

Transformation for a New Education Paradigm and the Role of Ecosystemic Leadership

GL-21 Education Group Position Paper

Pavel Luksha and Witold Kinsner¹

1. Triple role of education for future global leadership

The Education subgroup of the GL-21 project recognizes that education plays a triple role in regard to the new model of leadership.

- First, we need education to serve leadership, to help educate leaders of the 21st century.
- In order to do so, education itself needs to be transformed so it can deliver new curricula and new pedagogies - and thus it needs new models of leadership to carry it forward.
- Finally, as the educational sector itself transforms, it can evolve into a space for transformational leadership - in other words, it can lead the change for society, as a venue where new knowledge and skills can be developed or even created, and where the future can be prototyped.

Accordingly, education must model the change that society needs - it has to respond to new challenges to become the change we want to see in the world. In this paper, we will focus on the necessary changes to education and its leadership to accomplish such a mission.

2. The rationale for change of educational systems²

The existing “industrial” model of education has been criticized by many forward looking educators for at least half a century - and the texts of some of its formidable critics such as Paolo Freire or Ivan Illich read astonishingly. However, what is different today is that momentum has accumulated, and many new forces that demand transformation of education for the needs of the 21st century have emerged in a very wide spectrum of global civilization.

On one side of this spectrum are pragmatists: those who suggest that the main task of education is to come to terms with existing demands of the economy and the society. They indicate a significant skill gap exists between what recent graduates know and what employers demand - and both graduates³ and businesses⁴ acknowledge that the education system is not

¹ Substantial parts of this publication use materials from reports by Global Education Futures on the future of learning and leadership in education, and represented texts are coauthored with Joshua Cubista, Alexander Laszlo, Mila Popovich, Jessica Spencer-Keyse, Ivan Ninenko, and Pim van Geest.

² This section is derived from *Educational Ecosystems for Societal Transformation*, Ch.4.1 (Luksha et. al. 2018)

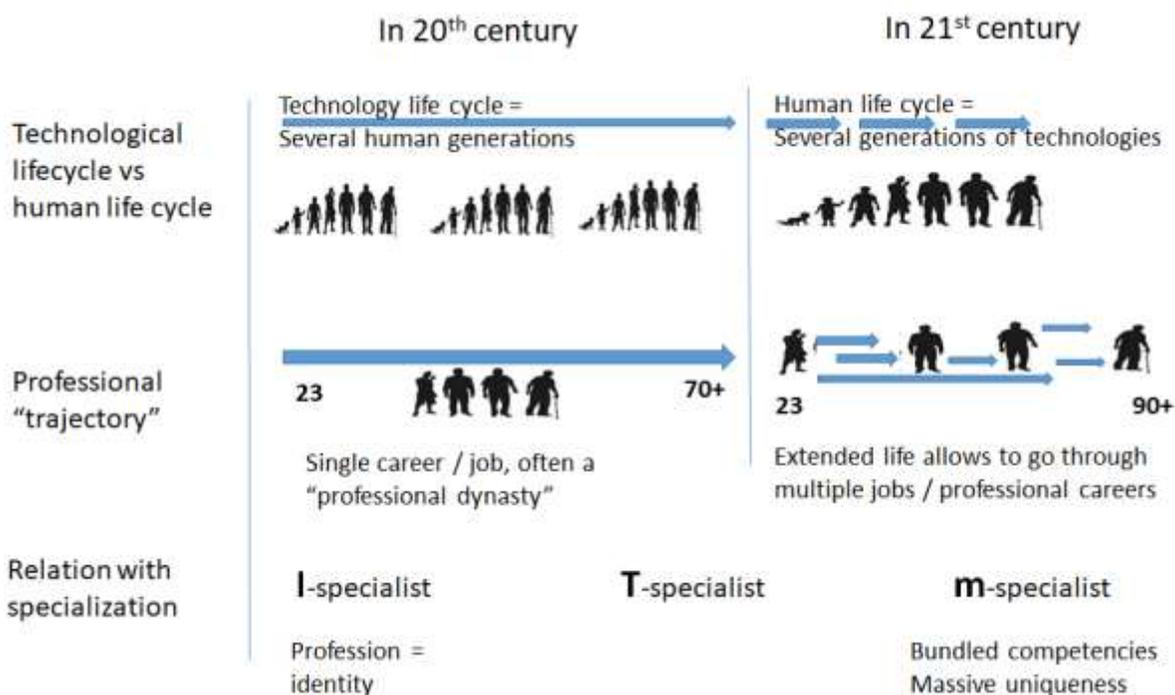
³ <https://rda.worldskills.ru/project/voice-of-youth>

⁴ <https://www.hays-index.com/>

adequately doing its job of preparing students for the real world. Furthermore, they indicate that many regions of the world even do not have access to basic education⁵, and that university education, even in its more traditional form, remains in high demand.

More radical demands come from innovative economic sectors, social change agents, and political leaders. They indicate that our society is on the move. