and to develop its own capacity for reflection so that it can participate in the identification and anticipation of problems and make proposals for creative and viable solutions to the serious problems currently affecting our societies. Just as changes in knowledge production are urgently needed, teaching strategies must also be rethought. The learning required by contemporary societies demands an updating of teaching methods which completely overhauls higher education as it stands. Solidarity, creativity and innovation must comprise the core of the university curriculum. Defining a pedagogy for the twenty-first century is as crucial as identifying the new skills that today's students need to pursue their careers in tomorrow's world. We must develop a pedagogy based on research and cooperation that considers the community as both the origin and the destination of the learning acquired. The reinvention of higher education must, moreover, support the creation of skills that enable students to master new technologies to ensure their access to an increasing amount of information. There is also an urgent need to explore learning possibilities beyond university walls. Thus, alongside revamping research and teaching, reviewing the purpose of outreach or connection with the surrounding area is strategically advisable.

## The twenty-first century university

The university we need in the twenty-first century must redefine its connection to its environment by continuously striving for substantial and creative integration. The purpose of outreach is a two-way communication space that nurtures both the society and the university. Outreach plays a strategic role in fostering creativity, innovation and the development of knowledge that is in keeping with the exigencies of society. This rethinking of the university-society relationship implies new forms of government with increased participation. It also implies collaboration with the community to design participatory programmes and plans that enable society to take ownership of knowledge and universities to use this knowledge to serve as a guide for institutional research and teaching plans. Within the framework of the third Regional Conference on Higher Education, which took place in 2018 in Córdoba, Argentina, proposals were put forth to guide the transition from the university we have to the university we need (Álvarez and Pérez Centeno, 2015; Fernández Lamarra, 2017; Fernández Lamarra and García, 2018; Fernández Lamarra and Pérez Centeno, 2017). The main proposals included the following actions, which are of central and strategic importance to creating sustainable futures to ensure the citizen's right to higher education:

- Update the society-university partnership, consolidating their bond to contribute to the design and development of new political, social, economic-productive and educational guidelines
- Promote the innovative aspect of the educational and research processes, institutions and system developed

- Plan for the long term; formulate future public policies and guidelines for higher education in general and for institutional development plans in particular
- Create inter-institutional academic networks which strengthen the South-South axis to help resolve the region's problems

These proposals must be considered not only as a means to address current or immediate challenges, but also as a means of addressing issues beyond the next 15 or 20 years as they serve to contextualize and guide contemporary decisions. This is particularly so in light of the impact education continues to have on future social development. It is not possible to conceive of sustainable futures in societies that are fragmented and unstructured. Overcoming poverty and exclusion is a prerequisite to shaping such a future. Since these problems are much more complex and paradoxical than in the past, the situation demands an urgent and profound transformation of universities and of higher education as a whole in order for said problems to be adequately addressed. It requires a genuine commitment to the future and entails a responsibility based on an "ethics of the future" (Innerarity, 2009), which links the responsibility for our present actions to the circumstances for future generations, regarding the future as an inevitable result of our actions in the present.

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# Shadow education: Scale, drivers and future directions in the global spread of private supplementary tutoring

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The author draws attention to the growing trend of private tutoring external to formal education systems (i.e. 'shadow education') that is impacting traditional education in myriad ways. He advises that policy-makers and education stakeholders determine the scope of this supplementary intervention and understand its impact to better shape the inevitable overlaps of these two domains.

Private supplementary tutoring is commonly called 'shadow education' because much of it mimics the mainstream. As the mainstream grows, so does the shadow and as the curriculum changes in the mainstream, so does it change in the shadow (see e.g. Bray, 1999; 2009). UNESCO's (2015, p. 72) *Rethinking Education* report recognized that "In re-visioning education in a new global context, we need to reconsider not only the purposes of education, but also how learning is *organized*." The report added that:

**In light** of the diversification of partnerships and the blurring of boundaries between public and private, we need to rethink the principles that guide education governance and, in particular, the *normative* principle of education as a public good and how this should be understood in the changing context of society, state and market.

The global expansion of shadow education, which is set to develop further, is part of this blurring of boundaries. It has far-reaching implications for the coming decades.

## Some indicators of scale

Shadow education is a major phenomenon in parts of East Asia. In the Republic of Korea, for example, 82.5% of elementary school pupils were estimated to have received private tutoring in 2018 (KOSIS, 2019). In Japan, a 2017 survey found that 33.7% of elementary students, 51.9% of lower secondary students and 29.3% of upper secondary students attended tutorial enterprises called *juku* (Kimura, 2019, p. 1). In China, 48.3% of sampled students in a 2017 nationwide survey received some form of private supplementary tutoring (Liu, 2018, p. 144).

The phenomenon is also prevalent in lower-income regions of the world despite contrasting educational settings. In India, for example, a 2018 survey of West Bengal rural students in Grades 1-5 found that 69.9% received private supplementary tutoring, and the figure for Grades 6-8 was 77.4% (Pratham, 2019, p. 301). Proportions have also long been high in such countries as Egypt (Ille and Peacey, 2019) and Cambodia (Bray et al., 2018).

Turning to other regions, a 2018 survey of students aged 11-16 years in England and Wales indicated that 41% of London residents and 27% of residents in the rest of the country had received private or home tutoring (Sutton Trust, 2018). Shadow education has become widespread elsewhere in Europe (European Commission, 2017, pp. 41-42), in Africa (see e.g. Napporn and Baba-Moussa, 2013), and in North and South America (Bray, 2017; Park et al., 2016).

In summary, shadow education has become a global phenomenon – albeit with variations. For many families, it is a normal activity that makes up part of daily life alongside schooling. However, shadow education is not neutral – it has an impact on the education system itself. Teachers commonly assume that many or even most of their students will receive supplementary help, and may therefore devote less effort to duties in school than they might otherwise. They also have to cater to greater diversity in classrooms when students receive different types of supplementary support outside of the formal system. Further, some government teachers are direct providers of private shadow education. For these and other reasons, boundaries between public and private provision have become blurred in an *ad hoc* manner.

## The drivers of shadow education

When considering this growing trend, one contextual factor to consider is the growing acceptability that education is a marketable service offered by the private sector alongside state provision, and in many cases serves as an alternative to government provision in both formal schooling and shadow education. Thus, the educational landscape in the contemporary era is very different from that in the second half of the 20th century (Locatelli, 2018). The 1948 Universal Declaration of Human Rights stressed the role of the state in ensuring education provision, and declared not only that education was a human right but also that "Education shall be free, at least in the elementary and fundamental stages " (United Nations, 1948, Article 26.1). That principle underlay much UNESCO advocacy and government action in the following decades. It now is mixed with neoliberal ideology that stresses the role of the market in providing choice and perhaps improving efficiency.

A second contextual factor is the strengthened intensity of competition, which is itself partly driven by globalization. Families and employees no longer compete just with other families and employees in their immediate neighborhoods or even in their own countries. Rather, they compete with counterparts across the globe in an environment that can move capital and jobs at the click of a computer mouse.

Further, a combination of the above factors has created another contextual factor that is inextricably linked to the UNESCO's Education for All (EFA) movement. First, the expansion of education placed greater pressure on governments, then achievement of universal

primary education led to demands for universal lower secondary education, which then expanded to upper secondary and higher education. Unit costs rose at each level, and government budgets felt the increasing strains. Second, expansion of education placed opportunities within reach of families for whom it would previously have not been possible. Essentially, social classes that in the past would have felt that higher education was reserved for other social classes now viewed it as within their reach. This pair of factors fueled shadow education as limits on government resources constrained the quality of education, inciting wealthier families to supplement it from their own pockets. Importantly, families competing for access to prestigious higher education institutions – or indeed secondary and primary ones – were rarely successful if not supplementing educational efforts with their own resources.

A further driver in many countries was perception by teachers that their salaries were inadequate. In many countries of the former Soviet Union, economies collapsed during the 1990s and teachers having to supplement their government salaries felt that private tutoring was an obvious way to do so. Families understood this, and as a result shadow education entered the culture to an extent not previously seen. Private tutoring became equally a norm in low-income countries of South Asia and elsewhere else that teachers felt a need to supplement their incomes. Some governments to varying degrees of success prohibited serving teachers from providing tutoring on the side – mainly on the grounds of conflict of interest and potential corruption. Some governments raised teachers' salaries to ensure that they would not need to undertake private tutoring to supplement their incomes. However, these measures did not quench the shadow education sector. Competition remained, and the families with resources that could no longer access the supplementary services of regular teachers turned to companies and self-employed tutors.

These explanations underline some of the forces that maintain social inequalities. Governments may announce that they wish to reduce social inequalities and may even mean to do so in good faith. In these circumstances, their policies to achieve the goal receive applause from lower-class families that naturally want the same opportunities as others. However, middle- and upper-class families are not generally interested in equality. On the contrary, they are typically interested in maintaining differences in the competitive environment that favor their own advancement. Upper-class families have their own mechanisms to do that which may not rely on the education sector, but middle-class families pay much attention to education, and in particular view shadow education as an instrument to help them get and stay ahead (Bray, 2017; Zhang and Bray, 2018).

## Where are trends leading?

Some commentators have assumed that if weak education systems can be strengthened, then shadow education will diminish. Comparative analysis shows that this is not the case. Japan, Hong Kong and Mainland China, for example, have strong education systems, yet ongoing shadow education still thrives alongside them (Zhang and Yamato, 2018). So long as competitive forces remain – and there is every reason to assume that they will – so will shadow education. The years ahead will bring more rather than less shadow education as families in the increasingly privatized global environment see it as a way to get ahead and/or stay ahead, and as entrepreneurs see it as a lucrative business opportunity.

However, just as mainstream schooling varies widely within and across countries, so does shadow education. Much provision closely mimics the syllabuses and textbooks found in mainstream schooling while other components are complementary, depending in part on whether the purpose is remediation or enrichment. Ambitious families and 'tiger mums' adjust their strategies to whatever is seen to work for particular age groups in particular contexts and at particular times (see e.g. Liu and Bray, 2019). For some families and age groups, the emphasis is placed on sports, music and travel alongside academic studies, while within the academic realm, focus may be on the extension of the school curriculum to new domains accompanied by study skills, etc. The delivery of learning support may remain one-to-one, in small groups or even in large lectures taught by 'star' tutors. In addition, technology is increasingly harnessed for teaching and learning over the internet, reaching across national boundaries in innovative ways.

Thus, to return to UNESCO's (2015) *Rethinking Education* report, indeed it is necessary to reconsider not only the purposes of education but also how learning is organized. Shadow education has come to stay and will only expand. Restructuring education demands an understanding of not only what happens beyond school walls but also what happens within them and how the two relate. As the *Rethinking Education* report also noted, this requires reconsideration of the normative principle of education as a public good and how it should be understood in the changing context of society, state and market. Certainly, it is still possible for state schooling to be free of charge as envisaged in the 1948 United Nations Universal Declaration of Human Rights. However, families increasingly feel – even in countries with strong education systems – that state schooling by itself is inadequate and therefore feel a need to supplement that schooling with shadow education. Policy-makers need to recognize this new reality. To get a better handle of the situation, a good place to start is with improved documentation of the scale and nature of shadow education and then proceed to dialogue with multiple actors (families, schools, teachers, students and others) on ways to handle the complexities of symbiosis and blurred boundaries.

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# Internationalization in public education offers hope for future citizenship

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This piece discusses ways that the internationalization of public schools can foster inclusive belonging and social cohesion in the face of ever increasing cultural and linguistic diversity. Often criticized as fostering elitism by reproducing existing social and educational inequalities, the hope is to harness the positive effects of internationalization to reverse these inequalities instead.

Public schooling around the world has experienced dramatic transformations in recent decades, largely attributed to the varying effects of global developments, ideas and ideologies, including shifting labor markets; the growing influence of new information and communications technologies; and political movements since the 1980s that have emphasized education as a private and economic good. At the same time, the ever more culturally and linguistically diverse populations linked with cross-border migration, as well as growing social and economic inequalities raise anxieties about cultural/ethnic and socio-economic divisions within societies (Appadurai, 2006; Engel et al., 2014). Implicated in these complex dynamics, public education systems are tasked with building national unity and inspiring civic values and social cohesion among increasingly diverse societies. They are simultaneously responsible for equipping students with the 21st century skills required to function as a citizen of the world, including cultivating the awareness and skills to tackle global challenges and build bridges across cultural divides, while also proactively challenging the hegemonic hierarchies of power – North-South, local-global and others.

These dynamics raise critical questions about the future of public education, particularly its role in fostering a future of citizenship, democracy and social cohesion. How has the expansion of educational access, increased cross-border migration patterns and the diversification of educational offerings driven by globalization re-shaped the commitment of public education toward the common public good? What is the role of national education systems in building a globally minded and socially inclusive citizenry? To what extent is

global citizenship education underscored as a means for national economic competitiveness, diminishing the advancement of social inclusion and social justice? How might the growing cultural and linguistic diversity within public school settings be leveraged to foster inclusive belonging and social cohesion?

## Advancing global citizenry: Can internationalization hold the key?

Some of our respective work has examined these questions and the extent to which internationalization – referring to the interaction and inclusion of global, international, multilingual, inter- and multi-cultural dimensions into education (Knight, 2004; Yemini, 2015) – is activated as a mechanism for mitigating and harnessing the powerful effects of globalization in public schooling around the world. Internationalization, much more commonly discussed in higher education, has recently been called upon and advocated widely in compulsory education by many key players – from local stakeholders to international organizations – to cultivate and advance globally competent citizens (Auld and Morris, 2019; Engel and Siczek, 2017; Yemini, 2014a).

On the one hand, the burgeoning body of research related to internationalized schooling warns us of the dangers. For example, shifting labor markets have encouraged a growth in cross-border movement of highly mobile populations, giving rise to a global middle class, which has increased demands for elite (and sometimes exclusive) internationalized schooling (Maxwell and Yemini, 2019; Weenink, 2008). This increased supply and demand for internationalized public schooling has been said to merely reproduce existing social and educational inequalities, acting as a vehicle to enhance elitism at a global scale (Maxwell et al., 2018; Maxwell and Yemini, 2019; Kenway et al., 2017). Internationalization's amplification of existing gaps in economic and educational opportunities resembles similar patterns with what Bray (2007) has found with shadow education. Moreover, as public education systems are actively compelled by larger forces of privatization, commercialization, commodification and marketization – partly chaperoned by international organizations sustaining international examinations regimes – the neoliberal, financially driven foci of internationalization is critiqued for doing little more than intensifying inequality within and among education systems.

Yet, research also suggests a divergent perspective on internationalization. It has the potential to help foster agency at the grassroots level; bring common understanding and mutual learning in diverse communities; encourage deeper forms of global social consciousness; and reduce inequality through mutual engagement with "the other" (Engel et al., 2019). For instance, in many systems (e.g. the UK, Israel, Germany), public schools serving populations of students from lower socio-economic backgrounds may tend to accommodate higher proportions of migrant students from diverse ethnic and religious backgrounds than schools that serve students of higher socio-economic backgrounds (Yemini, 2014b). Thus, at schools hosting pupils from lower socio-economic backgrounds, students encounter "the other" more often than in more privileged settings. This scenario offers a powerful example of how internationalization at a grassroots level is advanced spontaneously in less privileged settings and might be leveraged in its more inclusive forms.

## Reversing inequalities requires agency and grassroots initiatives

In part, these inclusive forms of internationalization are the responses of sincere attempts of some schools, educational leaders, teachers and community members to directly address this new and increasingly globalized landscape, challenging the existing schemes of internationalization. For example, a school serving mainly refugee families in Israel developed pedagogies of care to address the needs and life circumstances of these children (Dvir et al., 2015). An international school in Amsterdam, which actively eschews the elitist notion of internationalization, fosters an inclusive internationalized environment for local and immigrant populations (Prikarts, 2019). The urban public education system in Washington, DC builds equitable access to global learning through comprehensive forms of internationalization, including fully funded global travel (Engel, 2019). From these examples, we argue that the future of education is highly dependent on fostering agency, grassroots and locally responsive initiatives, led by the schools for the benefit of their communities. In this context, internationalization may serve as a powerful tool to mediate such processes. We call for more research into the enactment of such grassroots forms of agency enacted through internationalization, as well as the resulting practices and related outcomes. This research will help us better understand and employ internationalization for the benefit of public schools to achieve their mission of developing human capital *and* upholding the common civic good.

Emphasizing the interconnectivity between people and the broader global community is now an expectation for public schools worldwide. Inclusive practices of internationalization – ones built through the agency of stakeholders committed to the promise of public education – hopefully may serve equality, social justice and the common public good.

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# Strengthening the imaginative capacity to restore the communal

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The authors call for education to serve as the platform for the collective imagination of a global community that works in solidarity towards the common good. Within this argument, the quest for justice remains the core determinant of meaningful social cohesion and reconciliation for past injustices and prejudices.

The nature of the social community is ever-changing as it is continuously constructed and adjusted. This is not unique to our time, as it has been the case for all community structures and is part of the perpetual challenge of ensuring cohesion and meaning in our communities. The question is: what attribute or property ensures meaningful affiliation within a community? A central premise of this essay is that justice is the main determinant of meaningful social cohesion. The word 'meaningful' here refers to the significance that social bonds hold for the individual – it is not a matter of coercion or domination, but of the individual's conscious affiliation and the universal presence of such an affiliation. Defining 'justice' can be trickier as it is hardly ever an undifferentiated or homogeneous entity – there are different limits to what every society tolerates and defines as unjust. Despite these limitations, we set our sights firmly on a future where illegitimate biases are corrected, and we partake of a collective desire to return to justice.

## The communal as an unconsummated, ever-developing aim of collective justice

Common destiny is the notion of a unifying force that is of utmost importance to the persistence of community ties (Weber, 2014; Delannoi, 1995). Common destiny not only encompasses our basic principles, the past and the memories that are deemed collective, but also our shared future and aspirations encapsulated in common values and goals (Villoro, 1997).

What is particular to our time – and is intensified and exacerbated in Latin America – are the abuses of, and affronts to, the social limits of tolerance in the face of social injustice. The uncertainty that undermines the viability of thinking in common – i.e. the collective shaping

of our common destiny – discourages the shared development of dignity for all. In this regard, we concur with the assessment on which this call for contributions is based: "these varied forms of insecurity [uncertainty] are exploited by some, thus straining social cohesion and weakening trust in established institutions" (UNESCO, 2019). The institutional issue must not be left out of the discussion on justice, as it is a marker of legitimate actions and processes. Institutions can be understood as structures founded on normative principles that order the interaction between individuals and groups. The extent to which these normative organizations actually reflect moral agreements and contribute to a just life is a matter that must be constantly re-examined. Otherwise, force of habit can end up aggravating power differentials in the institutions that regulate life in society.

Our hope is to shed some light on the question of how we can harness cultural diversity to enhance community bonds, foster peaceful coexistence and strengthen social cohesion (UNESCO, 2019). First, we posit that observance of the rules (a culture of lawfulness) constitutes a socially desirable path only where agreement justifying the institutional framework reflects shared principles for peaceful coexistence. When the institutional framework is morally meaningful, peace becomes a prospect with the potential to guide and justify respect for the law. Moreover, through the agreements underlying peaceful coexistence, the temporal framework for lawfulness is expanded and we can then envision a possible future beyond the enforcement of the law.

In response to the question of whether a "disruptive transformation in human societies and institutions" is necessary? (UNESCO, 2019). We believe that justice, as a vector of group cohesion, complements the temporal scope of institutional sanction and promotes a conscious and continuous commitment to a body of shared values. In addition, justice, as a unifying force, transcends the punitive legal response through collective frameworks of what is due as a condition for social reconciliation. Ultimately, when an institutional system is just – and by extension, peaceful – one can envision a continuum of responsibility and dignity, as a precondition to strengthen that system.

## Imagination to discern and activate alternatives to affirm collective dignity

The acknowledgement of injustices experienced by both, the individual and the group, is a prerequisite for the forging of viable dignity-affirming social alternatives. Injustices that have historically affected social groups ultimately solidify as dominant patterns of inequality. Distinguishing and understanding the historical conditions that support the structure of social inequalities, in specific contexts, are the keys to activating a process of transformation guided by the collective and effective imagining of plausible scenarios and alternatives.

Thus, in addition to examining the question of which attribute or property ensures meaningful community affiliation, we wish to highlight an ability that is central to the possibility of social transformation – essentially, in a context of injustice and indignity, a capacity through which it is possible to create a common alternative to make change viable. We feel that imagination comprises this ability. "It is possible to provide feasible alternatives to historically disadvantaged social environments through an expanded understanding

of both the ways in which this indignity is reproduced and – especially – the alternative process which explains the viability of the shift towards socially desirable situations. In other words, through imagination as a catalyst for the latent redefinition of the social bond" (Garcia González and Vargas Escobar, 2019).

The viability of the imaginative alternative, in settings where injustice and indignity have been historically reproduced, is based on an already irrefutable analytical argument. More importantly, however, the practical relevance and real value of this alternative are unquestionable. Castoriadis (2013) defines imagination as the ability to create representations or images that go beyond immediate experience or the memory of an event. Basically, imagination does not answer to necessary determinism. It can use memories or desires, but no causality is implied thereby. This is the basis of the process that, through imagination, explains the possibility of alternative courses of action resulting in a redefinition of the terms of the social contract. This openness to the sphere of the improbable, which is implicit in imaginative practice, enables the operationality of value categories (i.e. hospitality, care and solidarity) which require, and are sustained by, the ability to imagine the Other despite diverse conditions. This is a generic capacity of the category of imagination. It functions as the potentiality for putting oneself in another's shoes, which appeals to our understanding of the possible.

Because imagination is linked to actions that transcends determinations and expectations, it opens up a world of alternatives, and enables the collective and individual sense of groups and individuals. At this point, it is important to recall that imagination is not a mere device, and that the sense of creative possibility that it embodies has a necessarily social analogue. In other words, the fact that an alternative belongs to the realm of the imagination does not render it artificial. It demonstrates a human and, therefore, universal ability to assimilate the threshold that makes transformation, shifts and contingency feasible in the world of the individual and within the ambit of the communities in which the individual develops (Garcia González and Vargas Escobar, 2019).

## Education as a platform and catalyst for the collective imagination

In response to the question: "What will be the role of education in fostering and actualizing the creativity, imagination, and social resolve needed to embrace the possibilities of radical reconfiguration?" (UNESCO, 2019), we seek to re-establish where education stands vis-à-vis the possibility – through imaginative capacity – of restoring the communal. This exercise is based on our belief in the vocational requirements that educational institutions and practice must meet. Before defining the role of education here, however, it is important to clarify that, while the materialization (i.e. materiality) of education is usually also institutional, educational practice – if not revised and readjusted – can also end up reinforcing the perpetuation of prejudice and injustice.

In this context, we concur with the stance of the United Nations. "At the United Nations [sic] international congress entitled *Peace in the Minds of Men*, which took place within the framework of the fight against racism and colonialism in Côte d'Ivoire, the debates and discussions held led to resolution 53/243 of the General Assembly of the United Nations. The resolution, entitled *Declaration and Programme of Action on a Culture of Peace*, gave

rise to a series of actions which emphasized education for social transformation" (García González, 2019).

The educational processes that correspond to this transformative summoning must be conducive to an ethical awareness of one's own place, of the place of the Other, and of the common destiny that brings us together. Education can serve as the platform and the catalyst to build an alternative repertoire at the base of a shared episteme that is fundamental to making divergent perspectives possible.

Imagination does not completely subvert the social order, rather, it produces a transformation leading to new models of the social bond. In this sense, imagination paves the way towards new affiliations that transcend old models of social membership. Alternatively, it deepens and gives new meaning to the matrices of affiliations, such as citizenship, consanguinity or nationality. This potentiality diversifies and strengthens the possibilities on which human solidarity is built. When called upon to do so, education can be involved in, and committed to, prompting and serving as a platform for this reconstitution of human solidarity and restoration of the communal. In this process, the imperative of imagination must be continuously fostered, repositioned and exalted as a resource and ability that we can all access, and that we are all enjoined to cultivate.

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# The disaggregated, networked and open future of education for sustainable development

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To address societal change, the authors highlight the need to incorporate new cross-cutting digital and physical spaces for learning – in and outside formal education systems – by embedding the concept of openness. They argue that this cannot be done without revisiting the global knowledge infrastructure.

Ten years prior to the "birth" of the world wide web, Lyotard (1979) had outlined a prediction for a computerised society in which knowledge and knowledge creation would be altered and transformed. Berry (2015) has recently transferred this idea into the discourse surrounding the digital transformation of contemporary societies: "The digital world is increasingly creating destabilizing amounts of dis-embedded knowledge, information and processing capabilities that undermine the enlightenment subject." While these two authors paint a rather pessimistic picture of the incorporation of digital technologies, the potential of the network society holds at the same time numerous opportunities to address the societal challenges of our time (Castells, 1996; 1997; 2000).

The curricular triangulation of sustainable, inclusive and smart growth could provide learning and cognitive as well as non-cognitive skill development opportunities to cope with destructive creation. Instead, this curricular approach could help introduce and diffuse creative destruction. In short, it could foster the innovations that make sense, nurturing responsible research and innovation that would contribute to a better and more creative use of diverse knowledge systems that can harness cultural diversity and indigenous knowledge in socially and technically inclusive ways. An integrated humanistic understanding of life and education would become possible such that the economic sustainability of profit as well

as the social and environmental sustainability of purpose would be adaptively integrated in education curricula. Before we project a future for education for sustainable development, we must first discuss the situation as we find it today.

## The bounded formal curriculum of education

Despite many technological developments in the educational field, and although education is more technology-enhanced than ever before, the image of formal educational programs and how individuals within universities engage with their curricula have remained relatively stable (Hicks, 2018). This undermines the potential of formal education to positively contribute and impact a sustainable future globally. First, under the influence of neo-liberal political economy, curricula are now often regarded as products geared towards increasing 'customer' (i.e. students) earning power in a graduate job market (Currie, 2004; May and Perry, 2013). In this demand driven definition of curricula, courses and content are often closed, which also creates a barrier to widening access to higher education (Mayes, 2014). Secondly, the majority of teaching occurs within modularised programs where learning experiences constitute little more than fragmented, disabling cross-cohort learning. The current approach oversimplifies the complexity of real-world settings and creates unwanted distances between bodies of knowledge, disciplines and communities that could benefit from being interlinked (Savin-Baden, 2011). Thirdly, many forms of assessment results in the intellectual work of the learners remaining in the institution. If artefacts resulting from assessment are not being shared more broadly than among cohorts and academics assessing these results, the potential for these artefacts to contribute to third sector and community groups, start-ups or wider societal needs will be lost. Lastly, culture is often very narrowly defined within formal curricula. As curricula is designed according to the dominant cultural context, there is a lack of acknowledgement of and adjustment to the diverse needs within society. This results in many missed opportunities to connect learners and groups of learners from diverse backgrounds, which would create a richer learning experience and enable socially relevant learning activities to broaden the perspectives and worldviews of learners.

## Disaggregated education to enable digitally distributed curricula

As we strive towards building the future of education, it is important to incorporate new spaces of learning into formal education by reframing openness in education. Embedding openness in formal educational curricula will entail going a step further than the affordances of most massive open online courses (MOOCs) and the distribution of open educational resources (OERs) as we currently know them. This step further involves the creation of co-located learning spaces that cut across physical and digital spaces that can both be inside and outside formal educational institutions. A step in this direction is put forward by Johnston, MacNeill and Smyth (2019), who propose a digitally distributed curriculum driven by the interrelated values of praxis, public pedagogy and participation. These are facilitated through the dimension's porosity, co-production, open scholarship and co-location by providing the context and conditions needed to enable a digitally distributed curriculum.

To reach this level of openness, first a disaggregation process needs to occur. This can be achieved through co-location as knowledge needs to be dislocated from institutional barriers and power contexts. The process also entails porosity as we build an educational future where digital technologies are used to facilitate the transfer of information across space and time, and to transfer locally produced solutions and knowledge into other context to serve as a solution to similar problems globally. As we foster this porosity, new ways of co-production of knowledge are enabled. Through open scholarship, community engagement can come to the forefront, so knowledge generation and mobilization can be used to overcome local and global challenges. Encouraging digital distributed curricula will help the global community learn from the local. The disaggregation process thus provides opportunities to develop human, social and cultural capital opportunities that can be utilized to raise awareness of local and global issues as well as the importance of implementing actions on both levels.

## Knowledge infrastructures for education for sustainable development

Beyond disaggregating the formal curriculum, we must also emphasize the need for a global knowledge infrastructure for education to support sustainable development. As computing power gets ever more affordable, the world community as represented by the UN needs to ensure that knowledge transfer is not inhibited by infrastructure problems and vendor competition for market shares. Edwards (2010) defines knowledge infrastructures as "robust networks of people, artefacts, and institutions that generate, share, and maintain specific knowledge about the human and natural worlds." While the robustness of the networks that emerge from MOOCs and open courses might not be as stable as defined by the author, there is an opportunity to use open education not only as a one-directional medium for sharing of knowledge, but also as a channel to network and address problems in a 'glocal' (i.e. global-local) way.

Global problems are targeted on a local or regional level in the context of solving a concrete problem. Several examples of successful knowledge building and support of the creation of networks can be drawn from the literature on MOOCs (Tabuenca et al., 2019). Another challenge would be how to ensure that these open courses can produce "actionable knowledge" – i.e. knowledge that is produced and can be translated into actions (Agyris, 2003). To achieve this, the course design for MOOCs needs to focus on educational scalability (Kasch et al., 2017) while integrating learning tasks that require an application of knowledge rather than the pure transfer of factual and procedural knowledge. For the future development of technology-enhanced learning environments, we envision an environment that combines aspects of classical electronic learning environments and MOOC platforms with the functionalities of mobile apps and synchronous communication and sharing opportunities. This new environment should facilitate the immediate transfer of local innovations or solutions to any 'needs context,' enabling the recipient to then adapt and apply the solution to their local needs.

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# Inclusivity and social justice through service-learning in the era of biopolitics

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The authors define 'biopolitics' as the non-repressive neoliberal power mechanisms that manage our time, space, social conventions, relationships and production methods, and accordingly the unique places in which we think, feel, love and desire. They suggest a reform of the old competence-based paradigm of education by adopting a critical service-learning pedagogical framework to promote inclusivity and social justice.

We live in tumultuous times that have made 'the posts' (post-developmentalism, post-modernism, post-structuralism, post-humanism, post-conventionalism, post-truth and post-critical) their *raison d'être*, requiring the creation of a new pedagogy that would reflect the direction education should take (Whitburn et al., 2017). In addition, this crossroad has a central obstacle: our own pedagogy, which continues to be reviled in our own field. Indeed, although it is in constant demand by the world of literature, sociology, sport and politics – even by fields that are apparently more unconnected, such as architecture and the medical sciences – it is eternally paradoxical that, as teachers, now more than ever, we must vindicate our crucial value. Teachers are also tasked to recreate pedagogy with new anchors to secure and decipher the social and educational codes of the increasingly pressing demands of today's society.

Before embarking on a discussion of reform, there is a need to recognize that the current context is impacted by biopolitics (Burchell et al., 1991), a term coined by Foucault to define how non-repressive neoliberal power mechanisms manage our time, space, social conventions, relationships and production methods, and accordingly, the unique places in which we think, feel, love and desire. As a result, our behavioural patterns are becoming fixed in all areas, including politics (Saltman, 2018) and are being made natural and even desirable as an aesthetic element that we are trained to enjoy and expand, as shown by Paul Beatriz Preciado (2006).

In this scenario, whoever is aware of this reality and wishes to react does so in various ways – at least three of which we will highlight. First, as described by Bauman (2017) in his now posthumous book, we can take refuge in "retrotopias", which means finding calm in the utopian nostalgia of a precolonial, or even tribal, past in the attempt to create a better world. Another global reaction is fear to the point of establishing Machiavellian imagery that can take the form of monarchy (Nussbaum, 2018), faced with which we will need a compass and even a road map. Third, we can glimpse the existence of an obstinate, driven and global evil (Bauman and Donskis, 2019) that systematically springs up in all issues relating to human beings, although simultaneously restrained by its uncertain fluid nature, in the face of which we must rebel for the sake of our generation and one day, future generations.

## Teaching in the era of biopolitics

How is biopolitics viewed in education? Since its acceptance and normalization, as detailed above, solutionist teaching is currently gaining traction. It is useful only if it offers solutions to knowledge that has lost the power to improve people and society, as shown by Garcés (2018). What no longer exists shows a kind of informed illiteracy (i.e. a deliberate blindness in the face of prevailing inequalities) in the face of which we can do nothing but choose a new, radical enlightenment. Namely, the recovery of the human race and of the pride of learning and teaching oneself to live a more sustainable way of life.

There is also a need to consider other pedagogies that address this unjustly seized dignity, thereby enabling us to recover the full privilege of building an educational science that concerns – and is responsible for – the profession of teaching. On the one hand, Biesta's pedagogy of interruption (2010) states that education must offer real, varying scenarios that constitute a break from what is traditionally "controlled" in the teaching and learning process, thereby opening up possible routes for the freer development of skills. On the other hand, the teaching presence outlined by Bruce (2013), which is closely linked to the pedagogy of interruption, posits education as a readjustment of the subject of experience and encourages students to shape their own presence in the world based on the observation and analysis of their own sociocultural reality.

Having considered the previous scenario, we must now ask ourselves how, drawing from these teaching models, we can access teaching and learning from a critical viewpoint that reconfigures its sociopolitical architecture and in particular, its inextricable link with society that, as stated by Garcés (2018), requires group action from the outset and not as a postreaction. It is time to reverse the trend.

The critical models of education will therefore help us respond to the unanswered question of "why shape it from this viewpoint?" (Carr and Kemmis, 1988; Freire, 2006, 2015; Grundy, 2013; Habermas, 1987). First, because we need innovative educational models that both manage and integrate the three kinds of knowledge: *technical*, that is useful; *practical*, that aims to ethically inform, guide and direct people; and *critical*, that is guided by the values of freedom, justice, inclusion and equality to attempt to overcome the unequal relationships of power and dependency in our communities worldwide. Second, because with the aim of raising awareness among people and communities, we should return to the basic principles outlined by Freire (2006) that education is dialogue, critical knowledge of reality, training

in change and commitment to utopia (not retrotopia) to transform reality. How do we concretize this? Which teaching and learning methods do we attribute to these proposed education models? Critical service-learning provides the answer to our current situation.

## Critical service-learning to concretize reform

Service-learning is a teaching model that is experiential, proactive, reflective and critical, in which teachers create experiences that place students at the centre of their learning. In groups, learners consider together the various planned phases of the project: planning, action, demonstration, reflection and recognition. The goal is to stimulate academic, social and personal learning while applying specific knowledge and values related to the social need in question with the objective of contributing to the common good. This methodology has theoretical support in various education paradigms. One of which, Dewey's experiential learning (1938), can be highlighted as an indisputable basis although there are different focuses when understanding it, depending on the fundamental educational ambitions. To better grasp the approach of critical service-learning, there is the important stage of questioning, given that it has considerably expanded since its emergence both in research and in teaching. We can begin by first exploring the four links between service-learning and critical pedagogy in accordance with the Freirean movement from which they originate.

*Change* is the first link. Service-learning promotes a commitment to social change and transformation on the basis of equality and independence, taking a stand against injustice and in favour of the universal interests of oppressed groups. The second link is *deliberation* as students become active citizens at all stages of the process. In critical service-learning, each person learns from their neighbour with diversity perceived as an enriching and creative benefit. As a result, service-learning involves multidirectional and horizontal feedback between teachers, students, service recipients and the other social players involved. This takes place from the viewpoint that reflection and dialogue – just as much as debate – constitute together the indisputable basis of the transformation. *Awareness-raising* is the third link as critical service-learning educates and raises awareness of the subjects of change, on the basis of the change, of identity and even of behaviour that is produced in interactions with vulnerable groups. It is absolutely essential that school is intricately linked with society and life through an explicit commitment to social transformation with them. The fourth and final link is *social justice*. During the critical service-learning process, the service provider group identifies with groups that are socially disadvantaged or risk exclusion, given that knowledge building must be undertaken in contexts of social need and that the goal of educational practice lies in combating social inequality and marginalization at their roots.

From this critical perspective, the curriculum will be created through the consensus, communication and participation of the different players. It is best that the social group participate as actively as possible in forming its expectations and in the transformative and redistributive direction of power in the design and development of the project. The social group must cast aside the role of mere service recipient and/or a passive facilitator of experiential learning and promote with it awareness to implement effective social transformation (Deeley, 2015). For this purpose, the fundamental role of service-learning lies in raising awareness among students, preparing them to identify and take on future situations of social injustice, while adopting a politically-neutral critical stance.

What of teaching staff? The result of the above is that the redefinition of their role is unavoidable due to the demand of the innovative culture put forward by the proposition. Through their roles as stimulators of reflection, they will have to give students tasks rich with debate, discussion and dialogue concerning real situations to enable them to build the skills and capacity to understand reality, emphasizing the influence of subcultures, personal experiences and prevailing diversity. Therefore, rooted in the line of Freierian awareness, service-learning engages in an emphatic and necessarily fully-fledged dialogue between education and life.

## The transformative power of methodology

In a culmination of the above factors, critical service-learning goes further than the current competence-based educational environment to offer real and different scenarios that break from what is traditionally considered 'controlled' in the teaching-learning process. It deviates from the old constraining model by opening up empowering channels for capacity development. Thus, it serves as an optimal catalyst from which to transit, apply and delve in a deeply educational way into the focus of capacities, promoted synchronically and diachronically from UNESCO's commitment to education (Martínez-Usarralde and Viana-Orta, 2018).

From a viewpoint that is as much individual as it is social and cultural, service-learning should be understood as a dynamic process that considers that a person is in constant evolution and not unchangeable (Pallarès-Piquer and Chiva-Bartoll, 2017). In essence, a service-learning model strives to develop authentic relationships – a much needed approach, not just in pedagogical reform but in life – and it is here to stay.

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# Open educational resources and global online learning

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This piece highlights how open educational resources can help bridge the knowledge divide to achieve equity in education. The author discusses the different digital barriers set in place to prevent free access to content and explains how these serve to erode efforts to achieve universal learning and education for all.

Open educational resources (OERs) are materials in various formats and media, that reside in the public domain or have been released under an open license that permits them to be accessed at no-cost, reused, repurposed, adapted and redistributed by others (UNESCO, 2019). OERs can help shrink the knowledge divide that separates and partitions societies.

## Growing relevance of OERs for teaching and learning

Educators worldwide continue to face significant challenges in their efforts to provide increased access to high quality learning opportunities while containing or reducing costs. New developments in information technology, especially with the introduction of mobile computers on phones, tablets and other devices, can help surmount these challenges faced by the traditional education community as well as flexible providers such as open universities. Newer technologies have the potential to aid in increasing access and flexibility in education by rendering it ubiquitous. Basic education for all continues to be a goal that poses great challenges for many countries. OERs twined with mobile learning technologies can be used to overcome many of the obstacles faced by both learners and educators in the quest to achieve basic education for all. This growing trend toward ubiquitous computing using the power of networks and mobile devices has opened the door for learners and instructors to access the world's knowledge from almost anywhere and at any time.

The world's knowledge is a public good that should be made available to everyone. Currently, the internet serves as the world's intellectual commons and OERs render this knowledge accessible to all. The role of OERs in providing learners and teachers with free learning content, including application, games, etc., is becoming increasingly more relevant.

## Open licensing is key to unlocking access to OERs

OERs encourage the sharing of educational resources though the provision of open licensing. Ultimately, this serves to reduce the costs associated with lesson and course development as it facilitates access to quality learning opportunities. The open licensing afforded by the Creative Commons or by releasing the materials into the public domain provides authorization to adapt, assemble, distribute, mash, re-mix and republish OERs. Open licensing is not the same as obtaining separate authorizations to view content freely – as is sometimes the case when accessing commercial content. This is not enough to support true open access and public sharing as even the simplest requests for permissions can take weeks and even months to confirm. Instructors and institutions must be able to make use of the content freely without having to request permission. When accessing content, true open access means that instructors and students can make effective use of the materials without any barriers or conditions in place. OERs are becoming essential in supporting online learning and is supported on various platforms in diverse scenarios – dedicated devices in the home, smart phones while commuting, on tablets during meetings, in the office on laptops and foreseeably, on any future devices as they become available.

## Technical controls widen disparities

Digital rights management (DRM), more commonly known as 'digital locks,' are used by major publishers to enforce their Intellectual property (IP) rights. Digital locks protect their "property" by controlling the conditions under which their content is used. These 'locks' can deliberately 'cripple' devices to limit the affordances of the users' devices. Using DRM, publishers can technically control how, when, where and with what specific brands of technological assistance licensees are able to access content and applications. Similarly, many commercial systems use these locks to disable important features essential to online pedagogies when learners review content, such as highlighting, annotating, hyperlinking and accessing a digital dictionary.

Digital locks are particularly problematic for disabled users. The visually impaired, for instance, are denied use of a text-to-speech function and in many cases, cannot even increase the text size. Publishers also insert DRM 'time bombs' in e-textbooks that delete the course content after a set period of time and use methods to block users who attempt to make use of prohibited features. Moreover, commercial digital content structured as e-text or as a simple website is all too often provided at a lower quality version to dissuade reproduction. The charts and tables can appear light and washed out, thus rendered unreadable (Richard the Lionhearted, 2011).

## Digital licenses further hinder access and disadvantage users

Digital licenses for commercial e-books prohibit not only copying and printing but also modifying, removing, deleting, augmenting, improving or adapting content in any way. Most significantly, the licenses legally prohibit any removal or tampering with the DRM. Given that the breaking of locks is illegal, users cannot tamper with the DRM – even if for legitimate reasons, such as archiving or fair dealing. Realistically, digital protections, no matter how

robust, can always be broken. As hackers have been able to consistently break any DRM inserted in software, the legal restriction of digital licensing poses a much more formidable problem than digital locks. DRM is protected by legislation in most countries and reinforced by the digital licenses that come into effect when users click on "I Agree" when they access commercial content.

Digital licenses also prohibit the transfer of content to other students when teachers wish to use a variety of devices with different groups of students in later semesters. These legal restrictions combined with DRM along with the "sole device" stipulation effectively block any attempts at mobile access to learning – even if institutions are prepared to pay, pay again and keep paying for the same licenses until they expire. In many cases, if institutions don't continue paying, they risk losing access to data or records linked to a particular product or provider.

Even more unacceptable, software licensing exempts publishers from *all* liability under consumer protection law as there is no physical 'product' to purchase. Not only does the purchaser have no rights, no requirements are placed on the publisher to ensure that an application even works. Further, the publisher incurs no liability when they deny access to the content or software for whatever reason, legitimate or otherwise. They can also alter clauses in the contract at any time. In fact, whenever software is upgraded, the contract can be changed and often is, often not for the benefit of the user (Brown, 2012).

## Geographical restrictions drive piracy

The predicament of a citizen in Luxembourg puts the question of geographical restrictions under scrutiny. In this case, even though the user wanted to legally purchase content, he could not as it was not available in his country. A commentator who reviewed the case deemed that geographical restrictions using DRM are a "most pressing issue" (Wolf, 2010). Users typically receive an error message for attempting to access books or videos that are not licensed in their country. Google's "Geographical Constraint" error message along with YouTube's "This video is not available in your country" are notorious examples of geographical restrictions. This restriction may drive demand for pirated sites to enable users to access content. For instructors, a legal purchase is mandatory, so in many countries, they are effectively excluded from accessing much relevant content (Woodwarth, 2011). Likewise, for borderless online courses offered by institutions that deliver lessons to many different countries, these restrictions effectively prevent institutions from using this content. As noted, copyright owners, in an effort to secure profits and safeguard their content, are inadvertently encouraging piracy through these geographical controls that prohibit legitimate uses.

## Breaches of privacy abound with DRM

Online learning is also premised on reasonable levels of trust between students and instructors. As they share resources, participants should be provided with assurance that their personal information will not be used for purposes other than those of learning and sharing with other students and the teacher. Publishers have a history of enganging in an open ended and indiscriminate collection of private information for unauthorized purposes, using DRM to help persuade users to their disclose personal information (The Canadian Internet

Policy and Public Interest Clinic, 2007; Schneier, 2005). In many – if not most jurisdictions – companies use restrictive licenses to obtain the right to invade personal computers and private networks without notice and without permission; and to disable software for any real or imagined license infraction. These restrictive licenses that users must accept to access content or applications constitute a violation of privacy and pose a serious impediment to online learning.

## OERs: An essential for global online learning and the future of 'Education for all'

DRM accompanied by legal restrictions can seriously cripple an educational environment, make it problematic and even impossible to introduce future technologies, new pedagogies or new methodologies for learning. Learners must be supported in their right to education with unrestricted access to OERs and allowed to flourish in an open environment that includes the right to use content under licenses that favor access over commercial limitations on any technological platform. The portability of devices supports learning flexibility and the sharing of educational resources, and is thus paramount to the future of education. When reviewing content, learners require the rights to highlight, annotate, print, share content and link to websites. Other rights that should not be restricted digitally include the right to receive a file that is not locked or otherwise crippled and subject to recall by the publisher; and the right to convert files to different formats for use on a variety of devices and computer platforms (UNESCO. 2019). Kroszer coins this state of access as "trouble free and device agnostic" (Kroszer, 2008).

An essential right for ubiquitous learning would be to allow other users to access content either for shared learning or for future use in additional classes. OERs, by definition, fit this description. They come with minimal, if any, restrictions. They are technologically neutral, transmittable on different platforms and when built using commonly accepted or open software, they conform to international interoperability standards and can be transported with little effort or concern by users. Presently, there is a large and growing body of OERs, supported by open source applications. These resources arguably represent a crucial pre-condition for the implementation of systems to enable global online learning, which can effectively lower the barriers to accessing knowledge universally. Education for all will remain only a concept unless and until we can ensure the long-term viability of OERs through the active support of educators and educational institutions and through governmental policies encouraging their creation, adaptation and dissemination.

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# Public education is not for sale to the highest (or lowest) bidder

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In this piece, the author highlights the human rights obligations of states to provide public education and regulate private involvement in education. She makes the argument that innovation can be incorporated into public education without having to commercialize it.

"Education is the primary vehicle by which the socially and economically marginalised adults and children can lift themselves out of poverty and obtain the means to participate fully in their communities. "). (CESCR, General Comment 13 (1999)) . The Convention on Economic Social and Cultural Rights envisages that the way to provide equal access to education is through the provision of public schools. If we want a system of education that truly leaves no one behind – as states have committed to doing through the sustainable development goals – then it must be accessible to everyone, including the poor and the marginalized. Yet, in discussions on the future of education, many people turn to the private sector for new ideas. It seems that many lack faith in governments as innovators. If thinking out of the box needs to happen, people seek ideas from entrepreneurs. Innovation is very much needed in a changing world where so many children still do not enjoy equal access to quality education, but the problem with asking entrepreneurs for answers is that when education becomes a commodity to be bought and sold, the idea of education as a common good, something that everyone must have access to, is at grave risk. We may need entrepreneurs to help redesign the future education system – but let them be social entrepreneurs.

## New demands for inclusive education

The content of education and the way we teach is changing. It is highly likely that it will undergo a metamorphosis in the future as we see developments, such as more home-schooling and increased reliance on distance and digital learning, in response to a demand for an education that is adapted to the different needs of individuals and the current challenges our global society is facing. We certainly do need to reflect on the way we educate in the rapidly changing world we live in. Education for a sustainable environment, for instance, is of crucial importance. In this regard, children themselves are leading the way, with child activists, including 16-year-old Greta Thunberg educating her peers – and many adults – on the vital importance of saving the planet. She asks, "why should I be studying for a future that soon will be no more, when no one is doing anything whatsoever to save

that future? And what is the point of learning facts within the school system when the most important facts given by the finest science of that same school system clearly means nothing to our politicians and our society?" (Thunberg, 2018).

Schools as we know them today, may disappear or reform, which may transform the role and the form of public education. However, if we want education to contribute to the common good of humanity and respond to ongoing inequalities and exclusions in our society, states have a central role to play in the delivery of education – no matter the form it takes – particularly in providing free quality education.

## Abidjan principles: Refocusing attention on the role of the state in education

The importance of public education has recently been the subject of attention from a group of eminent experts from around the world, culminating in the Abidjan principles on the human rights obligations of states to provide public education and to regulate private involvement in education. These principles were welcomed by the UN Human Rights Council in their resolution on the right to education on the 9th of July 2019. Drawing from international human rights law, its overarching principle recalls that "states must provide free, public education of the highest attainable quality to everyone within their jurisdiction as effectively and expeditiously as possible, to the maximum of their available resources" (Human Rights Council, 2018). The Abidjan principles were developed in response to the rapid expansion of the involvement of private actors in education to provide clarity and guidance regarding the state's obligations in this new and changing education context.

Where states struggle to implement the right to free public education for all due to the lack of resources or capacities – often exacerbated by structural adjustment programmes – the involvement of private actors in education is often 'sold' to them as the solution to the growing demand for education. Regrettably, even donors have in some instances opted to fund private education, including commercial low-cost private schools, instead of supporting the receiving state in strengthening its public education system.

## Transforming education for individuals and society

A free quality public education is transformative, both for the individual and for society. Within a generation, children can move from the margins of society to a life in which they can reach their full potential through the engine of free public education. The last two centuries clearly demonstrated this. For centuries before, only the children of the wealthy were able to access education. During the late 19th century and into the 20th century, children in industrialised nations moved from being the poorest paid workers in the industrial revolution workforce to accessing education in public schools. Today, it is widely accepted by all nations that all children should be at school – and not at work. So, we have witnessed the power of education as a lever to lift people out of poverty and contribute to an inclusive and fair society.

But now, 20 years into the 21st century, some states are slipping back to a situation in which only children of parents who are willing or able to pay can receive a good education. In

countries where education has been massively privatised, research shows an increase in inequalities and segregation, which perpetuates or further exacerbates inequalities and segregation seen in societies. In addition, the standard of education in low-fee private schools is not always good – in some cases, parents are not only paying for what should be provided to their children free of charge, but many are being short-changed in the process.

Of course, it is true that human rights treaties also make allowances for the liberty to establish and maintain private educational institutions, provided that they are regulated by the state. This liberty is grounded in ideas such as freedom of religion and culture, and also protection against an authoritarian or neglectful state that does not provide access to education that is acceptable to individuals or groups. The inclusion of this liberty in international law instruments has created a space for non-profit education providers, many of which have good intentions and are in fact providing education for the poor and marginalized in situations where the state simply is not. However, the downside is that this has led to situations in some states where governments have simply reneged on their obligation to provide free quality public education for all, content to let others fill the gap. It has also created situations where commercial entities have moved to fill this gap in what they see as a market, and sought to take advantage of this by commodifying learning and taking quality education out of the reach of many, leaving poor children stranded in worsening public education systems.

The Abidjan principles direct states back to their fundamental obligations to ensure equal access to quality education for all children, including those who are poor and marginalized. States need to become education innovators themselves. Of course, they can and should engage the best thinkers in the world, including entrepreneurs and private sector specialists to help them think 'out of the box.' They should certainly ask Greta Thunberg, Malala Yousafzai and other children and young people around the world about what the education system of the future should look like. However, states should not sell the education system to the highest (or lowest) bidder, because it belongs to all of us, to the common good.

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# 4. Science, Technology and Innovation

## Building the capacity to aspire in a digital era

# Towards virtualization: impact of technologies on educational ecosystems

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This piece is a reflection on the multiple manners in which new digital technologies impact teaching and learning activities, knowledge production and educational institutions.

Nowadays, as teachers, educational managers, policy makers or stakeholders, we are urged to change our present understanding of new technologies as merely tools or purely functional instruments through which knowledge is created and shared, taught and learned, with a new vison delivered by the philosophy of technology and sociology. The argument made here has at its core two steps. First, an interpretation of new technologies will be presented that motivates the necessity of a new vision. Second, inspired by this vision, some ways will be outlined on how we could try to integrate new technologies into teaching and learning processes, knowledge production and educational institutions.

The theoretical layer of this research is based on the idea that new technologies are not just tools or superficial strata added to the world. In its social and natural dimensions, new technologies increasingly mediate almost any human experience and tend to constitute the world itself for human beings. According to the 'theory of assemblage,' the relationship between human beings and the new technologies constitute an assemblage in which the components are inseparable and cannot exist independently (Deleuze and Guattari, 1980; DeLanda, 2006). Meanwhile, the post-phenomenological interpretation of new technologies is one of robots, self-driving cars and even educational robots positions as 'experience mediators' (Rosenberg and Verbeek, 2015). New technologies actually tend to modify both the forms and content of such relationships. Any change made by this interaction affects our behaviour as individual human beings in society as well as our whole experience of the social and natural world(s).

## New technologies reinterpreted using 'form' and 'content'

The terms 'form' and 'content' can be ascribed to the German philosopher and sociologist, Georg Simmel. For Simmel (1950), society does not exist separate from individuals, it is the product of individual interaction, but in a particular way. Simmel calls the way in which individuals create society 'sociation.' Through sociation, individuals interact and act together. Individuals function like the atoms of society, yet their labour, needs and feelings are not social if they do not take social forms. As individual characteristics, 'forms' are particular to

individuals as active behavioural and cognitive subjects. Forms equally explain how society is made possible as well as mediate the social experience of individuals. At the same time, forms represent society as being embodied in institutions and social practices. For instance, we work in an economic system with a specific division of labour and our health needs are expressed through social arrangements which can include the state or not. The 'content' of forms represents the particular aspect that a form can take in time and space, and that can embrace very different expressions. The content can modify and even disappear, but the forms remain to subsist and create new contents. For example, the most basic form of individual interaction is between two individuals as a dyad and concretizes in different contents as student-teacher, wife-husband, client-seller, etc. Complex forms can be expressed as hierarchies, understood in the same manner as in feudatory relationships, national states and multinational corporations. Essentially, forms are empty fractals that are filled with social content.

In their intersection with the empty fractals of forms, sometimes new technologies filled them with new content without modifying them. For example, using a laptop for personal or organizational ends does not essentially differ from the way we used traditional tools, such as the typewriter or mental arithmetic. Even the fact that we stream on Facebook or exchange emails could be seen as a more developed and fast way to broadcast, communicate, post or exchange information. This dimension of new technologies is incredible, but it does not radically modify the way sociation happens as interaction between individuals. We can coin this intervention of technology at the level of content as 'digitization' and 'digitalization.' Offering online courses and educational materials are examples of digitization while using educational platforms to teach and learn could be understood as digitalization. Through digitization and digitalization, institutions and practices remain basically the same, although formally they are progressively improved – until frontier shifts to a new level of evolution. This frontier of mutation is reached by 'virtualization.'

## Virtualization recreates new technologies as actors

Virtualization is defined here as a new form of sociation. In virtualization, new technologies intervene as an actor, a partner in individual human interaction. Technologies in this instance become an essential factor of sociation not at the level of content, but in terms of individual interaction. Usually, virtualization means to create virtual hardware on the same computer or to recreate virtually real or imaginary objects. Initial examples of virtualization are playing chess with a computer (i.e. we virtualize the computer as a person) and robots virtualized as persons. Through virtualization, the technological factor is seen as a true person endowed with reason, will, ends and autonomy. In other forms of virtualization as in computer games, individuals currently can virtualize themselves to interact with other individuals or entities from previously virtualized worlds. This kind of virtualization is just the tip of the iceberg. Fictionally, a suitable example of future possibilities is the way in which a remote human brain can operate a virtualized entity and interact within an existing the world as in James Cameron's film *Avatar* film (2009). Virtualization tends to become a form of sociation that allows interaction in and with a fully virtual world.

Although new technologies have progressed immensely while access to education has improved; creativity has been fortified; teaching and learning activities have become more attractive; and schools and universities have become more organizationally flexible, we can easily observe that educational systems did not respond well to these new challenges. The most important reason for the lack of response is the current vision that embraces educational systems both formally and informally at national and global levels. Such a perspective is expressed in Meyer's (1977) theory of education. According to him, the educational system is a particular case of the allocation of individuals within society by creating elites, redefining rights and legitimizing social order through certification and diplomas. Generally, this vision corresponds to a national educational system organized according to the needs of a state and based on industrial technology (Gellner, 1983). Here though, socialization and individual education are secondary and subordinate to the standardization of knowledge, values and behavioural schemes to cater to general economic and social needs. However, this vision is less relevant now as new technologies invalidate structures in modern society as well as centralized and institutionalized control arrangements by which knowledge and culture are produced, distributed, taught and learned. New technologies are centred on the individual. They offer practical infinite opportunities, including new (virtual) worlds and novel cognitive and behavioural situations where it is difficult for the state to exercise its power and control. It is true that the opposite situation of absolute control by the state (or another entity) of an individual's options could also be conceivable, but a new vision of education should reject any control over individuals.

## The earliest purposes need to guidet he new vision for education

Paradoxically, the new vision of education has to be inspired by the classical view that the role of education is to socialize people by exposing them to a variety of experiences that are useful for life and for their future social roles (Meyer, 1977). New technologies can help to create the necessary framework to fulfil the model advanced by the classical definition of education, offering individuals the chance to interact in an infinite and changing environment full of experiences. So, if we agree that education plays an important role – possibly the most important one – in the socialization of individuals and if we accept that education consists of exposing individuals to new experiences, then it means that educational systems need to integrate new technologies and transform them into the necessary environment to support educational activities and nurture the production of knowledge. Consequently, new technologies will offer individuals not only the opportunity to develop themselves according to their own interests but also the chance to use such technological outsets as a means for individual building – exactly as the Enlightenment intended to use public reason to gain autonomy (Kant, 2013). At the edge of this perspective and considering that new technologies could modify the ways of sociation, such an ideal is reinforced.

There are certain elements and processes of the present time that determine and, in a way, make this recent perspective inevitable. Two of these will be discussed here. The first one is the process of globalization. In the context of this new vision, globalization should not be understood as internationalization or spreading of the Western cultural model from the centre to peripheries. Instead globalization must represent the means for everyone to freely

access digitized educational resources and digital tools from every corner of the world. This global access and sharing could be realized through open online access and free teaching and learning resources, etc., but also through developing digital libraries, digital platforms, educational apps, information centres, forums, etc. Such a vision advocates in favour of globalization to be understood as the global availability of educational resources and tools for the production of knowledge, but also the full possibility of global participation in education networks. Globalization should universalize the forms and content of education and production of knowledge and make them available for every human being. The ultimate goal would be to realize a global education system characterized by full access to educational resources and a global education community consisting of numerous, variable and flexible networks of educators.

The second element is virtualization. The virtualization of different experiences is a process that is probably at its earliest stages, but it is expected to grow more comprehensive in the near future. Virtualization will offer radically different versions of realities and human experiences, both inward and outward. Through virtualization, we need to legitimize, once again, the design of our values and experiences that belong to the regular world. It is plausible that virtualization will be the next step in education after digitization and that it will modify fundamental moral assumptions and intellectual potentialities of individuals as well as how we act and interact with each other as virtual entities and within virtual worlds. Education could be avant-garde in this process, offering tools to integrate the difficulties raised by the experiences derived from the virtualization of the world, which could in turn affect even the forms of sociation. In any case, the future is here and requires imagination and courage to guide us as we identify the best ways to move forward.

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# New competencies for media and communication in an AI era

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This piece contemplates the crucial shifts required in the media and communication education sector in an era of artificial intelligence. The authors explore how and why the teaching of media and communication disciplines will be impacted as well as what skills, new digital competencies and critical media literacies will be necessary in a future media landscape.

Artificial Intelligence (AI), as the 4th technological revolution, is a major disruptive technology that offers both opportunities and challenges within the media and communication industries. According to a report by Elsevier 2019, there is "little overlap between the way AI is spoken about in teaching, research, industry, and the media" (Evans, 2019). The Elsevier researchers considered over 700 keywords and 600,000 documents about AI but concluded that there was no universally agreed definition of the term 'AI.' Elsevier also noted that the way the term is used differs substantially in the fields of teaching, research, media and industry, which poses a challenge for educators looking for common understandings.

In this piece, we define AI to include search and optimization; fuzzy systems, natural language processing and knowledge representation; computer vision; machine learning and probabilistic reasoning; planning and decision-making; and neural networks (Elsevier, 2019, p. 10). Much like any modern advancement, AI is a tool and a resource that advantages those with access while creating inequity and exclusion for those without access.

## AI and education: weighing the benefits and challenges

Increasingly, AI techniques are being utilised in the education of students, offering both benefits and concerns. One potential benefit of AI in education is it enables the personalization of study, allowing students more time, space flexibility and collaborations (e.g. peer learning, research platforms, global sharing collectives/knowledge ecosystems). These affordances will potentially increase diversity and cross-cultural input or networked collaboration. For instance, 'intelligent classrooms' (e.g. Tsinghua University's Rain Classroom)

offer the capacity to target each learner and teacher with instructions based on the analysis of data to intervene where students or teachers appear to need assistance or to be underperforming. Whilst some AI functionality, such as the automation of some kinds of assessment may be useful, there have already been issues with poor decision-making based on AI functionality. For example, in Houston in 2016, teachers were dismissed after an AI process that was found to be unethical and lacking transparency was used to evaluate teaching performance (Dawson et al., 2019, p. 5). Thus, while the benefits can be great, careful evaluation of the use of AI is required.

Data protection laws are still evolving – in many countries, they are not yet in place – so data gathered on a student or lecturer's performance in the classroom might not be secure. If AI analysis of facial expression is used to measure student engagement (or lack thereof), would individual reputations be at risk and would they adopt facial postures to avoid detection in response to this surveillance? Clearly, adequate ethical and legal frameworks need to be developed that respect privacy and laws. The guiding framework will need to be technically robust and safe – i.e. to guard against hackers who aim to cause harm or breach privacy.

AI algorithms reflect the biases of those who create them and the prejudices of the societies or cultures from which they emerge. It is therefore important that potential inequality and exclusion are anticipated by educators so as not to heighten discrimination, exacerbate digital divides and deepen inequalities. For instance, ensuring gender fairness (equity) will be paramount as it is already evident that women and girls are at risk of falling behind. As acknowledged in the program of the 2019 UNESCO International Conference on Artificial Intelligence and Education, "women and girls are 25 per cent less likely than men to know how to leverage digital technology for basic purposes….[and] only 22 per cent of AI professionals globally are female" (UNESCO 2109a, p. 10). The report concludes that "there is an urgent need to adopt gender fairness as a fundamental principle in machine learning and to close the gender gap in AI skills." Equally pressing is the need to ensure equal participation and advocate or encourage other marginalized groups to enter AI industries to ensure they are not left behind.

## Key skills needed for the AI era

While there are many tasks that machines can do faster and more accurately than humans, soft skills, such as creativity and imagination, are not as easy to duplicate. As scholar Carl Benedikt Frey has observed, "complex social interactions and creativity are the most difficult things to automate" (Frey, 2019). Critical thinking is a skill that is generally nurtured in students at university. In a 'post-truth' era it will become a key competency, and the human capacity to reason or develop concepts and arguments will carry more value – along with the ability to use evidence in support of arguments, draw reasoned conclusions and use information to solve problems (NSW government, 2019). Other important critical thinking skills are "open-mindedness to having currently held viewpoints challenged" and a "strong grasp of content-rich knowledge to draw on if they are to tackle cross-disciplinary, diverse

problems or novel situations" (NSW Government, 2019). Konstantinos Pouliakas from the European Centre for the Development of Vocational Training (Cedefop) observed that social skills have high value and identified the top skills as the ability to be adaptive to change, work well in a team, solve problems well, communicate well and assist customers undertake project management and use office IT (UNESCO, 2019b). Educators will be required to support students to develop new digital competencies and literacies, and promote a greater awareness of issues in the digital environment. For instance, students will need to be taught to validate their sources or information so they do not fall prey to articles created by bots.

## AI and the teaching of media and communication

A crucial role for the teaching of media and communication in universities is to develop ethical leadership in this profession. For example, data gathered by AI for the purpose of public relations (PR) will definitely be used in ways that will require an awareness of ethical issues (Gregory, 2019). PR professionals need to be trained to be aware of the issues of data use so they can critically interrogate them, and learn how to use data ethically in their profession. Likewise, other areas in the field of media and communication will need to adopt skills and sensitivity to the ethical use data generated through AI.

AI has made possible the creation of press releases and news stories without human input and this has implications for students in media and communication. This is particularly urgent in fields such as PR and journalism, where in the past, students and graduates typically gained entry level experience by themselves producing the kinds of outputs that are increasingly being created by AI. Where will these entry level skills be gained now? On the other hand, with menial tasks automated, journalists would have more time to perform other important tasks, including fact-checking and investigative research, which may increase the quality of journalism.

Although creativity is often viewed as a human skill with high value in an AI era, AI is already in use in certain creative applications. For instance, at Tsinghua University in China, researchers have developed designs assisted by AI to produce chairs through applications that collate and merge contemporary and Chinese Ming chair designs. AI has also been used to compose music that can be performed by robot bands while AI classical poetry writing systems have been engineered based on research data on deep neural networks. These developments raise important questions on how AI and new technological advances will work alongside creative humans and whether and how human artistic practices might change.

AI technology has application in the movie industry as well. For example, movie scripts can now be fed into a machine that generates a rough-cut edit of a film. It is unclear if or how this might change the work of a film or video editor and whether the distinctive style and creative edge of renowned editors can be replicated or matched by machines. This generates questions on what the work of the film editor will be in the future.

Currently, media and communication students learn how to use technology in their industries. In an AI era, they will also need to comprehend how algorithms work and operate in their sector. As mentioned, a machine's decision-making power is informed by human bias that can inadvertently be coded into machine learning, resulting in faulty data logic or bias. For instance, what if automated cars run over people of colour because the creators of the application failed to factor in skin colours other than Caucasian? This is one theoretical example of the consequences of a gross oversight due to bias generated when applications are designed largely by white men (Sigal, 2019). Fortunately, algorithms can be corrected to neutralize bias. For instance, until this year, the translation from Turkish to English in Google Translate turned 'that person is a doctor' and 'that person is a nurse' to 'he is a doctor' and 'she is a nurse.' This has since been corrected and Google has been working on neutralizing gender bias in this web application (Mimnagh, 2019). As a first step to correcting bias, an understanding of how it is generated is critical for media scholars and practitioners.

There exists opportunities for media and communication students who regularly study through work integrated learning to engage with real world AI problems, alongside industry. With the right pedagogical framework, AI professionals and talent will come from the media and communication discipline – most likely with interdisciplinary collaborations with the computer science and information technology disciplines. In addition, there will be a particular need to impart a good understanding of the social and cultural implications of areas, such as data mining, big data and data processing. To this end, media and communication students will require ethics courses to underpin their existing critical thinking skills and training. This will be crucial in a 'fake news' era when trust in media professionals is being eroded – especially when news and documentary production is impacted by the capacity of AI to manufacture authentic-looking 'fake' material. For instance, researchers at the University of Washington have successfully created algorithms based on hours of video footage and audio recordings to create realistic lip-synced videos of Barack Obama (BBC News, 2017). Key issues such as trust will potentially form research investigations and a whole ethnographic area of study on how people experience the new media and communication landscape.

In a new pedagogical landscape, the literacies that have formed the backbone of media and communication courses, described by David Buckingham (2003, p. 36) will continue to be important, including networked literacies (making and doing within networked ecologies); social literacies (ethical collaboration and teamwork); evolving media literacies (knowledge, skills and competencies that are required to use and interpret media). Other competencies, such as literacies of learning (critical thinking, research skills and reflection), will also continue (French, 2015). Alongside this will be the development of new literacies in data mining, and techniques, such as reverse image searching to verify information and make optimal use of the data available in vast online databases. There are many existing tools that will be of use to the digital journalist. For example, if a bomb is reported to have gone off in Syria at 10 p.m., journalists can check this via Google Earth technologies. AI applications are increasingly using existing technology to create new tools for humans who will use them to create new questions, comparisons and enquiries.

## Conclusion: New digital competencies for students and educators alike

It is clear that new digital competencies and critical media literacies will be necessary for students of media and communication. Tomorrow's AI-rich environment offers many potential benefits but also creates a great number of challenges. Media and communication students will need to be taught twenty-first century soft skills, such as the ability to collaborate, be creative and work ethically along with skills in critical analysis, data mining and the use of AI algorithms in their work. Media and communication educators will need to devise appropriate training courses for the next generations of media and communication students to prepare them for these opportunities and challenges in a rapidly changing landscape.

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# Science education for a sustainable future

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The author calls on the need for a well-defined strategy towards science education, which includes greater accessibility from pre-primary to graduate levels, creative teaching and learning methods, and an integrated approach linking academia and industry. The author also emphasises the need for sustainable development training for engineers.

In order to take the first step on the moon 50 years ago, humans had to leverage all their scientific and technological expertise and create new knowledge, without which this feat would never have been accomplished. To continue our extraordinary space exploration adventure, we need to significantly increase our scientific knowledge.

At the same time, while continuing to look up at the sky, humans will have to preserve planet Earth; to address the major challenges it faces, such as climate change and air and ocean pollution. To reach this goal, the world will also need more basic science knowledge and more technological innovation.

Each scientific discovery is another step forward for humanity because, as we know, every scientific breakthrough leads to new applications in all sectors of the economy, from health to industry to agriculture.

It is our collective duty to create the conditions that will enable scientific researchers in all disciplines to produce scientific knowledge contributing to a sustainable future while respecting ethics. Our duty is also to create the conditions for stimulating technological innovation to meet the needs of an ever-growing population and to make its daily life more dignified in a healthier environment.

The only way to reach a sustainable future is with the help of science and scientific innovation.

## Building on science education

We cannot develop or innovate without science, and we cannot practice science without education

It is imperative that we swiftly set up a global, stimulating, effective and inclusive approach to science education.

Science education needs to be made available to the youngest students; as early as the first classes in primary school, or even pre-school. We need to foster students' natural curiosity about understanding nature and the environment around them and stimulate their scientific minds. Teaching and learning methods need to be reinvented or reoriented to provide students with very strong training on inquiry-based thinking.

This approach can take place inside or outside the classroom: for instance, in a garden, in a forest or at a beach. Teaching using inquiry-based learning will stimulate students' scientific thinking and mindsets and allow them to understand the major issues concerning sustainable development and the world they will one day have to build.

Initiatives to this effect, inspired by inquiry-based science education (IBSE) and active learning, are developing, in particular thanks to international networks of scientists who are convinced of the importance of this approach in building a sustainable future. Particularly impactful could be North-South-South initiatives, which enable exchanges of good practices in science education to promote faster and more in-depth evolution, particularly in teacher training.

Training teachers in inquiry-based learning that raises awareness of the need to build a sustainable world is essential, for both induction and continuous training.

Teacher training centres should follow the examples where those being trained are given the opportunity to go back to their scientific, cultural and educational roots in a stimulating scientific environment with a library of scientific publications, and through meeting high-level scientists and teachers from different countries at annual workshops.

In many countries of the world, teaching methods have remained unchanged for decades or even centuries. Therefore, implementing methods of active science learning is a real challenge. In the least developed countries, with overcrowded classrooms, which are highly under-equipped for science education, the efforts required will be even more significant.

However, everything becomes possible with a strong political will and wise priority-setting at national, regional and international levels to invest in teacher training.

Teacher training in this science learning method should cover all levels, whether primary, secondary or higher education, including technical and vocational education.

## Making a special effort to train engineers in sustainable development issues

When it comes to engineers, their role in building a more sustainable future is key. For this reason, the way in which they are trained is fundamental. One of the methods that seems most appropriate to us is the problem-solving approach, in line with the needs of companies and populations.

Of significance is the need to create platforms to train teachers in engineering schools to strengthen their capacities in active learning towards innovation in the South and to strengthen links with the business world to find technological solutions for sustainable development. In this perspective, future engineers should work directly with companies on designing integrated projects and meeting their real needs.

Such interacademic networks, will make it possible to disseminate quickly the good practices in scientific teacher training in active, inquiry-based and problem-solving learning focused on ecological transition that have proved their worth.

Prerequisites to mainstreaming this approach to science education towards sustainable development at the national level would be increased awareness among decision-makers of the importance of the issues at stake, and their willingness to prioritize building a more sustainable world through *science and science education*.

# The quest for meaningful learning through ICTs

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The authors provide their understanding of meaningful learning in a world that is increasingly characterized by cultural, environmental and sustainable injustice. They elaborate on the use of ICTs to enhance a set of 10 skills needed to cultivate meaningful learning. In a world that is experiencing rapid advancements in technology, they argue that we must look beyond the 4Cs, and that co-responsibility is a non-negotiable.

The world is currently facing dire problems that threaten its very existence. The dramatic shifts occurring globally include climate change caused mainly by the huge quantities of carbon that humans release into the atmosphere – it is the number one threat to all human life. Humanity is facing a crisis of sustainability that includes not only environmental issues, such as ozone depletion and biodiversity loss, but also economic and social injustices, such as poverty, social inequalities, violation of human rights, unequal trade and gender inequalities (Makrakis, 2014a). Statistics from various organizations and resources paint an alarming picture:

- The wealthiest 20% of the world's population consumes more than the 80% of the world's resources while the world's poorest 20% are left with 1.5% (World Bank, 2013).
- In 2011, it was estimated that malnutrition was the cause of 3.1 million child deaths annually or 45% of all child deaths in 2011. Meanwhile, defense expenditures are approximately US$781 billion a year while US$7 billion more per year is needed to sustain education over the next decade (UNICEF, 2015).
- Thousands of refugees – among them small children – have been drowned in the Mediterranean Sea trying to reach safe haven in Europe.
- Although technology is becoming more affordable and internet access seems increasingly ubiquitous, a "digital divide" remains between rich and poor.

The data presented indicate that social, economic, environmental and cultural injustices prevail. The asymmetries created by economic globalization have not only widened the disparities between developed and developing countries as well as the wealthy and poor,

but also within countries across the world. Indeed, we live in a world characterized by a series of crises and injustices: the social justice crisis, the environmental justice crisis, the economic justice crisis and the cultural justice crisis. These crises reflect the four dimensions of the newly constructed concept of sustainability justice by Makrakis (2017). To explain these dimensions more specifically, we will define each one. The environmental justice component refers to the right of all people on the planet to enjoy an equitable, clean, safe, fairly treated and healthy environment as well as the right to social, economic and cultural wellbeing. The social justice dimension addresses inequalities and injustices of all kinds, including poverty, racism and the violation of human rights. The economic justice component addresses the issues of unfair trade, economic exploitation, the unequal distribution of wealth, racism and poverty. Finally, the cultural justice dimension encompasses all the other three components of sustainability justice in the same way as it does the three sustainable development pillars. In this sense, "Sustainability Justice is a process, not an outcome, which: 1) seeks fair (re)distribution of resources, opportunities, and responsibilities; 2) challenges the roots of oppression and injustice; 3) empowers all people to raise their voice, needs and rights; and 4) constructs knowledge, empathy, compassion, social solidarity and action competences" (Makrakis, 2017, p. 105). It has been found that all the four dimensions of sustainability justice are reflected upon the whole Earth Charter document and are related with its underlying vision (Kostoulas-Makrakis, 2017). The critical question that one should ask is: Are we preparing students to challenge the sustainability injustices or are we preparing them to reproduce and perpetuate an unjust growth-oriented global society? How can information and communication technologies (ICTs) enable education for sustainability justice?

## The quest for meaningful learning

If we are to imagine new ways of knowing, being, living, doing, giving and sharing as well as transforming oneself and society, we must be capable of assessing and bringing about social change, raising consciousness, engaging in critical reflection and discourse. In other words, the learner should be able to think and act "out of the box", rather than merely replicate what is "found in the box." The focus of 20th century schooling has been on the latter goal, contributing to the great majority of students feeling ultimately frustrated and bored. School systems worldwide have adopted a manipulative instead of an empowering and emancipatory pedagogy and a prescribed, vertically structured and overloaded curriculum that does not reflect what is happening outside the school.

In general, education has failed to give learners agency in decisions concerning their learning content and methods. It has also failed to bring the school into society and society into the school by neglecting the potential and will of learners to make a difference in their communities and in the world. The fallacy is that any progressivist pedagogical concept advocated has been bottled in old and manipulative pedagogical practices, leading to surface learning that involves cramming and memorizing. Teaching instead the deeper or underlying meaning of what is being taught should enact a shift from a shallow and instrumentalist pedagogy to meaningful learning. The key characteristics of meaningful learning, as we have conceptualized them from a critical and humanistic pedagogy perspective are as follows:

**Reflective** learning that invites students to engage in a self-critical assessment of their learning experiences to identify areas that require improvement so they can proceed in constructing new knowledge that makes a difference.

**Active** learning that involves students in a process that requires them to play an active role in constructing knowledge and understanding.

**Experiential** learning that engages students to reflect on, learn from, develop new knowledge and take new action based on experience.

**Constructive** learning invites students to experience things and reflect on those experiences to construct understanding, knowledge and meaning in the world.

**Transformative** learning that involves students in a critical self-reflection process to deconstruct, construct and reconstruct themselves and social realities.

**Collaborative** learning that invites students to construct meaning and knowledge collectively and collaboratively.

**Dialogical** learning that engages two or more students in a process of structured, purposeful egalitarian dialogue with the shared goal of raising their critical consciousness on an issue that concerns them both.

**Political** learning that involves students in a process to reflect and act on themselves and the world in order to transform it.

**Ethical** learning that invites students to reflect and act to achieve a common good driven by moral principles and values.

**Authentic** learning that involves students in a process that allows them to explore, discuss and meaningfully construct concepts and relationships in contexts that involve real-life problems.

**Problem-posing** learning where students identify, code and decode real-life issues through critical discursive reflection and act to change realities.

**Subversive** learning that enables students to raise critical questions about teaching, learning and curriculum and their role and underlying assumptions about these processes.

The meaningful learning components listed reflect the 21st century super skills of critical thinking and problem solving; communication; collaboration; and creativity and innovation. These super skills are more commonly known as the 4Cs advanced by the Partnership for 21st Century Skills, which has been widely disseminated in the last decade. However, in a world of rapid change highly driven by ICTs and expansion of human knowledge along with the current sustainability crisis that threatens the very existence of humankind, education must go beyond the 4Cs to what we term the 10Cs enabled by ICTs (Makrakis and Kostoulas-Makrakis, 2017). The 10Cs represent: (1) Constructing knowledge; (2) Critical thinking and problem solving; (3) Communication; (4) Collaboration; (5) Creativity and innovation; (6) Connectivity and networking; (7) Critical consciousness; (8) Critical reflection; (9); Cross/inter-cultural competence; and (10) Co-responsibility.

## Defining the 10Cs paradigm

There is no single right answer to developing a 21st century learning environment, but expanding our notions beyond the 4Cs combined with the potential of ICTs in unlocking the spatial and temporal restraints of 20th century schooling will help us shift towards a more meaningful learning environment (Makrakis, 2017). ICTs can facilitate more meaningful learning by giving students a concrete pedagogical strategy to explore real-world issues and make positive changes locally and globally (Makrakis, 2014b).

Although there is some overlap among the 10Cs, each one plays a distinct role in the teaching and learning process. For example, tackling a challenging critical thinking question or addressing a real-world problem or issue requires collaborative, communicative, creative and reflective skills. These super skills can be enabled by ICTs, such as Pixie, Frames, Share, Thinkquest and Destination ImagiNation, which can help learners engage in collaborative, communicative and creative problem-based learning in real-life contexts. Learners can also utilize the resources availed to them on the web to research, communicate, collaborate and create by setting up a blog using Blogster or Blogger, a wiki using WikiQuESD (Makrakis, 2010) and tools like Google Docs or LiveMinutes. Another online application called "VoiceThread" enables learners to upload and present images, documents and videos and then share comments with other students.

As mentioned, blogging is a good means for virtual communication (e.g. Edublogs, Blogger and WordPress) and when used along with mind/concept-mapping tools (e.g. SpiderScribe, Wise Mapping, ChartTool, Cmap, Creately), it can represent a great collaborative way to reflect, conceptualize, construct and assess knowledge. Constructing knowledge represents an attempt to actively shift from consuming knowledge to creating it. Such tools also help connect ideas, knowledge and perspectives. Connectivity is a critical skill that goes beyond connecting knowledge in the mind (Head) but also merging it with feelings (Heart) and human agency (Hand). Connectivity can also be significantly enabled by ICT-driven social networking tools. These tools can boost learners' critical thinking, creativity and critical consciousness by providing them with different ways of knowing and reflecting. Critical consciousness or conscientization in Freire's (2005) terms denotes the process of developing a critical awareness of one's social reality through reflection and action. Critical reflection strongly engages learners to uncover answers that relate to who they are and what they should be. Digital storytelling activities allows students to use multimedia tools (images, audio and video) to empower, emancipate and construct knowledge. As mobile communication media and the internet become more affordable and accessible, the encounter between different cultures becomes more enhanced, necessitating the development of cross-cultural awareness, understanding and communication.

All 10C super skills necessitate an alternative conception of responsibility that views every person as responsible for the consequences of their decisions, which correspond with his/her awareness. Co-responsibility is thus a skill that cannot be left out of the 10Cs paradigm.

## Education as an agent of transformation of individuals and society

We are living with a series of sustainability crises fueled with injustices across all the four dimensions of sustainable development – environment, society, economy and culture. Meanwhile, education has been used as an instrument to perpetuate these injustices. Accordingly, there is a need to shifting from the current manipulative pedagogical paradigms and learn to view the world and, therefore education, in a new way. In a sense, education must lead to empowering learners to understand who they are and what they should be. This necessitates placing the 'whys' before the 'whats,' which translates to perceiving teaching and learning as an ethical and political praxis. Our meaningful learning conceptions and development along with our expansion of the 4Cs paradigm of super skills to the 10Cs is expected to contribute towards transforming education for the 21st century. These skills can enhance the power of education as an agent of change to advance more sustainable ways of knowing, being, living, doing, giving/sharing and transforming oneself and society.

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# Artificial intelligence for the common good in educational ecosystems

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This piece reflects on how artificial intelligence (AI) can help solve global learning crises and how a concept of AI for the common good can serve in these contexts. In both instances, we must first understand what public-private relationships mean in an AI context and what new challenges can arise from interactions between human and machine learning. Crucially, the governance of AI and how it can best serve education needs to be decided beforehand.

Machine learning (ML) has rendered computers and digital devices more interactive and adaptive based on users' reactions and needs (Amershi et al., 2014), and deep learning marks a striking advancement in ML programming. Globally, artificial intelligence (AI) is implicate in several common themes related to education and learning, such as teaching robots, intelligent tutoring systems, online learning and learning analytics to analyse and profile different learners. Augmented and virtual realities enable interactive high-standards competence training, especially in areas such as health care and security systems. Massive open online courses (MOOCs) and other online education models operate at all levels – predominantly in higher education – and are connected with a plethora of products (e.g. tools for contextual in-text and -video discussions, formation of study groups and connecting learners in real time, in the real world (Grover et al., 2013; Synced, 2018; Standford University, 2016).

Most new tools have been developed by companies and offered through privatized education markets (UNESCO, 2019). Markets and Markets (2019) forecasts a global market growth from US$ 373.1 million in 2017 to US$ 3.684 billion by 2023, at a compound annual growth rate of 47%. AI offers opportunities to expand learning in and beyond traditional classroom, yet simultaneously requires a new understanding of education and learning. AI will also decisively reshape our concept of expertise. These circumstances call for new kinds of education and training to enable people to take advantage of AI and prevent mass unemployment under newly structured working conditions.

## Does AI present the solution or is it a new divider?

While AI is making strides in educational developments, global inequalities continue to grow. According to the latest assessment, at least 250 million children are unable to read, write or count adequately – even after four years in school (UNESCO, 2014; 2017; UNICEF, 2017; World Bank, 2018). Many children emerge from school unprepared for adulthood and the labour market. Unemployment is a reality for many as the nature of work is changing and new competences are needed. According to recent UNESCO and World Bank reports, millions of young students could miss opportunities because their schools are not preparing them adequately for future success. By 2030, more than half of the world's young people – over 800 million, including about 400 million girls – will not possess basic skills (Education Commission, 2016; Lant and Sandefur, 2017). Already at play are traditional factors of educational marginalization, such as gender and residence, combined with income, language, minority status and disability, particularly in low-income or conflict-affected countries. Sounding the alarm, the UNESCO conference warns "already today, there is a major skills gap in the labour market when it comes to AI-related jobs and skills," concluding that "we need serious efforts to prevent the development in which AI will exacerbate digital divides and deepen existing income and learning inequalities, as marginalized and disadvantaged groups are more likely to be excluded from AI-powered education" (UNESCO, 2019b).

## A new definition of 'common good'

AI breaks public and private sector boundaries in educational service production and calls into question what constitutes a public good. Recently, critics have questioned the relevancy of traditional definitions of a 'public good' based mainly on economic and individualistic approaches (Holster, 2003; UNESCO, 2015; Daviet, 2016). Public goods are typically contrasted with private goods and services. Civil society organizations' increasing involvement in the field and the trend towards the privatization and commodification of education demand new educational governance (Lant and Sandefur, 2017; Tooley and Longfield, 2015; UNESCO, 2019a).

A new concept of the common good has emerged in educational discussion, encompassing ethical and political concerns and providing principles for rethinking education's purpose. Daviet (2016, p. 8) claims that the common good must benefit all. The common good is a collective decision involving the state, the market and civil society. In an AI context, we must explore how it can serve the common good and prevent deepening global inequalities (Tooley and Longfield, 2015). Doing this requires governance and procurement structures that involve the state and a variety of non-state actors. AI is a powerful tool that can provide new learning opportunities, especially to those in danger of exclusion, however, it cannot replace or fix an underdeveloped educational system. In many countries, the weakest and most vulnerable learners need support and new learning tools yet often don't possess the means or have the opportunities to afford market-based services.

AI's implication in education needs to be viewed in terms of ethics, security and human rights. At the core of the debate are issues that include rights for the collection, use, storage and analysis of data. Thanks to new technology, data can be gathered on almost anything

related to what humans undergo during learning processes, including cognitive and socio-emotional features, bio-signals, facial/body expressions, behavioral actions, how they react in their surroundings and environment as well as the role of health, entertainment and sport. AI capabilities can categorize and profile people based on many features and bias data through algorithms. Collected data can augment people's learning journeys but may also help subjugate people if clear ethical principles of data transparency, security and rights are not in place. To take full advantage of AI in education, policy level decisions of governance are needed as well as new pedagogical developments.

## Governance needed to ensure the quality of knowledge

Education encompasses wider societal perspectives than do AI applications. Education is related to values, moral foundations, sustainability and purposes that promote quality of life. To render education relevant and empower its use to solve global challenges, we first need high-quality knowledge that is available to all. People must also be able to evaluate the quality of knowledge through and with ethical foundations, critical thinking, independent judgement, problem-solving, and information and media literacy skills that represent the keys to developing transformative attitudes (UNESCO, 2019, p. 38). This requires that learners possess a wide spectrum of knowledge and transferable competences. These issues are crucial to address when designing curricula for lifelong learning and when considering AI a tool to enhance learning, which is a continuum in which schooling and formal education institutions increasingly interact with other less formalized educational experiences from early childhood throughout life. Implicating AI in education first requires more discussion on education's purpose and governance, and the clarification of different partners' responsibilities. Governments and a variety of non-state actors must anticipate the future and create conditions that bear an impact beyond the present setting. To this end, actors must work together to design, adapt and replicate innovations in AI that extend the impact of learning and create systems that lead to lifelong learning and high-quality education for all.

## Interactive human and machine learning

Amershi et al. (2014) propose that interactive ML differs from traditional ML. The interaction cycles in interactive ML are typically more rapid, focused and incremental than in traditional ML. This increases users' opportunities to impact the machine learner and vice versa. As a result, the system and user contributions to the outcome cannot be decoupled. This requires new kinds of pedagogy. We now have two learners, which necessitates studying the system together with its potential users (Amershi et al., 2014). For both learners, the aim is deep learning – ML towards adaptive and interactive learning, and human learning towards understanding connections and relationships. Recent research on human learning emphasizes processes in which learners have agency in constructing their knowledge base and a value of social contexts (OECD, 2013). Socio-cultural theories can offer insights as they focus on the social interaction that occurs between learners and a teacher as well as between learners (Vygotsky and Luria, 1994: Kozulin and Presseisen, 1995). Socio-cultural theories also emphasize learner-tool interactions. In AI environments, we need to study the system alongside its potential users with ML. We need to identify human user needs and

desires, and inspire new ways in which learners could interact with ML systems. Finally, we need to identify common barriers faced by humans when novel interfaces and ML systems are introduced.

## The future of AI and pedagogy

Human ecosystems are affected and developed by human actions. AI places new demands on all parts and partners of the education system, hence we must be aware of the influence of different parts on the system. AI can become a common good, but this first requires urgent discussion between different partners on how power, rights, responsibilities, control, regulations and resources are negotiated and agreed upon in the system. AI must not increase inequalities and narrow knowledge. To avoid this, new governance is needed at global and local policy levels, and new analysis and design of curricula is required from the perspective of lifelong learning and values. AI learning environments also elicit questions on how human learners and communities will gain learning agency when machines are also learning. This sets new challenges to pedagogy. AI can serve as a powerful tool but it should be situated in a wider educational context to aim for sustainability and inclusive human and social development.

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# Ideas for gender-transformative futures of education in the digital age

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The authors reflect on what it would take – both in classrooms and through higher education – to transform media and information and communications technology (ICT) to be more gender-responsive.

Feminist scholarship and feminist media educators in particular have dealt with issues of inequalities, violence and exclusion – as well as their intersections – for decades. We have conducted research on the causes and consequences of gender inequalities in and through the media; developed teaching programs and developed thematic modules to raise students' awareness of the different forms of exclusion and their repercussion on the very fabric of democratic societies; and we have contributed greatly to the articulation of the nexus between gender-unaware (and too often sexist) media operations and the different forms of gender-based violence through the use of language that silences women, degrading images that objectify them and the imposition of societal models that constrain their autonomy and potential to become fully recognized citizens.

We find ourselves well into the 21st century, wondering how to deal with a media environment that has been profoundly transformed, yet continues to perpetuate persistent forms of gender inequality. We are witness to a reality that presents a mix of slow progress in making the media and ICT more gender-responsive combined with new challenges to gender equality emerging from the complexities of digital developments – from digital divides and big data to artificial intelligence and machine learning.

## Persisting inequalities, violence and exclusion

Have we done something wrong? Have we not adequately prepared successive generations of media professionals and media managers to work with an awareness of gender diversity? Have we not helped them see it as an opportunity to make societies more equal and inclusive, hence better able to deal with the complexities of the present? Or do the problems reside elsewhere? What enables societies across the world to remain resistant to the many efforts carried out by gender-sensitive educators who have often also engaged as active

citizens beyond classes and courses in local, national and international contexts when media systems were being designed, developed and implemented?

The question today is: what would education in the future look like if all the acquired expertise (i.e. experiences of collaborative thinking and knowledge sharing, and lessons learned through teaching and learning), particularly in higher education institutions, could be translated into reflective, responsive and transformative gender-aware approaches and models to educate a new generation of media professionals, ICT developers and global communicators? To find clues, we can look to the past. As a starting point, let's take the First World Conference on Women held in Mexico City in 1975 and review the progress made all the way through to the Beijing World Conference in 1995, celebrating its 25th anniversary in 2020. What inspires us today in spite of the very modest progress achieved over the past four decades or so are the signs of a current crisis, which also indicates a transitional phase.

Things are happening in our classrooms. On the one hand, students are genuinely interested in how gender inequalities characterize the world and, on the other, they are mostly oblivious to the concrete realities of such inequalities. This insight is drawn from the findings from any number of studies, assessments and monitoring exercises. Students know how things should be but have little knowledge of how things actually are and are therefore unprepared to face the challenges and determine how can contribute to make change happen. However, once students are exposed to the facts – the numbers, stories and histories of gender inequalities in and through the media and ICT – they experience what we call a 'critical moment,' which constitutes a combination of surprise, disappointment, outrage and/or call for (re)action.

These epiphanies may help them to move beyond an ambivalent attitude. This stance can be defined as an acceptance of irrelevance, which can be experienced, for instance, when confronted with the well-known practice of all male panels. Epiphanies may instil the desire to become part of the solution by adopting and applying a gender lens to critically view and interpret the unequal realities around them. Essentially, these epiphanies could mark a first step towards making change happen and these transitional moments carry a huge potential for change. We could be on the verge of a paradigm shift towards learning and educational experiences that may contribute to the transformation of the personal and professional realities of gender inequality, violence against and exclusion of women. This calls for a profound rethinking of educational approaches and methods as well as a review and possible re-booting of our role as educators.

## Reimagining the classroom as a space to foster change

We believe that to foster and speed up the shift, rethinking should start with the classroom. It could be a teaching-learning space for students and teachers in which we exercise critical attitudes and develop critical skills, and through this process become capable of imagining alternative futures and human relations. Students should be encouraged to be imaginative and develop new visions of gender-responsive media through the elaboration of concrete projects. The classroom should also operate as a space to consider gender as a relational concept that involves and speaks to everyone. It should serve as a space that facilitates the recognition of the intersection of inequalities and axes of power, where personal identity

also incorporates characteristics, such as sexual orientation, ethnic background, age, class and religion. Students should be invited to elaborate, reflect and write about their own experiences of intersectionality.

The classroom may also become a space that is attentive to the specific challenges of the locale while at the same time, maintaining an awareness of the linkages between that locale and the many others across the world. Students should be involved in collaborative transnational projects to explore, compare and discuss the different experiences of gendered inequality that exists. These encounters should make use of digital technologies – especially those platforms specifically designed to foster intercultural exchanges – and not simply comprise communication as a remote experience. Blended forms of learning could therefore translate into transcultural encounters and favour a direct experience of the educational power of cultural diversity to debate controversial and contested issues such as gender inequality. In such a context, teaching and learning for the media, ICT and communication professional would mean imagining a future of media making through diversity while jointly working on projects that highlight the gendered nature of language(s), the frames we use and the framing of issues. We could develop projects where issues of exclusion and inequality are addressed using a holistic approach while maintaining an awareness of the histories that have defined unequal relations and remaining attentive to the intersections of unequal power relations in society.

## A holistic approach requires a host of diverse practices

Adopting and practicing a holistic approach would mean addressing the many issues that pertain to gender inequality in and through the media in syllabi content and class conversations. Such issues include unequal representation; limited access to media and decision making; gendered cultures in newsrooms and digital programming organizations; and harassment on and offline, particularly against women journalists, women who takes public positions and those who occupy roles of responsibility.

A holistic approach also implies a diverse set of learning practices combined to foster a better connection between theory and practice. This connection could help promote transformation using several knowledge sources, including acquiring an understanding of the complexities of communication realities by listening to women's and men's voices; entering into dialogue with different professional worlds and experiences; working hands-on, in mixed groups and connecting across cultures; critically reflection; and having the courage to engage in alternative thinking.

A multiplicity of practices should characterize and enrich the future of gender-aware education – theory and practice; local and transnational; listening and voicing; exploring histories and imagining alternative worlds. This would happen in classrooms imagined as dialogical settings where it would be possible to deconstruct the cultural and social sources of inequality through rigorous investigation and learning from available data. Such classrooms would be spaces for creative experimentation with alternative languages, vocabularies, images and genres – spaces enriched by international encounters where gender-aware storytelling from different geo-cultural contexts would parallel the opportunities to learn from academic studies and research, including those conducted in

other regions and cultural contexts.

## Preparing our youth to assume a gender-transformative role

Creating educational settings that encourage young people to take some responsibility for changing the media through diversity implies addressing the question: who is in charge? This, in turn, requires a reconsideration of the very role of the teacher. Educators themselves would be required to perform different roles to facilitate dialogues and discover the many initiatives that, across decades, have been developed within and outside academia to deal with media-gender inequalities. They would be required to listen to emerging questions and proposals, thus supporting experimental approaches to address gendered and intersectional issues. They could also perhaps invite students to write for online platforms as well as simulate newsrooms to provoke deeper explorations and nurture critical questioning. This approach could help boost their courage to speak up in class and beyond, including engaging with media and ICT professionals in 'think sessions' where experiences can be shared. Thus, educators would learn alongside students and participate in the transformative educational experience.

Clearly, in such an educational environment, reflexivity emerges as a critical element. Assessment of learning would no longer be centred on the capacity to reproduce and replicate lecture content. Again, this would require a reconsideration of current evaluation approaches and mechanisms if we are to nurture the next generation of communication professionals to learn to question, critique and deconstruct media structures and mechanisms as well as languages and practices through a gender-aware perspective. This approach will help prepare young people to assume a gender-transformative role in society.

The challenges are broad and much thinking and experimental practice is needed to develop new models of critical education to promote gender-sensitive media and communication practices. As we begin to imagine different educational futures, we need to keep in mind the transversal relevance of gender-aware education, particularly in the field of media and ICT. Gender diversity and equal opportunities are crucial if we are to realize sustainable communication practices, processes and technologies. New ways of teaching and learning must be rooted in the many 'knowledges' that have been elaborated by women over the centuries in their different communities and contexts as responses to the multiple and intersecting forms of inequality they have experienced over time. By initiating reflections from personal experience and adopting an approach that acknowledges and values diversity in the classroom, everyone is invited to enter into a dialogue about their different skills and competences, lived experiences and stories. Such a process, in turn, is crucial to imagining something different, starting from the classroom setting. Ideally, the reimagined classroom would be a space that encourages the fundamental democratic principles of freedom of expression, pluralism and participation that are still not fully articulated from a gender perspective – all while encouraging women's empowerment. Higher education institutions play a vital role in this context as they are at the forefront of the paradigm shift to make gender equality a reality in the media and through communication in the digital age.

# Science as a cultural right

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This piece argues that the human right to science – in its normative and practical significance – provides a useful framework for linking education to knowledge production and dissemination.

We all have a human right to the benefits of scientific progress. This right has its origins in Article 27 of the United Nation's 1948 *Universal Declaration of Human Rights* (UDHR) – the document affirming the international community's moral and political commitments toward all humans in the wake of the Second World War. In 1966, the adoption by the UN of the International Covenant of Economic, Social and Cultural Rights (ICESCR) turned these commitments into binding obligations for ratifying states under international law. Article 15 of the ICESCR implies that governments are equally obliged to respect and adopt measures to ensure the right to science as they would any other rights, such as freedom of speech and due process.

Both the UDHR and the ICESCR refer to the right to science in conjunction with the rights to take part in cultural life and authors' rights. Together with the right to education, these three rights constitute the core of 'cultural' rights. Simultaneously transformative and empowering, these rights provide a much-needed discourse or a common forum in which to explore, negotiate and come to new cross-cultural understandings. This is important since respect for cultural diversity is a principal concern worldwide as migration and advances in technology are increasing the level of cultural exchange, yet also intensifying cultural clashes and incompatibilities previously masked by distance (Porsdam, 2019). If we want to address the futures of sustainability and knowledge as well as, more broadly, of citizenry, democracy, and social cohesion, we need a truly global discourse. Cultural rights provide us with such a discourse.

## The historical neglect of the right to science

Cultural rights only rarely receive the attention they deserve. This is not least true for the right to science even though science and technology are changing human existence in ways that no one thought possible just a few decades ago. Precisely because many profound changes we are currently experiencing are a direct impact of science and technology, it is imperative that we view the right to science as a right that is important in and of itself. Historically, it has been viewed as merely a right that supports other rights – such as the right to health – and this has lessened its perceived value. Farida Shaheed, the first UN Special Rapporteur in the

field of cultural rights, has argued that we should see the right to science as strongly linked to the right to participate freely in the life of the community. Both rights relate to the pursuit of knowledge and understanding as well as to human creativity (UN Human Rights Council, 2012, para. 3). Just as the right to participate in cultural life enables us to contribute to society's cultural meanings and manifestations, the right to science affords us the possibility to engage in critical thinking and to investigate and contribute new knowledge in the field of science (UN Human Rights Council, 2012, para. 18).

The historical neglect of the right to science has in part been due to the difficulty in interpreting its implications – both normative and practical (see Porsdam Mann et al., 2018). The right to gain scientific knowledge (i.e. the right to gain an education in science) overlaps with both the right to education and the right to information. It is a right that exists inside as well as outside the classroom. Inside the classroom, students should learn about the latest scientific discoveries and their applications. However, popularizing science outside the classroom, such as through science cafés, science museums or citizen labs dedicated to a more popular dissemination of scientific knowledge, is equally important (UN Human Rights Council, 2016, para. 27).

For the framers of the UDHR, there was a connection between the right to the full development of the human personality and the rights to education and science. The framers perceived that to participate in the benefits of education and science means to be able to receive affordable medicine, for instance. But it also means obtaining the means to combat intolerance, prejudices and ignorance (Morsink, 1999).

## The dissemination of science and public participation

A human rights approach automatically switches the focus to the disadvantaged. Applied to the right to science, "this requires a form of affirmative action, that is, specific investments in science and technologies likely to benefit those at the bottom of the economical [sic] and social scale" (Chapman, 2009, p. 14). Of special importance here is access. Access by all without discrimination is a precondition for participation in science and decision-making. Today, public access to scientific information and knowledge primarily involves digital media, for example, making digital versions of new research public through open-access journals and repositories as well as mandatory open-access policies. Ensuring access to information through communication technologies and the Internet is therefore a crucial obligation for Nations.

Significant digital divides exist today. Crucially, not everyone around the world can afford access to the Internet. Further, when it comes to the use of digital media, gender still poses a major barrier. An additional obstacle to the digital diffusion of science is the need for translation or curation. Funding bodies who invest in research do not always provide financial support to scientists or science journalists to then translate the resulting data and outcomes into a language that the public can understand. Large-scale science projects can oftentimes end in data being made publicly available but not explained or contextualized for the public. Likewise, in the world of cultural and natural heritage, the digitization of heritage is simply

seen as a goal in and of itself. There is a preconceived notion that scientific findings simply need to be digitized so the public can access and use them. However, open access to science is only the first step. To actualize the human right to science and culture, the digitized data or results need to be presented and contextualized in a way that promotes understanding by the lay public. Thus, unless a level of curation is built into the digitized publication process, access to basic scientific information will continue to elude the lay person.

Moreover, from a human rights perspective, participation must lead to decision-making as it is an essential component of democratic citizenship. Public consultations on scientific advances and their implications are necessary to ensure the advancement of appropriate research that can address vital social needs – in the areas of public health and the environment, for example. Further, particularly when it concerns vulnerable or marginalized populations, such as indigenous peoples, we must not shirk the responsibility to conduct scientific research in a socially and ethically responsible manner.

## Building the capacity to aspire for a better future

Anthropologist Arjun Appadurai has argued that for poor and disadvantaged peoples to subvert the present order of things and fight for a better future, they need imagination and aspiration. The unfortunate reality is that the capacity for imagining and aspiring is unequally distributed across the globe even though it is nothing less than a basic requirement for survival on which the very possibility of a better future rests (Appadurai, 2013). It is when the capacity to aspire is linked to what Appadurai calls 'the right to research,' that hopes and visions for a better future may be realized in practice:

> Without aspiration, there is no pressure to know more. And without systematic tools for gaining relevant new knowledge, aspiration degenerates into fantasy or despair. Thus, asserting the relevance of the right to research, as a human right, is not a metaphor. It is an argument for how we might revive an old idea, namely, that taking part in democratic society requires one to be informed. One can hardly be informed unless one has some ability to conduct research, however humble the question or however quotidian its inspiration. This is doubly true in a world where rapid change, new technologies and rapid flows of information change the playing field for ordinary citizens every day of the week. (Appadurai, 2006, pp. 176-77)

Calling for science to be used as an instrument for human benefit, ICESCR Article 15 touches upon complicated and important issues of access to and participation in science, science policy and science priority-setting. Situated within the larger cultural rights and ICESCR framework, the Article 15 rights present a practical method of analysis for issues that are relevant today and will only increase in importance over time. These include access to, ownership and dissemination of data, knowledge and methods as well as their affordances and applications. Similarly, Article 15 touches on the role of international co-operation, human dignity and other human rights in relation to science and its products. This practical approach is backed up by international law and public morality, which provides a unique and powerful angle to explore these intricate questions and to engage in discourse on the futures of education.

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# Web-based collaboration: a prospective paradigm of mathematical learning

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The author envisions a future comprising of a 'collective mathematical mind' through the use of collaborative web-based problem-solving tools in mathematics education. With this approach, he envisions the future role of mathematics education not as just developing individual skills, but creating collaborative capacities between man and machine while combining the strengths of different learners and learning styles.

Mathematics has caused many tears to both learners and their parents worldwide throughout the ages. It is not attractive to most young people, because it can be difficult to understand and requires much effort in developing sound reasoning and problem-solving skills capacities. Proof is the hearth of mathematics. Mathematical conclusions require proof. However, proofs are needed everywhere, not just in mathematics, but also in the physical sciences, computer science, philosophy, legal argumentation, political debates, and elsewhere. Hence, mathematical proving skills impacts all of science, technology, engineering, arts and mathematics (STEAM) education and young people's career choices in these fields as they rely heavily on the use mathematical argumentation and models. Unfortunately, there is much resistance from learners in acquiring these essential skills. The problem, commonly called 'mathematic-phobia,' is faced worldwide. It remains an unsolved puzzle not only for learners, but also for their parents, teachers and tutors; researchers in mathematics and science education; as well as ministry authorities and policy-makers.

## Use of the web to facilitate global collaboration

As an information system that facilitates knowledge sharing on a global scale, the web may critically transform the way we understand the activity and exercise of proving mathematical theorems. The web, as a collaborative medium, allows the active participation of people from different knowledge or cultural backgrounds, interests, values, viewpoints, skills, levels of giftedness and styles of thinking. The use of this medium can spark significant changes in the practice of proving, our vision of proof in STEAM teaching and thereby, in the way that proving practices are assimilated and implemented by learners.

The use of the web as a means of communication and collaborative search for proof dates back to relevant projects developed by Joseph Goguen (the Tatami project) (Goguen, 1999) and Timothy Gowers (the Polymath project) (Gowers, 2009; Gowers and Nielsen, 2009). The positive outcome of the latter raised serious questions on the advantages of this innovative mathematical practice and its collaborative character. Michael Nielsen uses the term "networked science" to denote the kind of open science that can be discovered using such new cognitive tools, facilitated by the W (Nielsen, 2011). Further, J.P. van Bendegem claims that the Polymath project has important consequences for the philosophy of mathematics (van Bendegem, 2011).

In essence, web-proving turned out to be a novel kind of proving activity with far-reaching consequences for mathematics education. The primary feature of the web that facilitates mathematical proving practice is its 'openness.' In contrast to the traditional communication methods, which are one-to-one or one-to-many, web-based communication enables the transmission of many-to-many. The web's distinctive interactivity enables the shaping of groups to collaborate over a problem posed and behaves like a goal-directed multi-agent system evolving in space and time (Vandoulakis, Stefaneas 2016). The interactivity afforded by the web enables collaborative group problem-solving, by which the solution for a given problem is sought through spontaneously generated ideas or arguments contributed by its members that depend on their knowledge background, talent, skills and styles of thinking. Thus, the final proof, when reached, is attached to a collective authorship as it is the outcome of a "collective mind" (Stefaneas and Vandoulakis, 2012).

## Harnessing collective intelligence to problem solve

'Collective creative thinking' and 'collective memory' are essential components of web-based mathematical problem solving. The image of an individual mathematical mind intelligent enough to cope with profound mathematical problems will be replaced in the future by the image of a web-based 'collective mathematical mind,' consisting of humans, machines or most likely a combination of both. Collective intelligence grounded in web-based problem solving is thought to become a cornerstone of mathematical education in the future. This new type of intelligence can be understood as an emergent distributive property over numerous individual minds functioning as a "collective mind" that uses a set of flexible and adaptable tools from a web-based repository to model and solve mathematical problems in various situations (Stefaneas, Vandoulakis, Martinez, and Foundalis, 2014).

Currently, we are witness to the emergence of a new mathematics education paradigm. The goal of mathematics education will no longer be to grow individual problem-solving skills for various learners who possess different levels of perception, different capabilities or giftedness and reason in different styles. The main purpose will be to nurture 'collaborative problem-solving capacities' that draw strength from a variety of learners' styles of thinking; their cultural and educational background; different levels of giftedness; as well as gender mindset and mentality. These pooled resources will be combined with the potentialities of the web as an open medium of communication and repository of available cognitive tools, functioning

as a collective memory of humankind. This approach will transform mathematical discovery into an intercultural, social process. Proving will no longer be an individual enterprise. Its social dimension as well as the social and ethical aspects of mathematical discovery will be fully manifested and used (Stefaneas and Vandoulakis, 2014).

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# 5. Knowledge and transformation

## Setting the stage for the futures of education

# An interdisciplinary humanistic approach to education

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This thought piece calls for an interdisciplinary approach to education to prepare learners for a future world where technological skill and social science knowledge will be required in tandem. The author argues that a humanistic approach to education is sorely needed to promote self-expression and spark creative thinking for the common good.

In modern higher education, disciplinary division is universal as is necessitated by the development of knowledge. Thus, since the beginning of the twentieth century, encyclopedic academics have been a rarity. Nonetheless, since life is a coherent whole and livelihood is also a coherent whole, a disciplinary vision that is too narrow may give rise to myriad and varied problem.

## Education for an interdisciplinary world

One example of how disciplines that are neatly separated in institutions of learning merge in real life scenarios relates to the intermingling of artificial intelligence (AI) and social sciences. Since AI technologies came to prominence, the legal community has been discussing whether copyright applies to machine-produced works or whether AI will qualify as a legal subject – without looking deeply into the meaning of 'subject' and 'creation', as if humanness can be inferred directly from 'capacity.' What is overlooked here is free will as a philosophical symbol of humanity, thus severing the link between creation and the human being. Law belongs under the auspices of social sciences while social sciences have always been closely connected to the humanities, and legal philosophy has long been a branch of law. However, except for the teaching of legal philosophy and jurisprudence, the departmental sciences of law have been shifting farther and farther away from philosophy. If the education of social sciences has shifted in such a manner, it is not difficult to imagine the same happening for the natural sciences.

## 'Real' thinking to build a capacity for the judgement of values

In this age of constantly updated technologies, knowledge can be acquired through an increasing number of channels, and resources on the internet can help students learn without dependence on a university classroom. Today, what is in need is not knowledge but 'real' thinking as what is difficult is not the identification of 'facts' but the judgement of values. In this age of new technologies, universities have to redefine the humanist value of education, rather than allow themselves to become institutions of vocational training. Today, the fear of humans being replaced by machines is prevalent, which echoes the modern individual's lack of self-confidence in their own free will and creativity. The more technologies develop, the more guidance individuals need from the discipline of philosophy. Zhuang Zi, an ancient Chinese philosopher, advocated the idea of "utility of futility", which suggests that knowledge that seems to be 'futile' is itself the most useful. Otherwise, people risk lose direction in life, even though technologies may increase their capacity.

With the development of technologies, more and more physical labour and non-creative intellectual activities can be handed over to machines, bringing the creativity of humans into fuller play. If traditional education featured much skill-based training, the cultivation of creativity will surely be the sole focus of future education. The main source of creativity is a free mind and strong will of self-expression, and these can only be nourished through humanistic education.

## The purpose of education in the future

The ultimate purpose of education is to foster well-being. Regardless of the type of knowledge, its teachings should bring to light the connection between knowledge and the meaning of life. The more granular the division of labour in society, the less essential an individual will seem. Failure to perceive the wholeness of life and grasp what this means can render us vulnerable to a myriad of psychological issues. Reshaping the human mind and equipping it through humanistic education to promote interdisciplinary dialogue should be the goal and direction for future education.

# Anticipation for emergence: defining, designing and refining futures literacy in higher education

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The authors argue that, in today's ever-changing and turbulent times, higher education should teach 'futures literacy,' the capability to become more open and creative in the face of the unknown and open ourselves up to new futures.

We live in turbulent times. The systems we work, study and live in are increasingly complex and so are the challenges that face us. What appeared to be certain, predictable and plannable now seems questionable, unprecedented and chaotic. What we once considered to be knowledge and facts may have become less evident and trustworthy. This realization could either paralyze us or motivate us to accelerate our actions – either way, it should give us pause to rethink our next steps (Akomolafe, 2018). These complex times demand a curious yet patient approach as it is complex and requires us to pay attention to "change in the conditions of change" (Miller, 2018). If problems feed on disruption, then disrupting the problem with quick fixes will only feed the complexity. Thus, we need to 'feed' something else when we relate to the future. We need to feed the love for complexity in ways that inspire us to look around us with care, to discover the unprecedented, the unseen, unheard or yet imagined novelty. We need time – if even temporarily – to slow down and nurture a mindset that embraces uncertainty, strengthens personal resilience and increases our ability to use our imagination to go beyond the current knowledge. In this paper, we argue that higher education and research should give way to 'futures literacy,' which encompasses the capacity to enhance sensing and making sense of complexity and emergence (Miller, 2010).

## Futures literacy teaches us to deploy our anticipatory systems

Futures literacy, as depicted in Miller's framework on the discipline of anticipation (2018), is the capability to see and use the future for different purposes and in different contexts as well as to take notice of the assumptions from which future visions, goals and strategy derive. When we become aware of the different assumptions on which we base our futures, one can become futures literate. When we plan, prepare or optimize, we use our so-called anticipatory systems to try and influence the probable, predictable, preferable, plausible, possible or potential futures. We anticipate for the future. The framework on the discipline

of anticipation also describes another more open and exploratory way of deploying our anticipatory systems, using the future in a diversifying way by anticipating for emergence. By combining the two – anticipating for the future *and* for emergence – we become more open and creative in the face of the unknown and open ourselves up to new futures (Miller, 2015). It is what Miller calls "walking on two legs." As we often only use one leg in the present, we need to develop the other one. Currently, higher education and research focus on grand societal challenges and sustainable development goals; innovation and transition; and design and design research to equip students with tools for the future. However, do we equip them with the mindset to use (or not use) these tools wisely as well? One way of learning to become futures literate (FL) is through hands on, learning-by-doing tools called 'futures literacy labs' (Miller, 2018). Our research so far indicates that our FL programs (one- or two-week intensive courses) lead to increased awareness of assumptions, personal resilience and self-efficacy. Although much data is still needed, we know this: these capabilities are for all times, for all cultural contexts and very applicable to the context and aims of higher education.

## An approach to navigating the plurality of futures

We assume that FL as a capability becomes more visible and sustainable when explicitly connected to on a personal metacognitive level. This is described by Pouru and Wilenius (2018) as 'individual futures literacy,' where active reflection on the discipline of anticipation fosters deeper learning on the matter of FL, reflection on one's relation to the future, its transfer to professional identity and practice, and nurtures personal resilience. This is needed to incorporate FL in every day professional practice, where anticipation for the future is very likely the dominating approach to transition and complexity. The importance of building an emotional capacity for FL consisting of self-knowledge; openness towards change and alternatives and empathy and intuition is stressed in the framework built by Pouru and Wilenius (2018). It also addresses the cognitive capacity and the active skills required for FL.

Van Oeffelt et al. (2018) built a case for the strengthening of professional identity since professional work is characterized by the ubiquitous condition of uncertainty, novelty and unpredictability. According to them "professional identity emerges in the interaction between individuals and their contexts, involving our relationships with ourselves, others and our profession. It allows us to cope with changes and developments without losing ourselves… Knowing your professional identity improves self-regulation, resilience, wisdom and excellence (2018, p. 239). To apply FL, we advocate as well for self-literacy, a reflective practice that, for instance, builds the capability to recognize unchallenged deep rooted personal beliefs that can help overcome an unconscious resistance to change (Bowe, 2013).

Another factor to take into account when applying FL to higher education, research and innovation is 'the other' in the broadest sense. When we recognize the future as a cultural fact, it can become a space for democratic design (Appadurai, 2013). To avoid the risk of becoming too focused on chasing one's own desirable future, inclusive, intercultural, multi-perspective, transdisciplinary approaches are needed in complexity and futures thinking. According to Lianaka-Dedouli and Plouin (2017) for instance, one of the prerequisites for global citizenship is the capacity to navigate the plurality of futures to not only base solutions on long-term perspectives but also enable them to be shared across national, cultural,

ethnic or religious boundaries. Developing a higher level of these sorts of awareness and mental models as described by Kegan and Lahey (2016) and van Oeffelt et al. (2018) shifts our own mindset to the contextual relationship with others as the mental complexity model emphasizes how we should take a step back and play with opposites.

We believe the foundation to build these capabilities can be taught through relatively short, intensive educational programs that seek to stretch the mind and uncover the unseen, unheard or as yet unimagined. These programs must be transformational by nature as they seek to trigger shifts in mindsets and paradigms. At Hanze University of Applied Sciences (HUAS) and with our partners abroad, we develop design principles that form the foundation of carefully constructed programs for students, teachers and professionals. The basic foundation is to practice what we preach. When we ask our students to practice empathy and trust, then these should be principles on which we develop their learning spaces. Our FL programs are intensive and short as we strive to create a safe environment for learning. They are based on inclusion and equality as all values are equal. We teach our students FL as a capability and at the same time, we teach them how to become facilitators and designers. While teaching, we co-create; while learning, we conduct research. While we design and develop intensive programs for students and teachers, other FL learning spaces emerge as does novelty itself. While we teach students to become aware of the different ways in which to use the future, we challenge our educational system to do the same. As we educate students for a different approach towards the future, our own system is changes along with it.

## New questions to guide future literacy

This sought-after shift in the educational paradigm is not without challenges and obstacles. New questions arise as changing a system *from* a different time while teaching *for* different times requires resilience and openness from faculty as well. While we want our students to use the future for emergence, we are currently working in an environment that often teaches for the future – i.e. preparing students for jobs and for futures that we deem predictable. Instead of teaching for the future, we could choose to teach for emergence as well.

So, in a world that seems to generate increasingly urgent problems by the minute, how do we ensure that we do not overlook the glimmers of novelty? How do we 'not-do' in a world that seem to require more action? Miller (2018) described FL as the microscope of the 21st century as by looking through the lens, we see things that don't yet make sense. We can add color, substance and context, but very often what we need is to embrace complexity and slow down.

FL, self-literacy and the awareness of one's assumptions, beliefs and identity in relation to others is what can truly transform how we see ourselves, the future and how we make sense of the world. A newly formed professional identity helps us shift from being an agent of change to becoming a part of a 'chain agency' as we are never alone in finding a path through transition. FL guides us to leave our scripts behind so we can learn to become spontaneous and free, allowing us to *sense* that same spontaneity as it emerges around us. We move from responding to urgency to adapting to emergence.

By educating students and conducting research, we gain insight into how we can create a

different mindset that fosters not only strategic problem solving but resilience as well. This approach stimulates not only acquiring knowledge on a deeper level but also the wisdom to make sense of that knowledge. It encourages boldness, but modesty too. These attributes may seem to contradict yet, in fact, complement each other. They represent the two legs on which we must walk, that allow us to move forward in the midst of complexity without losing ourselves. It is how we lear n to become.

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# Plurality of knowledge to meet the challenges of tomorrow

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The authors suggest that knowledge for the future must be inherently plural. In essence, they propose the harnessing of a combination of different kinds of knowledge within an "educational pathways" framework to make education relevant and equip learners with the skills to tackle the societal challenges of the future.

As every generation before, ours must think about education in light of the social and cultural changes as well as economic and environmental challenges of the coming times. This approach requires us to distance ourselves from immediate realities to think about the challenges of tomorrow. A futures perspective is not only about developing the skills that societies and economies need and will need, but also about planning to meet complex educational challenges as well as reviewing and reinventing how knowledge and learning can contribute to the global common good (UNESCO, 2019). Social and territorial inequalities; peace; democracy; environmental issues; our relationship with nature; and issues relating to gender, minorities and migration are just a few of the complex issues that are inextricably linked. The current situation is neither fair nor sustainable, and renewing our ways of thinking and acting is as much an ethical imperative as it is a social, economic and environmental imperative. Although education is not a magic wand, it is central to the transformations of our world and the emergence of a renewed citizenship (UNESCO, 2015).

Indeed, we consider knowledge in education to be the cornerstone of the educational edifice given that the problems faced are highly complex and equally touch on social, cultural and environmental issues at both the local and global levels. This idea draws on the theoretical framework of the ecology of knowledge as described by Boaventura de Sousa Santos (2016). The framework emphasizes the importance of analysing the logics that govern the construction of transmitted knowledge and highlights the question of its links in education. This ability to link knowledge of different kinds – to think in a plural way – is decisive when it comes to creating alternative solutions (Laville, 2016). Our contribution in this piece will then focus on the practical modalities of this ecology of knowledge and propose an emerging framework of "educational pathways" (Jourdan, 2017).

## Knowledge at the heart of education

The complexity of the challenges to be met – as well as the inextricable nature of the links between South and North, East and West, local and global – render solving the problems through technical adjustments led by a few experts illusory. Everyone's participation is required. As these are pressing societal and environmental issues, their formal and informal educational activities take specific shapes (Mérini, Victor and Jourdan, 2010). Indeed, the relevant policy areas are as close as possible to social practices, and they do not refer to a well-defined body of academic knowledge but rather to political compromises. They refer to a variety of scientific, cultural, legal and economic fields and are the subject of controversy (Lange and Victor, 2006). As there is no universally recognized consensus, learning in this field must be explained and justified (Jourdan, 2010). Finally, the complexity of the social and environmental challenges facing humanity makes it essential to develop a real capacity to move beyond linear approaches to link – and not just juxtapose – diverse knowledge (El Hage and Reynaud, 2014). There is a strong challenge to link local and universal, inexpert and scientific knowledge. First, the plurality of the knowledge involved and its status must be clarified.

Thus, beyond transmission, the ability to link knowledge of all kinds by having a clear vision of their status is a condition for the ability to innovate. The challenge is that everyone can contribute to thinking of and offering alternatives to existing solutions, to creating a new type of social, political, economic and ecological development (Laville, 2017). The prevailing Western model, however, cannot meet all global challenges. It cannot constitute the scope of education on its own. As stated by UNESCO, "given the diverse cultural interpretations of what constitutes a common good, public policy needs to recognize and nurture this diversity of contexts, worldviews and knowledge systems, while respecting fundamental rights" (UNESCO, 2015). Today, there is a proliferation of initiatives in all the countries of the world which, although they have limits, pave the way for social and environmental alternatives (see, for example, Vanhulst and Beling, 2013).

## Towards an ecology of knowledge

Knowledge is not merely a mass of information, but organized systems of knowledge that have emerged in various contexts and cultures. This knowledge is of a different kind depending on how it was produced (i.e. experiential, scientific, professional, traditional, spiritual, religious, cosmological, legal, etc.). Today, the digital space that affords us access to a wide range of knowledge along with globalization, which tends to amplify its homogenization and prioritization, requires a radical rethinking of its relationship to knowledge.

Knowledge is linked to a variety of relationships to the world, so it is never neutral, and it has its own distinctive characteristics. For example, scientific knowledge can answer the question of how (e.g. physical or biological mechanisms) but not the question of why (e.g. the meaning of life, which underlies social relationships). Local knowledge governs the organization of life and our relationships with the environment, allowing individuals to participate in social life while giving meaning to our relationship to the world and to the cosmos – it is the legacy of a history in a place, within a culture. The value given to it is also

a reflection of the relationship of power (i.e. Western knowledge is currently considered superior to the knowledge of minorities or traditional knowledge). We are faced with a hierarchy of knowledge that tends to be perpetuated and therefore continues to promote exclusion (Santos, 2011).

## Education and societal challenges

Once the challenges of an ecology of knowledge have been identified, it is necessary to identify the conditions under which it is possible to organize educational activities related to social and environmental challenges. Four key elements are needed here (Jourdan, 2017). First, the activities cannot be conducted by the school alone but should involve the stakeholders of the territory. School is a space where, with the teacher, a body of knowledge from schooling, from the internet and from educational experiences outside the school are linked.

Second, coherence is needed between what is being transmitted and the organization of the living environment. Indeed, it is difficult to imagine working on sustainable development without questioning daily practices of recycling and energy consumption, or on citizenship without addressing the school environment. Taking contemporary challenges seriously falls within the scope of the school's policy as a whole (Jourdan, 2012).

Third, the activities should lead to the implementation of a specific educational approach. When addressing pressing societal issues that require awareness, a critical approach, debate, development of action skills and so forth (Paakkari and Paakkari, 2012), the active participation of pupils is essential (Jourdan et al., 2016).

Finally, these activities require teachers to undertake substantive work on the organization of teaching. The aim is to ensure synergy between instrumental learning and work on pressing issues.

## Educational pathways on societal issues

There is real diversity in the institutionalization of educational activities relating to sustainable development issues. Depending on the country, social expectations of school, school culture, levels of centralization and so forth may be expressed in different ways. We propose to make it clear that formal education requires both instrumental teaching (for languages and different forms of literacy) and selected pathways that make it possible to address pressing citizenship issues. These educational pathways can be defined as organized and coherent successions of educational experiences of a varied nature – inside or outside the classroom or school.[1] They mobilize all the stakeholders and all areas of life of children

1 The terms 'learning pathway' and 'educational pathway' do not have universally agreed definitions. Such expressions are derived from the common language and, in education, they cover a wide variety of meanings (e.g. the educational journey of a person throughout his or her schooling, a set of courses, modules or internships followed by a pupil or student in a given field). That is why we have decided to clearly define our meaning of the term.

and adolescents. The pathway explains and formalizes the content, the participants and the educational methods of what is offered to children and adolescents. It can be a single pathway or diversified pathways (i.e. living together, gender equality, media, environment, heritage and cultures, health, etc.). The pathways are the embodiment, in a given context, of an educational ambition that finds practical expression in a local context. The course also has a communication objective to explain the educational mission of the school in a given field to the students, families, partners and professionals.

The reference to the educational pathway is a way of answering the question of how to ensure the coherence of the various educational experiences throughout life. A multiplicity of knowledge is accessible behind any screen but not all of it is to be placed on the same level. The role of teachers is to provide students with the capacity to analyse their research clearly and to support them in the acquisition of knowledge. Teachers must also ensure openness to different world views to prevent the paradoxical risk of inward-looking attitudes owing to the fact that people can easily find others who think like themselves on social media. Teachers are strategists who ensure the acquisition of different languages, help pupils maintain a critical distance from information received, and allow the linking of knowledge on pressing social issues.

These educational pathways are a potential response to the need to rethink school in terms of current and future social issues. They are an emerging form at the core of the fundamental and permanent tension between instruction and education. They must be conceived as common goals for education professionals, students, families and local stakeholders. Ultimately, they serve as a means of supporting an ecology of knowledge, of moving towards a shared understanding of educational challenges and of supporting the development of collaborative practices.

This approach, however, is not without challenges as this reflection on the ecology of knowledge and how to support it through educational pathways has its questions. The ethical issues (i.e. risk of instrumentalization of school, inward-looking attitudes, influence of lobbying, relevance and universality of content choices, etc.) and epistemological issues (i.e. legitimacy, foundations of these multi-referential areas in social practices and a variety of scientific fields, etc.) are particularly acute. The question of overall coherence must also be raised, as must the framing of these pathways between total local autonomy and centralization. The involvement of all stakeholders (policy-makers, civil society, educational leaders, professionals, volunteers, students, etc.) in a debate on the future of education and the professional development of teachers and other educators appear to be key conditions for the developments envisaged. These issues should be addressed within the global framework of the UNESCO Futures of Education project – at both the national and regional levels.

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# Imagining a transformative future for vocational education and training

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This piece proposes a critical capabilities approach to reimagining a transformative role for vocational education and training to support human development.

Vocational education and training (VET) has been trapped in a conventional view that sees it simply as being about learning to do, with that doing itself narrowly understood as support for industrial work. Yet, as UNESCO's current language of transforming VET for an alternate notion of development makes clear, VET is about so much more. VET also harbours longstanding issues concerning the role it plays in the transition from youth to adulthood relating to; inclusion of those marginalized in various (and often intersectional) ways; informal economies, subsistence agriculture and community development; and the challenges of producing in sustainable ways. The advent of Agenda 2030 and the pressing nature of societal, political, economic and environmental challenges require us to bring these other traditions more to the fore when we think of VET.

As part of that wider imperative, a group of VET researchers have been trying to build an international VET-specific response to the insights of Amartya Sen crystallised in the human development and capability approach (HDCA) (Sen, 1999). This response emerged in the early 2010s. Whilst other important contributions to this emergent field should be acknowledged (e.g., Wheelahan and Moodie, 2011; Tikly, 2013; de Jaeghere, 2017; Bonvin, 2019), the bulk of literature in this area comes from a group associated with the University of Nottingham UNESCO Chair (e.g., Lopez-Fogues, 2016; Hilal, 2017; Suart, 2019; Powell and McGrath, 2019). The term "critical capabilities approach" (CCA) signals that this work uses HDCA in combination with critical social theory.

## Eight key elements of the CCA-VET approach

At the heart of the CCA-VET tradition is a strong focus both on the need to pay considerable attention to young people's voices in articulating their aspirations for meaningful work and lives, and on their intersectional experience of marginalisation and disempowerment. The following eight elements are key to the CCA-VET approach:

i) **Centrality of poverty**: Whilst VET includes offerings for those across all socio-economic statuses, a large proportion of VET activity and the policy rationales for VET relate to its role in poverty reduction. Conventional VET programmes have understood poverty in simple income terms and the solution has been to position VET as a means to provide employability and hence increase income. However, the CCA-VET view is that poverty is multidimensional as it also includes elements related to family structure, household education levels, the extent of drug trafficking and crime in the area, etc. The CCA approach suggests that VET learning is more effective when the multidimensional poverty experiences of individual learners are understood and addressed.

ii) **Female disadvantage:** CCA-VET is strongly influenced by feminist literature, particularly feminist economics and work on intersectionality. This leads to an ingrained emphasis on how women experience intersectional disadvantages that shape the decisions they make on education and work throughout their lives as well as the outcomes they achieve. In particular, the CCA approach views labour markets as highly segmented in unjust ways that reflect not simply macro-level structures but also societal and individual beliefs and practices. CCA-VET argues that VET is used by many women, particularly "adult returners" as a space where people can attempt to identify different agentic responses to structural obstacles that reflect their experiences as women. Hence, it is advisable that policies and practices be better attuned to this facet of VET.

iii) **Political economy lens:** Many of the writers in this new area have worked previously with a mindfulness to the political economy of the skills tradition. Part of the critical dimension of CCA is that it draws on this political economy tradition to view how VET systems have evolved in specific contexts, reflecting local, national and global dynamics. It is attuned, therefore, to the dangers of path-dependence or, at the very least, the dangers of VET institutional arrangements that are rooted in policies entrenched in deep ideological and institutional grooves that are difficult to exit. Rather, CCA-VET uses a political economy lens to develop a richer understanding of what factors enable and obstruct positive VET change to stay in alignment with the transformative agenda.

iv) **Broad notion of work:** CCA-VET argues that work needs to be conceptualized broadly. Following Sen (1975), CCA-VET argues that work is central to any thinking on human life and development. Therefore, work needs to be conceptualized in ways that stress how to maximize its potential to fulfil wider human needs. 'Work' here is understood to include caring and other socially useful forms not typically considered 'work' in narrow economic definitions. In this vein, the CCA approach draws from the feminist economic and political economy traditions to recognize 'work' as unequal and structured profoundly by class, gender and race. These realities need to be kept in mind when attempting to envision a transformed and transformative VET. Moreover, this research points to many experiences of indecent work. Thus, the approach stresses that the UNESCO agenda of transformed VET and the ILO commitment to decent work need to be seen as intertwined objectives.

v) **Human flourishing:** Like work, VET is a means to a greater end: human flourishing. This means that the focus of VET analysis should shift attention away from what the capitalist state perceives as the purpose of VET and life to what individuals value and why they participate in VET. Research on why people participate in VET and what they think it provides them emphasizes that there is more to this than just qualifications, work and income. While these are of crucial importance, it is important not to overlook other common themes, including participation in community/society/politics; bodily health and integrity; respect; personal agency, confidence and empowerment; and creativity and imagination.

vi) **Developing aspirations:** A key task for VET is to support the development of young people's aspirations. There is too much rhetoric on youth or poor people's lack of aspirations that blames them for not aiming high enough, conveniently ignoring the structural obstacles that they disproportionately face. In contrast, CCA-VET offers a distinct view of aspirations as forward-looking 'life projects' in which individuals attempt to respond to their structural obstacles and harness their endowments of various resources to imagine and achieve better lives. Again, this emphasizes the narrowness and short-sightedness of the employability orthodoxy.

vii) **Complex pathways:** The CCA-VET approach argues that pathways through learning and work are complex, not linear. Individuals reassess life projects repeatedly and adjust their aspirations accordingly. The series of decision points that individuals encounter along their learning and work trajectories are unique to the individual in terms of the exact dynamics that both cause a moment of decision and shape their calculations in that moment. Nonetheless, many of these are caused by system effects that can at least be predicted in terms of their timing. For new VET interventions to be truly transformative, such an awareness is important.

viii) **Transformed evaluation:** a transformed view of the purpose of VET requires a transformed approach to its evaluation to capture the new dimensions that the CCA approach brings to the fore. Rather than emphasize pass, uptake or employment rates – important though these are – the CCA calls for evaluation to focus primarily on the extent and ways in which institutions and the system support the flourishing of learners. This envisioning of a new evaluative stance can play an important role in imagining and building a transformed VET.

The CCA concludes that all of the factors and dimensions discussed requires us to think about what counts as success for vocational providers in a different way. Reimagining the possibilities of VET to fulfill human needs that go beyond supporting industrial work and the provision of income could truly transform current notions of its role in human development.

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# Disruptive innovation in universities to secure the future of humanity

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This piece calls for innovation in universities to suit the needs of the future. It suggests changes in the three key areas of governance, training and research within knowledge producing institutes to ensure that knowledges remain relevant to the realities of possible futures.

The transformation of knowledge into power over people – individually and collectively – continues to generate tremors that are radicalizing in all directions. Possession of this knowledge has supplied the means of domination over humans and nature. Looking beyond the forms of radicalization emerging around the world, there is a need to find the root cause of the problem. Among the sources from which this knowledge flows are universities, recognized as temples of knowledge. Will these temples that have been able to withstand storms and reforms be able to withstand the almost herculean changes brought about by technological dynamics and humanity's irreversible march towards globalization? Will universities be able to reconcile their original vocation with the new requirements of the twenty-first century – a century in which modernity and postmodernity call and respond dialectically – to produce a human capital that is not just more competitive but certainly more humane?

The future of universities is at stake here, inseparable from the future of humanity. The future of humanity must be considered as immanent – not exogenous. Universities are being called upon to change without becoming diluted in the process of their transformation. An inherent strength is required to withstand change that threatens to make them lose their position as a driving force. As a driving force and force for the future, universities must engage in a process of sustainable production of scientifically reliable and socially relevant knowledge. How will they manage this? Within this narrow framework, we respond with what appears to be a truism: universities will owe their strength and survival to their sense of innovation alone. To be clear, the innovation required for universities to function as we need them to is not incremental as it is not simply an improvement of what already exists (Pavié, 2018). It is an innovation that could, in many ways, be described as disruptive since it invites us to break with certain habits by using our creative imagination (Pavié, 2018). For universities of the future, there must be innovation at a minimum of three levels – governance, training and research

## Transformations in university governance and new managerial praxis

Through disruptive innovation, university governance must meet the challenge of a managerial praxis that combines technicality and ethicality, technical rationality and hermeneutical rationality. The essential characteristic of this praxis must be the constant search for a balance between the essence of the university and the direction imposed by the complexity of the contemporary world. It is within this balance that quality, which has almost become a fashion phenomenon, must be sought and promoted. Quality, beyond fashionable trends, must be understood here – in the context of university management – as the intertwining of the scientifically reliable and the socio-economically desired, the universally relevant and the contextually good. Disruptive innovation, however, calls for more than quality. It calls for excellence and urges us to assert its three-dimensionality: elitist, social and societal.

While elitist excellence, based essentially on academic criteria, seems to be in line with the essence of the university, it falls short of disruptive innovation. On the other hand, with social and societal excellence, we move beyond the *topos* of the essence of universities to put its existence to the test. When excellence is social and societal, it links the concern for individual emancipation with the search for the general interest and the common good (De Ketele et al., 2016). Taking into account this triple dimension of excellence must lead to a critical review of the international rankings by which universities are classified according to a conception of excellence that more or less integrates, in the same way, the three dimensions of excellence.

From the Shanghai ranking to the European Commission's U-Multirank, and Britain's Times Higher Education World University Rankings and Quacquarelli Symonds World University Rankings, the excellence required has not yet been brought to its completion as its three dimensions are only partially integrated. In the near future, we expect to see the promotion of a universal instrument for the evaluation of universities under the auspices of UNESCO. It is also through this three-dimensional excellence and disruptive innovation that universities will have to recruit their leaders, teachers and researchers, administrative and technical staff and students.

## Training and teaching put to the test of disruptive innovation

It would be a tautology to say that over the next ten years, education will undergo a profound transformation of which precursors are evident in the already widespread experiences of e-learning and the pedagogical approach of the flipped classroom. Contrary to widespread belief, information and communications technology (ICT) does not make teaching any easier for teachers. Increasingly, teachers are confronted less by learning judgements and more by epistemic judgements. While learning judgments, which relate to what the student knows from what they have been taught, present teachers with an easy task, epistemic judgments, which concern the reliability of the knowledge found on the internet by students, require teachers to be sufficiently equipped to assess the validity of this knowledge. As teachers are increasingly called upon to comment on the credibility of the knowledge sourced from the Internet, their position in the temple of knowledge will become

that of experienced guides – coaches engaged in permanent and risky competition. The temple itself will appear to be endowed with the gift of ubiquity through ICT. The university will be present everywhere and attended at any time as we can already see with so-called virtual universities, which will need to accommodate more than half of the world's student population by 2050. This new temple has the particularity of being more than a place for the production of knowledge. It is now a place where information is transformed into psychoanalyzed knowledge.

Another particularity is the transition from the teaching of a single discipline to a transdisciplinary approach – not to be confused with an interdisciplinary approach, which already exists – to enrich minds, encourage innovation and stimulate creative imagination. For imagination to be truly creative, it must move beyond the constraints of a monovalent educational path. By offering up different disciplines, the transdisciplinary approach enables the voices of students to be heard as they are eager to ask and be asked the right questions about the nature and purpose of knowledge and the world of the future. Transdisciplinary teaching can be highlighted through foresight, in its social and technological dimensions as well as through ethics, in its multiple and complementary dimensions (biomedical, environmental and communicational) promoted by UNESCO on a global scale. Ethics and foresight reveal – in all scientific humility – the developments in contemporary societies and the types of people that could result. Through their characteristic anticipatory focus, ethics and foresight have already opened the way for reflection and research on post-human and trans-human issues.

## Innovative research requires a transdisciplinary approach

Universities are – to a larger extent than we think – research structures that must be reconciled with the three-dimensional excellence (elitist, social and societal) before opening the path to innovation. This path is twofold. First, the classic path of disciplinary research, which recognizes the importance of fundamental research and recommends addressing the needs of society through research and development (R&D). Second, the new path, embodying innovation itself, is that of transdisciplinary research, which is equally attentive to the essence of university research, the existential concerns of contemporaries and the lives of future generations.

Research will be considered innovative not only because of its ability to satisfy the dual requirement of scientific reliability and usefulness for the present generations, but also because of its ability to ensure the protection of future generations.

Universities everywhere, through the optimal use of ICT, are preparing to meet the major challenges of a future that is both distant and close. Their reform can be encapsulated in three main lines: their self-transformation to achieve a lasting osmosis between scientific culture and humanist culture; the transformation of human capital into a more humane capital; and their positioning at the heart of the knowledge-based society and of the knowledge-driven economy. In light of these changes on the horizon, it would be tempting to conclude laconically that the pulse of humanity in motion can be measured at the heart of modern universities.

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# Re-imagining futures, education and learning relations

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This piece reflects on recent developments that hold implications for how education might transform itself from meeting the challenges of the future, to participating in co-creating it. It is presented in three parts. The first focuses on the idea of 'futures' itself. The second reflects on ideas related to the mission of educating for the future. The third and final part focuses on how intergenerational relations may be shifting, with implications for changes to traditional teaching and learning roles.

How we understand 'futures' matters as it shapes education's capacity to envision and plan. The words 'future' or 'futures' now usually come prefixed by qualifiers such as 'precarious' or 'uncertain.' They conjure associations of intangibility, nebulousness and contingency, posing challenges for all involved in education – be they policy-makers, practitioners, researchers, teachers or learners.

## Conceptualising futures requires expertise in 'not knowing'

Perhaps, in recognition of the need to better conceptualise the notion of 'futures', there is now an emerging body of literature across social science disciplines that focuses on understanding futures as a live subject of research (Adam and Groves, 2007; Appadurai, 2013; Anderson, 2010; Colebrook, 2014; Poli, 2011), and the related methodological innovations required for such study (Salazar et al., 2017; Wilkie et al., 2017; Coleman and Tutton, 2017).

These emerging orientations ask us to develop abilities to look *at* the future, rather than just *into* it. They reject the idea of the future as something to be predicted or conquered, or even as an extension of the present. If older unsatisfactory paradigms – that may contribute to human inequality or ecocide for instance – are to be replaced, they require a step change in how the idea of the future is understood. In particular, they require going beyond traditional predictive logics/rationalities that aim for a 'programmable tomorrow', to more critical anticipatory practices that are open to the unknowable yet seek to create radical new futures that are not tied to capitalist or modernist teleologies. All of this requires

researchers and scholars, rather paradoxically, to become 'experts in not knowing' while still seeking opportunities for interventive practices (Pink and Salazar, 2017). This shift in thinking calls for new research habits, different practices of paying attention, intervention and experimentation. Without a conscious commitment to a radically different idea of futures, these futures are likely to be more of the same or worse.

## Re-orienting education to co-create futures

Education can tend to remain stymied the past, serving as a 'machine of reproduction.' If the purpose of education is too preoccupied with addressing today's issues, we may miss the opportunity for it to play a vital role in making more promising futures. For instance, if we repeat the discourse surrounding 'globally competitive nation states' into whose service education is often pressed, then there is less room for imagining education in the service of a collaborative world centred around ecological well-being, low-growth and zero-carbon futures. Similarly, an emphasis on just increasing the flexibility/resilience of the population to prepare them for precariousness, ignores the educational opportunity involved in creating agency and opening the future to radical new possibilities. Thus, some of the most stringent criticisms levelled against the practice of education are when it defines its 'telos' (i.e. its desired endpoint) too narrowly.

Current 'anticipatory regimes' in formal education (Amsler and Facer, 2017) position it more as a device that feeds into a programmable future, rather than as a live, unpredictable process that can enable different futures. Educational practices in such regimes can over-value the pre-plannable and predictive, confining the mission of education to pragmatic or instrumental uses, often ignoring or not responding to the learning already happening outside of formal contexts. Scholars have therefore called for a more explicit re-orientation of education as a creative, interventive co-creator of futures than as a fear-induced insurance or as a 'corrective' for uncertain futures (Facer, 2016; Facer et al., 2011). This requires education to be taken as a global endeavour and for us to face up to bold questions regarding what kinds of old habits need to be lost; what narratives and actions ought to replace them; and for what purpose.

An education with this new orientation can be imagined, for instance, as an explicit experiment that is committed to lifelong learning – one that sees everyone (including teachers) as learners, and one which encourages all learners to speculate about and anticipate desired change. This can include opportunities for learners to articulate both desired and undesirable or feared futures, and then learn to plan and bring into existence preferred scenarios over undesirable ones. This requires curriculum to be more immediately responsive to the needs of learners and a pedagogy that is interventive, that is open to creating positive change. It also requires us to acknowledge that roles such as teachers/instructors/educators or learners/students are open to swapping within an educational context. This leads to the final set of reflections on the dynamics of teaching and learning relationships that may be relevant for the future.

## Intergenerational dynamics or, teaching and learning relationships

The many conceptualisations of young people – as students/learners, as beings that are becoming or as 'thought tools' – are constantly changing in response to developments in social theory and practice. In relation to the future, young people can be narrowly imagined as 'fragments of the future' (Lee, 2011), as beings asked to imagine/project a sense of their future selves, even to defer gratification for some future prize (Adams and Groves, 2007).

These models of youth/childhood are problematic as they can be used to service nostalgic adult agendas (Bruhm and Hurley, 2004) that can override young people's narratives for the future (Bateman, 2014). Notwithstanding the practices of participatory approaches to reduce power imbalances, or sensory and art-based interventions that may be more inclusive and hold more appeal for the young, there is no denying that the ethical and political stakes of intergenerational relations have escalated (Lyon and Carabelli, 2016; Coleman, 2017; Ivinson and Renold, 2013; Springgay and Truman, 2019).

Currently, youth demand much more – better, more truthful and more reciprocal interaction – from adults on a range of matters. The young speak of the burden of 'truth-telling' and other forms of 'debt' that they are inheriting (Thunberg, 2019). School climate strikers around the globe have explicitly made the argument that learning in school is meaningless if there is no meaningful future to look forward to. These societal shifts signal a need to re-think how we conceptualise acts of teaching and learning across generations and lifespans. It raises critical questions on how we build systems for collaborative learning for a variety of actors across their lifespans. If we are to deal with the 'burden' narrative that can pit old against young, then the challenge of influencing and transforming all actors through learning encounters must be grasped.

How do different kinds of learning encounters (methods/activities/formats/modes) mediate improved relations between young people and adults, learners and educators? This is a different question to one concerning the right curriculum or the right pedagogy to pursue. It involves understanding education itself as an ecological unit in which all elements – human and non-human – are interdependent. In this sense, a post-humanist perspective is also vital. This suggests that continuing to retain humans at the centre of all action, seeing them as initiators or beneficiaries of action, and relegating non-human and material elements as subservient to the human cause is no longer sufficient. This does not mean that inequalities between humans are neglected, but that it may be pursued as a problem that is in fact, tied to a humanistic perspective that has ignored the place of humans as just one element in an interdependent planet. In sum, the politics of intergenerational relations is being shaken up, posing challenges to how we understand adult-child/youth, learner-teacher, human-non-human roles. Education can be conceptualised to approach these changing dynamics as an opportunity to be re-imagined. How this will then enhance or unsettle concepts of reciprocity, voice and power in educational relations will remain to be established.

Approaching this triumvirate – futures, education and learning relationships – and its intersections and challenges in fresh ways demands bold innovation in theory, research and practice. Interventionist approaches encourage critical anticipatory stances, which move

away from a descriptive or reactionary position to the future, to articulating imaginative propositions that actively create desirable future landscapes. They seek to encourage agency in the midst of uncertainty and precariousness (Facer et al., 2011). These future landscapes may require us to re-think how roles of learner-teacher, adult-child/youth are interchangeable and how a post-humanist perspective may help us in this re-imagining.

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# Lifelong learning, counseling and life designing to promote careers for the future

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The authors argue that a rapidly changing and complex global work market poses unique career-related challenges that require lifelong learning, counseling and life designing to help individuals to access sustainable careers. Lifelong counseling and education are expected to foster personal empowerment and fulfillment while also tempering the impacts of careers on planetary stability, global peace and concerns of sustainability for the future. To promote sustainable careers action and the individual, social, and political levels have to be combined.

Lifelong learning, counseling and life designing interventions are becoming key practices. These interventions harbour one main purpose: to design an individual's work pathway or their life. They help individuals build a vocational self-concept appropriate to the current world of work. This activity requires individuals to engage in a certain type of reflection on themselves and their experiences. It is imperative that these interventions be studied and supported by international organizations and put into action by national public policies as they are needed to help individuals face a set of major social changes occurring all over the world. In this context, the issue of access to work is crucial to ensure decent lives and promote an individual's life-long self-construction (Guichard, 2005). The labour market continues to generate more and more social and economic 'grey zones', which are social spaces where traditional regulated work categories are disappearing (Bureau et al., 2019). At the same time, the rapid development of novel technologies and forms of communication have generated new opportunities for work and learning. However, these changes require people to be more adaptive, strategic and entrepreneurial to navigate this fluid labour market and the possible obsolescence of their knowledge and skills. Moreover, the working world and workers are also facing the global challenges of climate change and the biodiversity crisis, which require radically innovative production practices. Workers must now imagine their careers while anticipating the consequences of their actions on a planet with limited resources (Guichard, 2016). These challenges constitute major considerations for policy makers when developing public policies to promote access to sustainable careers for all.

## Sustainable careers in a shifting labour market

The 21st century labour market is unstable and characterized by frequent job transitions, making it a fundamental challenge to construct sustainable careers, find decent work and build a decent life (Blustein et al., 2019). The emerging research field of the Psychology of Sustainability and Sustainable Development can help define both sustainable careers and life projects (Di Fabio and Rosen, 2018). Just as traditionally a product is considered sustainable if it requires a manageable amounts of materials and can be produced using renewable and non-polluting processes, the construction and management of a sustainable career and life project should also aspire to preserve, generate and regenerate resources (Di Fabio, 2019). Career and life are more sustainable if rooted in a paradigm of meaning, anchored to authenticity, self-attunement and purposeful identitarian awareness (Di Fabio, 2014). The construction of a sustainable career and life requires a preventive perspective in guidance and career intervention, balancing employability on one hand and objective talents and potential (what I am able to do), subjective talents and potential (what energizes me in doing it) on the other. Thus, sustainable careers and sustainable lives promote sustainable development and decent work through the respect for talents and for the meanings of each person within his or her culture and environment, in terms of harmonization of complexity in/with self, the natural environment and other environments (Di Fabio and Tsuda, 2018).

## Lifelong learning as a key component to lifelong employability

Ethnic, racial, gender and social class disparities in education and employment continue to constrict life course choices and outcomes for much of the world's population. At the same time, however, there are promising innovations to engage lifelong learners in gratifying, sustainable educational endeavors that open doors to new employment possibilities, especially for historically marginalized populations (American Psychological Association, 2012; Chan et al., 2019; ILO, 2018). Specifically, there is a call for discourse and activities in lifelong learning that prioritize social justice over market-driven goals as a primary force (Vargas, 2017).

These social justice-oriented efforts have four key qualities. First, successful lifelong learning opportunities must work within the contextual, cultural and community realities of the learner. By recognizing the place-based lived experience of the learner, educational opportunities are more likely to be relevant and engaging. The psychology of working theory clarifies the importance of socio-cultural context in the conceptualization and direction of one's working life and career (Duffy et al., 2016). Second, lifelong learning programs should challenge deterministic policies by encouraging democratic reciprocity and enabling the learner to be a self-determining agent (Biesta, 2006). Third, the design of lifelong learning should be grounded in an awareness of human development across the lifespan (Erikson, 1975; Elder, 1998) and there should be an intentional effort to address life stage concerns that are most relevant. Fourth, inventing the future is both an interpersonal and intrapersonal process (Jarvis, 2006). New innovations in lifelong learning need to attend to both as they provide a relational space for self-understanding within a collective, through the articulation of one's own unique, creative and desire-driven narrative (Guichard, 2016).

## Lifelong counseling and life designing for careers of the future

Drastic changes have been occurring at an accelerated rate in both social and working contexts. Individuals must actively adapt to these changes as more workers are forced to make transitions in their working lives. To cope with changing conditions, personal and career development interventions are needed to accompany and guide individuals throughout life so that they can best promote their own career development. This means that vocational guidance solely to help young people manage their school-to-work transition is no longer sufficient. We must promote lifelong counseling policies.

Lifelong counseling and life design interventions are intended to support people in their lifelong career and personal constructions, helping them to generate actions that promote the attainment of sustainable careers and decent working conditions. Through this process, individuals become constructive *agents* of their own realities – in relation to the social contexts in which they develop, and the subjective experiences they generate within themselves. It is crucial to take cultural and social diversity into account and to lend particular importance to situations of social injustice that affect vulnerable groups. This can be achieved by focusing on individual empowerment, by promoting community intervention programs and by strengthening institutional support and public policies that promote access to sustained careers and lives (Aisenson et al., 2018). In this context, the concept of sustainability has to consider three interconnected aspects: the development of a dignified life with and

for others; secured by fair and supportive institutions; and ensuring the sustainability of authentic human life on our planet (Guichard, 2016).

## Lifelong learning and counseling across cultures

Counseling practices and theories are social and cultural productions. For this reason, they cannot be transposed across cultures without being appropriately contextualized. This contextualization will favour a counselee's understanding of the goals and purposes of a counseling or educational intervention and as such, their adherence. Contextualization is therefore a key factor if we want to promote lifelong learning and counseling for all, considering the great social and cultural diversity around the world. We provide recommendations here for aspects that should be considered when contextualizing counseling practices and theories.

First, at the epistemological level, it is important that concepts are re-developed using an interdisciplinary approach that considers the dialogical interaction between concepts and the context. We may say that concepts have "to be forged with others, not for others" (Freire, 1975, p. 32). It is essential to be sensitive to cultural differences and specificities. In some cases, when co-constructing unifying concepts, it may be especially useful to integrate some aspect of mainstream theories with culture-specific aspects to create new adapted theoretical frameworks. Such a combined emic-etic approach enables theory development to be locally relevant (Arulmani et al., 2011). Second, within each cultural setting, diversity as it relates to the intersectionality of gender, social class, or race/ethnicity, etc., should be considered when developing theories and practices. Finally, lifelong strategies and counseling practices should always be deconstructed and reconstructed in a process of co-construction (Nota and Rossier, 2015) and through an intercultural dialogue (Santos, 2014). In that sense, group-based interventions and communitarian strategies should be fostered. In essence, the context must always be considered and intercultural dialogue is key in promoting sustainable careers for all by means of lifelong learning, counseling and life design across cultures.

## Lifelong learning and counseling for all

Equitable access of learning for all is an assumption underlying the concept of lifelong learning. The idea is to provide opportunities to engage fully and gain from inclusive and equitable lifelong learning for people of all ages, genders and across different socio-economic and cultural backgrounds. Yet, equity in access to lifelong learning continues to be more an ideal than a reality. While the shift from national economies to a digital global economy and the proliferation of networked technologies have expanded platforms for lifelong learning, they have also created technological divides and further complicated the issue of access and participation in lifelong learning. The danger is for lifelong learning to become restricted to the privileged few who have access to the infrastructure and are equipped with the knowledge and skills to participate in it. Thus, opportunities may not be available to marginalized and disenfranchised groups, such as the elderly, women and girls; people living in poverty or in extreme conflict contexts; those with disabilities or reduced mobility; as well as refugees, migrants and ethnic and racial minorities. To realize equitable

access to lifelong learning for all demands effort on a local and global level. Collective efforts need to leverage resources and engage in alternative methods grounded in the arts and indigenous approaches to support and promote lifelong learning for those who are typically excluded from the discourse.

## Lifelong learning and counseling to promote well-being

The psychology of working links the socio-cultural context, personal resources, decent work, needs fulfillment and well-being in a unified model (Blustein, 2006). However, well-being is often neglected by educational or career counselors who tend to be more focused on the question of the fit between individuals, their professional context and the feasibility of their choices and projects. Considering the 'meaning of work' (Morin, 2008) or the 'ethos of work' (Mercure and Vultur, 2010) as an important need to be fulfilled helps us to consider well-being in our counseling interventions. This focus on meaning can be combined with a lifespan perspective, considering counselees' 'self-calendar' (Neugarten,1996) or 'subjective age' (Heslon, 2016). Such an integrative model would consider the temporalities of age and existence along with the fluctuations of the relation to work among the main vectors of well-being throughout life. If well-being is something between hedonism (i.e. perfect happiness filled with positive affects without any negative affect) and eudemonism (i.e. the search for fulfillment and a full life), then the goal of any counseling process is to allow people to integrate their stories and their temporalities in a structured self-concept, as already suggested by Montaigne (1586). In other words, holistic life design practices can contribute to well-being if they consider both in a manner synchronized with ages of life, relation to work as well as all other life spheres.

## Individual fulfillment in careers for the future

Sustainable careers imply an adequate fit between the person and the context as well as access to dignified work over time to promote happiness, productivity and health (De Vos et al., 2018). Access to dignified work and a sustainable career is, of course, closely linked with social inclusion and recognition (Urbanaviciute et al., 2019). In a rapidly evolving labour market, lifelong learning should sustain workers' employability over time. However, lifelong learning is not enough as the evolution of the structure of the labour market may also lead to careers that are made up of sequences of experiences in different economic sectors. These transitions can happen throughout one's career and may represent moments of vulnerability. For this reason, public policies should also promote lifelong counseling to help people manage these transitions. Such interventions can promote the conservation of resources, proactive growth and development, and self-awareness. However, such interventions cannot simply be standardized if we want to ensure that they are available to all. The process of adapting interventions throughout the world must include considering the cultural context and local diversity. In addition, we must consider the person and the diverse contexts in which he or she evolves. Thus, a life design approach considering all socially defined life spheres is necessary to understand a person's situated or contextualized identity development (Savickas et al., 2009). People's subjective representation of themselves and of their environment overtime underlies their situated identity development, allowing them to navigate across spaces over time (Rossier et al., 2015). To understand an individual's career

trajectories, the context, life spheres and different layers of identity(ies) must be considered simultaneously. People's identity allows them to be the agent of their lives and to make sense of their trajectories in a dynamic social, economic and political context. To foster sustainable careers for all, public policies all over the world should promote access to education, lifelong learning, lifelong counseling and life designing, considering in particular diverse, underserved and vulnerable populations.

## *Note from authors*

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# Polymathy as the missing link to increase access to relevant knowledge

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This piece calls for the establishment of a worldwide knowledge depository accessible by all people as part of their fundamental right to education and by extension right to relevant knowledge. The author also calls for a radical transformation of the education system to produce relevant knowledge and advocates for the student to function as a 'polymath' (i.e. a learner well-versed in a variety of disciplines).

Often, I have wondered how the world would look like if the ancient Library of Alexandria had survived. Which pieces of knowledge disappeared forever? How much did their disappearance slow down the evolution of knowledge? My obsession with the Library of Alexandria has roots in ever-present questions related to the production of and access to knowledge. When there is no central repository where all pieces of knowledge are stored, can we really access what is already known? New world institutional infrastructures and technology play important roles in connecting sources of knowledge and increasing access to knowledge. Technology provides the possibility of storing and connecting pieces of knowledge from different sources and UNESCO, with its collective intelligence and global observatory capacities, should lead the process of building a virtual world-wide depository of existing knowledge – in essence, take on the role of housing knowledge as an online version of the Library of Alexandria. The process is feasible and within reach.

Although such a worldwide depository of knowledge is on the horizon, access to knowledge is still a huge issue – both access to educational services and access to relevant knowledge. In principle, ICT could provide access to educational services to everyone, but poverty and the lack of political will denies this right to many people. If there is a delay of more than 50 years for young people in low-income countries to equalize their access to upper secondary education to match the attainment level of young people in high-income countries, no one should have the right to prevent people from relocating to places where their human rights could be fulfilled better than in their homelands.

## Relevant knowledge is constantly evolving

In contrast to access to educational services, access to relevant knowledge is rarely discussed at the depth which this issue requires and deserves. Typically, discussions circle around the mismatch of educational outcomes and competences needed by the business sector, but mostly do not go beyond it. Researchers are main producers of knowledge, gained through inventive and innovative research activities. Sometimes, such knowledge is relevant to developing the capacity of individuals to identify problems, find optional solutions and implement a selected one. However, in most cases, there is a need to first connect the pieces of knowledge as "raw material" (OECD, 2018, p.5), developed through disciplinary channels, to access the relevant knowledge (cross-disciplinary) needed to identify and solve problems. Who leads this initiative? Currently, no one – it is left to enthusiastic teachers, and in the most cases, to students themselves.

Using the term 'relevant' knowledge begs the question of how relevance is defined (i.e. for whom? In what time – now or in the future? How do we predict what the future will consider as relevant knowledge? Is there something as obsolete knowledge? How can different combinations of pieces of knowledge produce different 'relevant' knowledge?). In the final analysis, 'relevance' is not a stable feature. It depends on the configuration of problems and competences to find pieces of knowledge and integrate them into relevant knowledge.

An unpredictable and uncertain future will always remain the norm, nonetheless the most important competence (as per a holistic approach) to transform knowledge into 'relevant' knowledge can be developed independently. The holistic approach helps us understand the dynamics of changes – and even recognize early signals of changes – through interactions. It provides a guide to searching the pool of knowledge for pieces that can be assembled into relevant knowledge on innovative ways, depending on a feature of a change.

The relevance of education should be checked on a daily basis. It should also always be related to the role and capability of education to contribute to improving the well-being and sustainability of the planet. A question 'and education?'[2] should be a mantra for taxpayers, policy makers, teachers, students, parents, businesses whenever any social, economic or technological problem emerges or change is happening.

## The polymathic approach and solving global problems

'Polymath' denotes a person with broad knowledge spanning over many disciplines. It is used here as a metaphor to signify a departure from the narrow specialist knowledge approach predominantly used by educational institutions. The fragmentation of knowledge in specialized silos was an inevitable outcome of speeding up the process of research, discovery and innovation. Unfortunately, what was lost is a holistic/system's approach to understanding the interconnectedness of everything, without any spatial or time limitations. This is what education is currently not providing – an understanding of inter-connectedness, without spatial or time boundaries, and without this understanding, students cannot become polymaths.

2 As the OECD asks in its publication, *Trends Shaping Education 2019*.

There is a lot of evidence on how growing a pool of specialized knowledge about a specific phenomenon does not always help solve problems around us at the needed scale or speed, if such specialized knowledge is not connected. Problems (especially on a global scale) do not arise in a vacuum as they are the result of many interlinked phenomena. Thus, we cannot understand them or solve them in isolation without first gaining an understanding of how they are connected. Poverty, climate change, health, migrations, wars, economic growth, peace and many other issues influencing our lives, require special combinations of knowledges, depending of the problem and the different contexts in which the same problem emerges. The practice of polymathy entails speaking a holistic language that is needed to understand inter-connectedness and to assemble previously unconnected pieces of knowledge, thus building individual and institutional capacity to solve complex problems.

## Moving towards polymathy

"For education to truly be transformative, 'education as usual' will not suffice." (UNESCO Global Education Monitoring Report, 2016, p. 163). Educational institutions and teachers should revise their expectations of students to connect unconnected pieces of knowledge without being first taught how. Currently, educational institutions are not designed to teach polymathy, and teachers are not prepared for such an approach. Institutions of learning are structured around disciplines and courses and there is huge deficit in experiential teaching. Likewise, teachers are educated within the framework of disciplines, without being exposed to experiential learning. The practice of team teaching with other teachers and practitioners; experiential teaching; and student-centered teaching should be encouraged and more broadly adopted.

To move toward a polymathic approach, there is first an urgent need to re-configure the whole educational system, redesign educational institutions and prioritize investments in re-training existing teachers for new this approach while introducing the new ones to this holistic concept. Re-configuration of the educational system requires reconciliation between formal, non-formal and informal education. The redesign of educational institutions evolve in the direction of student-centered and problem-centered learning, which will require abandoning the traditional course structure of the curricula. The most demanding aspect of the move towards a polymathic approach is how to equip teachers with new competences so they are able to connect fragmented pieces of knowledge and produce relevant knowledge – jointly with students and other partners from outside the traditional educational institution.

## A high return on investment

How many people with access to educational services have at the same time access to relevant knowledge? A precious few globally, as a lot of available knowledge is not configured in the form of relevant knowledge. This phase of knowledge production is as challenging as the production of new knowledge. Thus far, it has been neglected by many key stakeholders (i.e. policy-makers, universities, tax payers, students, researchers, teachers). Among the possible reasons why more was not done in the field of producing relevant knowledge are that the issue was not recognized, or there was a lack of knowledge on how

to deviate from the comfort zone of an existing discipline in which people were already educated/trained and venture into the unchartered territory of assembling unconnected pieces of knowledge into relevant knowledge.

The asymmetry of increasing problems and diminishing relevant knowledge requires immediate action. Currently, the pool of knowledge is huge, yet the capacity to transform it into relevant knowledge is very low. Educational systems around the world *should* be major producers of relevant knowledge as they seek to discover how pieces of knowledge are inter-connected without spatial or time limitations. Yet, this is a radical departure from what educational systems are doing now. Therefore, the OECD's (2018, p.3) statement rings true: "…in an era characterised by a new explosion of scientific knowledge and a growing array of complex societal problems, it is appropriate that curricula should continue to evolve, perhaps in radical ways."

Investment in the radical change of educational systems to re-configure them from transferring disciplinary knowledge to producing relevant knowledge will yield the highest return, as this approach will exponentially increase the ability of global citizens to participate in the problem solving process. Return on investment will be based on the activation of two major features of the open system approach: nonlinearity and equifinality. Both features bring optimism as they stave off desperation as the existing state of any system does not determine the expected trajectory of the desired state in the future (i.e. a state of poverty now does not dictate poverty forever). Identifying appropriate trajectories by assembling unconnected pieces of knowledge makes it possible to avoid the destiny of perpetuating an unfavorable existing state of an observed educational system in the future. In addition, such return on investment will be coupled with an empowerment of the people to implement a subsidiarity principle, which will broaden the capacity to make changes in the world.

The current low capacity to produce relevant knowledge significantly limits effectiveness and efficiency in solving issues related to the well-being of people and the planet. Without learning how to deal with an ever-rising quantity of knowledge, how to integrate the fragmented pieces in innovative combinations needed for problem solving and how to react to changes in an ever-shortening time window, the process of achieving fair well-being for all and of building sustainable conditions for the planet will irreversibly stagnate.

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# UNESCO as the global public intellectual for the twenty first century

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This piece proposes a line of action for UNESCO and global citizens alike to help fight against the existing tensions between the continued expansion of democracy alongside growing efforts to address climate change and the rise in populism, inequalities and the degradation of our planet.

We stand on the precipice of a planetary cliff with two alternate futures laid out before humanity. On one side is the continued expansion of democracy; the further extension of human rights and freedoms; and concerted efforts to address the growing threats and realities of global climate change. On the other, the dismantling of democracy in lieu of a populist, authoritarian rule; increased attacks on the marginalized, oppressed and exploited populations of the world; and acceleration of the degradation of planet earth. The future now unfolds as a battle between two dominant discourses. One seeks to recapture the heart and imagination of the Enlightenment, harness the power of scientific research and rationality to lead us on the road to a brighter future for the great mass of people. The other is an atavistic return to a past where a small cadre of global elites dominate the political, economic and cultural worlds, where propaganda and ideology dictate the contours and content of the public sphere and where multinational corporations and the power elite decree policy by fiat at the local, national and global levels.

## A role for UNESCO as a global public intellectual

In this battle, the institutions charged with knowledge production take on an increasingly essential role in challenging the new paradigm of fake news, insular politics and discourses of nationalism, intolerance and hate. UNESCO finds itself in a uniquely powerful position in this fight as a key global voice amongst the institutions tasked with fostering and revitalizing the public sphere. The Organization wields the capability to bring together schools and universities, scientific institutions, political organizations, think tanks and the media to counteract the rising tide of cynicism and authoritarianism. Its breadth and reach is unparalleled on a global scale and we thus argue that it has the best opportunity available to take on the responsibility of not only continuing to foster contemporary and future

generations of scholars, researchers, thought leaders and public intellectuals but to also serve as a public intellectual itself.

One might immediately ask what that looks like? It starts with continuing the extraordinarily important work UNESCO has already undertaken around the world, but is fortified by a commitment to expanding the channels of knowledge production and their interaction with the disseminators of knowledge in the traditional and new spheres of media and technology. It means working to bridge the gap between the knowledge produced in schools, universities and research organizations and the media reporting on that knowledge in ways that challenges the deep misunderstanding and misuse of that knowledge. It means challenging the degradation of popular discourse and the return to pre-scientific revolution reliance on received wisdom, old world customs and religious orthodoxy, working with the storytellers of our age to renew faith in the power of science to study uncertainty and reach toward truth. It means training the next generation of public intellectuals, including new and traditional journalists, scholars who can bridge academia and the popular press and those well-versed in the epistemologies of the global South. It also means helping to foster new public spheres – both virtual and real – that can challenge the increasingly insular nature of politics in the United States and around the world. Above all, it means taking on the role of a public intellectual itself to lead the fight to refortify knowledge societies against the forces that have so effectively assailed them over the past four decades, returning science to its ultimate goal: to undertake research in the service of humanity and the common good.

## A return to science in the name of public good

The challenge is profound but essential, with leading organizations around the world now charged with stimulating a revitalized public sphere that chooses discussion over dissent, understanding over ideological myopia, the embracing of difference over xenophobia and hate, and hope over cynicism. We must seek to restore the notion of science as a public good in concert with the broader concern of fostering a deliberative and participatory democracy in line with the ideals laid out by not only Rawls, Dewey, Freire and Habermas but Butler, Laclau and Mouffe and Hardt and Negri as well. The tentacles of UNESCO reach across so many of the institutions that can work collectively to lead this charge and compel them to alter their current course. Far too many universities have become cloistered in their ivory towers, far removed from the quotidian lives of those that surround them. Too much research is undertaken with the ultimate goal of profit and prestige, superseding all others. Too much knowledge production that is esoteric and arcane has been separated into tight disciplinary boundaries, that it precludes the broader, more holistic perspective of how the world truly works and what we can do to change it. Finally, too much of our popular discourse is consumed with consumer culture itself, rendering the marketplace of ideas little more than those of the market.

It is clear that new technologies and media provide powerful platforms to challenge these developments. We already see this with the internet creating new virtual spaces for researchers around the world to collaborate in medical, engineering and urban planning projects that have reaped innovative understanding and action; in social media platforms not only spreading hate but understanding, collaborative action and even profound social change – as with the Arab Spring, Women's Marches, Black Lives

Matter, global ecological movements and Me Too!, to name a few. We see voices so long cloistered in the hinterlands of popular culture increasingly resonate across the tapestry of the media landscape. To foster the expansion of these opportunities while confronting their obverse in the far-right political shifts in the Americas, Europe, Africa and Asia, we need comprehensive planning, concerted effort and collaborative action. Yet, this cannot happen without the leadership of an organization like UNESCO that has already built the relationships, trust and prestige necessary to champion this vital cause.

## Championing freedom, democracy and justice

Just as art house film, literary fiction and alternative music cultivate small but dedicated audiences, the champions of democracy, social justice and the pursuit of knowledge tend to congregate and interact in relatively insular spaces where they are too often speaking to one another rather than engaging the larger public This must change if we are to challenge the ideological manipulation of the masses currently leading us backward toward authoritarianism, violence and hate. The public intellectual has always stood as the progenitor of reason that can bridge that gap between the two worlds, finding ways to articulate ideas in a manner that not only broadens understanding and wisdom but that captures the imagination of the public. UNESCO now finds itself as a uniquely suited and best placed organization on the world stage to revitalize the spirit of the Enlightenment and its fundamental belief in the principles of freedom, democracy and justice for the many rather than the preordained few, and we believe the line of action outlined above is the best path forward for the organization, the majority of global citizens and planetary survival itself.[1]

1 The UNESCO Chair on Global Learning and Global Citizenship Education located at UCLA, has designed a new journal, *Global Commons Review* (globalcommonsreview.org) with the purposes of promoting a public science, bringing findings in science and technology to the broader public.

# Restructuring the knowledge production value chain in publishing

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The current system of publishing (i.e. knowledge sharing) values individualism and commodification, restricting our use of existing knowledge. The Western model of knowledge production is not currently inclusive of other forms of knowledge, which inhibits the reuse, adaptation, reinterpretation and development of existing knowledge. The author proposes that knowledge systems be purposefully re-created to prioritize the end users' needs and value them as co-creators.

Since the Gutenberg printing press, the dominant communications infrastructure for the dissemination of knowledge in the West has been publishing. In the East, printing ensured consistency of information across geographical distances. In the South, oral storytelling and symbolic art have been used to encode and communicate information across generations. Today, the number of ways of imparting knowledge has multiplied and these older forms have been joined by many more ways to transmit knowledge through radio, television, mobile phone and computer.

## Who owns the knowledge?

These communication systems share the common characteristics of gatekeeping, reproducing and packaging knowledge for dissemination. Yet, different societies have different approaches to the ownership of knowledge. In some, knowledge is commodified for sale by the book and journal publishing trade while in others, centralized verification and communal ownership predominates. In the South, indigenous practices embed cultural identity with knowledge systems.

The global reach of our communication infrastructure brings these into unprecedented proximity. What was once solely a cultural activity of a community performed in a set time and place can now be shared across a wider geography and replayed through recorded technology. Indigenous practices that emphasized the communal ownership of knowledge that is beneficial to society through oral storytelling have been extended through broadcast radio and mobile technologies. These operate within a system of ownership of cultural property that may not be compatible with the commodification of knowledge common in

the West. It brings into question the ownership of the story and the performance of the story in its telling. Questions that have no meaning in indigenous knowledge systems.

## The shifting ecology of knowledge

Globally, we need to ask: to what extent are the rewards of creativity individual or communal? Cultural and artistic knowledge is perpetuated and reaffirmed through social practice while systems of knowledge governance are in place to reflect this pattern of use in the present and safeguard it for the future. In Western publishing models, expression through words, performances or other visual means are designated as property. Ownership can be assigned to an individual or a company and can be exchanged, traded and licensed for reproduction through the right to make copies. Yet, the individualism of creative endeavor can be a stranglehold as we learn from each other and retain what is best and most relevant from the past. Moreover, indigenous knowledge systems of storytelling that are communal can be in conflict with the ownership of knowledge through the mechanism of international copyright law.

Not all information adds to knowledge nor is all knowledge new. Knowledge is subject to adaptation, refinement, reinterpretation and remixing. It is mutable. The ecology of knowledge is not one of absolutes and diversity is essential to development.

Learning, practice and the application of existing knowledge reaffirms its utility in the modern world. This is done in different ways. 'Inductive knowledge' derived from observation and experience can be communal – whether it is tested by a body of scientists and published in journal literature or built by a community and passed on as the fruits of experience and knowledge of ways of living. It can also be individual as the artist learns from their practice. 'Deductive knowledge' drawn from interpretative theories of the world can also be communal or individual as philosophers, poets and artists derive insights from the application of their theories in the world. In both epistemologies, knowledge lies in the relationship of information to an existing problem in the world.

## Western models of knowledge production need to be overhauled

Scientific research is necessary to generate new knowledge. Evidence has to be rigorously and objectively assessed through research to offer an interpretation that provides new insights. Good research advances on solid foundations of previous research and adds to knowledge that should stand the test of time. It is not repetitive, it is not commentary. It provides new methods, new ideas and new data. The distinction between research and argument, evidence and interpretation, knowledge and belief, fact and activism need to be maintained. Research brings forward new knowledge for verification.

Knowledge should be verifiable and able to withstand challenges. Systems of knowledge verification, authentication and dissemination are needed to facilitate the Sustainable Development Goals through communicating knowledge freely at the point of access. The proliferation of communication systems has divided and limited access in some areas while in others, made much more information available. Systems of knowledge dissemination

need to prioritize beneficial knowledge for immediate, medium and long-term application that may be disseminated through messages from global priority organizations such as the WHO or UNESCO. These bodies need to ensure multilevel access to original research data on which new knowledge is based to enable the ability to verify and correct them to ensure that information comes from trusted sources.

Through its highly adaptive book and journal publishing system, Western society has been able to ensure that creative, artistic and innovative scientific ideas reach an audience. Building and developing previous work to use as inspiration and tools for creativity is embedded in indigenous practices and the legal concept of the public domain. However, the Western model is not currently inclusive of other forms of knowledge as it inhibits the reuse, adaptation, reinterpretation and development of existing knowledge. Effective immediately, this system must change to ensure cultural renewal and the dissemination of new knowledge to all for the common good.

Research into the physics of the universe, health of our bodies, effects of forces of change on the earth's ecosystem and so on require a different approach to the modes of inquiry pursued in the humanities and the creative arts. A top-down approach has been proposed by major national research agencies (NRAs) and funders from twelve European countries. Plan S proposes that research funded by public agencies be made available as open access through journals or institutional repositories and explicitly exclude hybrid forms of publication (Science Europe, 2018). Through this initiative, the substantial and high-quality research that has emerged from European research funded projects would be freely available as publications funded by the Universities that host them. The output of the substantial research funding (numbering well in the million) that these schemes award would thus be accessible online; authenticated, verified and published. The end user here, however, is a more remote figure than the peer reviewer who assesses the utility of the research findings for future knowledge production. This is a somewhat circular system that reinforces the top-down targets of the NRAs and does not open up research to serve the public, individual or community needs. A bottom-up approach is available through crowd funding in 'kick starter' platforms where the end user actively contributes start-up income and can comment on the proposed project. These are typically low-cost creative projects (more often for the development of an idea rather than to research it) that after initiation have to generate their own income.

Models of contemporary publishing refer to a 'value chain' that starts with the author or creator. This model of publishing is based on the author's desire to share their creation. The subsequent processes of checking, verifying, editing, authenticating, packaging, transporting, selling and delivery is additive as each agent in that process 'adds value' to the original, which is then paid for by the recipient. The focus has been on the effect of technology on simplifying or removing the intermediate services. 'Disintermediating' has brought into question the value and function of the links in the chain. This is exacerbated by algorithmic pricing that calculates the value of knowledge at the moment of demand, leading to extreme variability in prices. This can disincentivise certain forms of inquiry and creativity while excluding and rarefying knowledge. A radical overhaul of this way of thinking and doing is needed.

## Knowledge systems need to value the end users as co-creators

Creating a knowledge system centred on the individual or community's desires and requirements will flip the value system. From this position, the community, audience or readership become the instigator of creative inquiry. Understanding our humanity and creativity both as individuals and groups has long been a topic of profound thought and reflection in the humanities. Meanwhile, the contrast between being human versus technological/scientific invention has come to the forefront of research with the global advance of communications technologies (e.g. artificial intelligence). Scholars have pointed out that reader and author are co-creators as both are needed to make a text come alive. Similarly, both user and researcher are needed to create knowledge. Thoughts and ideas that change us as individuals and communities breaking down assumptions, barriers and prejudices while advancing development are co-created.

An understanding of this co-creation is embedded in indigenous knowledge systems. What is useful for the individual and society is conveyed through multiple forms of communication, including painting, dance, ritual and tradition, as well as written and spoken texts. Significantly, this starts with the community's need for knowledge that is then selected and encoded for current and future generations to retrieve and activate for themselves. The retrieval is often given a status and significance of its own through an elder's teaching or cultural events within the family or community. This reversal of the publishing model puts the knowledge-user first.

New means of communication have brought into contact different forms of governance of knowledge, and we need to recognize the contribution of each to the work of development. Specifically, we need to develop a more flexible publishing system and international legal frameworks to put the knowledge-user and co-creator at the forefront.

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# Developing futures literacy as a tool to navigate an uncertain world

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This piece elaborates on incorporating 'futures literacy' into existing secondary school curricula as well as planning a multidisciplinary course. It proposes a framework to instill cognitive, emotional and active skills capacities to prepare learners for a future shaped by climate change, globalization and artificial intelligence.

As we move further into the twenty-first century, the role education plays becomes ever more essential. The pressing problems related to the destruction of nature, climate change in particular; the speeding up of globalization and the rising inequality as a part of its tapestry; and the growing temporality of working contracts all call for a rapid and massive shift in our education system. We need to renew our skills and way of thinking to cope with these global problems (Wilenius, 2017).

According to the Oxford dictionary, the word 'literacy' refers to the ability to use language by reading, writing, spelling, listening and speaking. Further, it refers to a specific knowledge and competence. When we add the prefix 'futures', we are indeed focusing on a particular domain of all these skills that enable us to understand the role that the future plays in all that we do, using future creatively and consciously in the present (Miller, 2018). In other words, this boils down to finding, understanding and creating knowledge that holds specific relevance to our immediate or long-distance future. How do we expand students' capacities to understand the essence of future and make use of that understanding in their decisions and actions today? After all, our future builds largely on the decisions we make in the present.

## A futures literacy framework: the next paradigm of education

A new collaborative, problem-based learning methods approach is required in school systems to better prepare students for the challenges they will face in the coming decades. Our ambition is to combine the long tradition of futures education (e.g. Rogers, 1998; Hicks, 2008, 2012; Bateman, 2012) with recent research in the fields of futures studies, anticipation and futures literacy (e.g. Ahvenharju et al., 2018; Miller, 2018; Poli, 2017), and combine these into an insight of how futures literacy can be integrated into upper secondary education. For this purpose, we have created the following holistic framework of futures literacy to define

the key components of which futures literacy consists. By adopting a pragmatic approach, our aim has been to render the abstract concept of futures literacy more tangible and easier to integrate into education curricula.

Our framework consists of three clusters of capacities: cognitive, motivational and active skills capacities that build up futures literacy, which then manifests itself as personal resilience in a changing world and a proactive futures mindset to take action to build a better world. Next, these three clusters of capacities will be further defined.

**Cognitive capacity** focuses on the why and how of using the future. In practice, this means understanding the basics of how the future appears, including phenomena that shape the future, such as demographic transition or digitalization. Some of these phenomena can be traced historically (i.e. trends, megatrends) while others cannot (i.e. weak signals, x-events). This is why 'future' is always in the state of emergence, the state of becoming. It is this quality that makes the future impossible to predict as there will always exist multiple alternatives. It is equally essential to gain an understanding of different time scales. Since we have a tendency as human beings to focus more on the short term, we can easily ignore thinking more long-term. Considering the long-term requires stretching our regular mindset. Finally, we should learn to comprehend that the most important component that defines time and future is that of constant change.

**Motivational capacity** deals with our capacity to create meaning in our lives. It focuses on developing our self-knowledge and reflecting on the expectations, hopes, fears and attitudes that influence our view of the future and the ways in which we use the future in the present. For example, our hopes and fears relating to the future can have a significant effect on our decisions and actions in the present. Particularly, for young people, it is important to make sense of their own mission and find a channel to express and develop their innate interests and values. They need to have a level of expectation about their own life that is positive, where the future is offering them something to look forward to. When this happens, it creates an attitude towards the future that is not based in fear or indifference but on trust and curiosity.

**Active skills** is the capacity for which both the cognitive and motivational capacities pave the way. These are skills that we assume are increasingly needed as we progress towards the middle of this century. They provide us with the critical tools to be proactive in the world, instead of passively waiting for things to happen to us. That is why we call those skills 'active' since they increase our capacity to act at any given moment based on our observations.

## Expanding the classification of active skills

There are four components that make up the active skills capacity that warrant futher discussion in the context of our proposal to incorporate futures literacy in education.
The first set of active skills are 'planetary living skills', which entails becoming aware of our personal relationship with the planet and observing our immediate impact on the physical environment around us. To build this relationship, we need to understand and experience how nature actually works and affects us (e.g. how plants grow and what they offer us). In today's world where people are increasingly raised in urban environments, it is important to

maintain a living relationship with the biosphere surrounding us. As we have moved into the Anthropocene era, we need to realize that humanity's impact on the planet has become so significant that we have to take responsibility to secure the future of our planet.

The second set of active skills are 'complexity skills,' which deal with the growing complexity of our societies. The aim is to improve an individual's flexibility, capacity to manage uncertainty and ability to act in complex decision-making situations. As the world grows ever more interconnected, develops more technology, increases in population size and as we have more information than ever to deal with, this tests our capacity to keep our minds clear and focused and not get led astray with too many impulses and stimuli. Our sense making ability becomes critical and we can only cope with the current reality if we learn how to think in systems – i.e. find connections and cause-effect relationships between individual phenomena. Developing our complexity skills helps us understand the structures of society and discover opportunities to influence matters within that complexity.

The third set of active skills are 'creativity skills.' There is a growing realization that creativity, as the ultimate human quality, is an important resource for us to use as machines, robots and artificial intelligence hold the potential to release us from monotonous and repetitive tasks. Creativity is a unique human feature that technology or artificial intelligence cannot replace. Thus, creativity skills aim at strengthening our creative and critical thinking faculties, and draw on our inner capacity to use our intuition. Creativity does not necessarily require great flashes of genius – it is more akin to the ability to find new, surprising solutions to existing problems.

The fourth and final set of active skills are 'empathy skills.' They focus directly on our capacity to reach out and loosen our innate bias to be self-centered in our thoughts and actions. Empathy skills nurture an individual's capacity to work with and for other people. Many positive developments in our civilization came about due to our capacity for emphatic behavior (Rifkin, 2009).

Our aspirations in this world should be driven by the need to contribute to the well-being of others, particularly those of future generations. Ultimately, to solve complex global challenges, one has to be able to put oneself in other people's shoes to find shared solutions.

## Integrating futures literacy into secondary education

To integrate futures literacy into secondary education, a twofold approach is suggested: 1) incorporate elements of futures literacy into individual subjects and 2) organize a multidisciplinary course on futures literacy. We suggest that the concept of a 'sustainable future' should be embedded in national curriculum plans for upper secondary schools in the context of every subject. This provides the foundation to deepen the futures perspective with futures literacy tools – within geography or history classes for instance. The existing pedagogic tools to build this are versatile, drawing from the long tradition of futures education.

The second approach appraises multidisciplinary, problem-based learning methods. Two pilot school projects in Finland have organized a cross-disciplinary futures course in collaboration with teachers of different subjects. The course explores futures from the perspectives of different disciplines, such as history, societies, art, geography, health, business,

etc. The 'futures course' gives space in the otherwise packed curriculum to explore one's own thoughts, feelings and aspirations regarding the future on various levels: personal, local and global.

Our vision is to develop a worldwide network that builds young people's capacity to navigate in the uncertain future through the teaching of futures literacy. We are not alone in our mission as there already exists promising initiatives on the topic. One example is the Teach the Future-network, launched by American Professor Peter Bishop, brings together teachers interested in teaching futures (Teach the Future, 2019). Moreover, futures literacy is actively promoted by UNESCO's foresight unit and Global Futures Literacy Network of UNESCO Chairs.

During the first decades of the 21st century, our planet has been pushed to the verge of an existential crisis. The only way out is to ensure a healthy level of basic needs for all humanity and move ourselves to the next level in our attitudes and behavior. Our concept of futures literacy aims to help us take that next step. Futures literacy and active skills help us understand the future implications of our current actions and deter us from overconsuming our basic needs, which is largely why our consumption patterns have become insupportable from planet-wide perspective. We need to incorporate futures literacy into our education curricula if we are to have any hope to overcome our current state of planetary crisis and educate future generations that will not repeat the mistakes of the past.

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# Supporting learning needs for increased longevity

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The author advocates for lifelong learning in a future where living up to a 100 years old would be the norm. In this future, there is a need to reshape education for those seeking meaning and fulfilment through the promise of education after turning 60 years old and in preparation for the next 40 years of their lives. To truly support lifelong learning, education must focus on imparting the shared values of humanity to prepare learners for the tasks that technology cannot tackle.

Never before have advances in technology exercised such a powerful and profound influence on the development of human society. Will the omnipresent artificial intelligence bring us boundless joy or deep fear? Will constant breakthroughs in the life sciences bring us longevity or species change? Educators must consider how the emergence of these technologies will affect education. Now that living to a 100 years old is a distinct possibility, how would you, at age 60, plan and design the remaining 40 years of your life – when your working years were not much longer than 40 years? Now that you find it impossible to surpass a robot either in intellectual capacity or logical analysis, would you feel fearful or saddened? Helpless or panicked? Would you wonder what makes a human being a human being, or if what you have learned is still of any use? How will education cope in a situation like this? Traditional educational modes, concepts and methodology are faced with great challenges. Technological transformations have made it imperative to reshape education with regard to its timescale and content. To keep up with the educational needs of the future in an aging population, we must act proactively.

## Reshaping the education timescale

The current educational timescale considers traditional norms, which starts from early childhood education and progresses to secondary education for adolescents, followed by vocational or higher education for youth. Generally speaking, its timespan ranges from 12-20 years and ends at between 20-27 years of age. Once in the workplace, some continuing education may be required, but this is mostly intermittent and discrete. Now that individuals can potentially live for up to a 100 years, this educational arrangement no longer matches up with people's needs. Education must be reshaped – and it starts with redefining the timescale.

When restructuring the timescale of future education, not only should young people's employment needs be taken into consideration, but also the needs after the age of 60 when one's working life typically ends. Education will play an active role once again when one looks forward to, or is faced with, the next 40 years. Our professional and educational choices at age 18 might not have been where our real interests and passions lay. It might have been a choice of one's parents, or influenced by the media, opinion, a friends' advice or even peer pressure. At age 60 or more, however, the call from one's inner self awakens a dream long overdue. Thus, to live out a more comfortable and self-assured life, it may become necessary to choose another subject of study and start learning anew. Education should prepare us for this possibility and provide due services. Lifelong learning goes well beyond a simple term. It should take into account the timescale of people living to 100 years and provide them with resources, services and a plan to achieve their educational goals. Educational institutions and educators alike need to adapt to this reality.

## Revising the content of education

When AlphaGo beat many high-ranking Go players, I wondered if everyone had the same question as I did: "Will I be replaced by a robot in the future?" With the development of science and technology, we can imagine such a scenario where a robot becomes your colleague, your employee or even your manager. Even decades of hard work and an encyclopaedic mind, you will not be a match for a computer, since its 'brains' contain achievements that span several thousand years of human civilization, which it can consult in the blink of an eye.

In the face of such a challenge, future education must answer the question of what to teach. Imparting knowledge is conventionally understood to be the fundamental purpose of education. At present, however, imparting knowledge alone may not provide sufficient skills to navigate future challenges. In his essay *On Teaching*, Han Yu, the ancient Chinese *littérateur*, maintained that a teacher is "one who propagates morality, imparts professional knowledge, and clears up confusion"[1] (Han, Tang dynasty). Similarly, the statute of Tsinghua University presents the three-way training mode and educational concept of "fostering moral values, developing ability, and imparting knowledge." Both Han and the Tsinghua statute highlight "propagating morality" or "fostering moral values" and this goal is perhaps the most important function that future education can perform.

Education must reshaped its content to adapt to the needs of future societies. In future, the major function of education will no longer be to impart knowledge but instead its fundamental mission will be to propagate values and support an orientation towards values. This will mark a transition from *being* to *becoming*. Ideally, the content of education would help the learner determine that which is 'good,' 'necessary,' 'deserving,' 'practical' and so on. Learners' responses in turn would reflect their value orientation and value identification. The questions of 'what' or 'how' will reflect a subject's views of an object's nature, shape, structure and rules, and will no longer function as the mainstay of education. Rather, these questions

1 HAN. Yu. Teaching. Mr. Changli's Anthology, Tang dynasty.

will exist in the technical realm as they may be solved with technological assistance (i.e. through the use of embedded chips, input knowledge, etc.). Eventually, values and a value orientation will be what determines our humanity, distinguishing human beings from robots or AI.

The *raison d'être* of educational institutions and educators is the transmission of humanity's shared values and value orientation to future generations, so that they may respond fearlessly and unwaveringly to the challenges posed by technology.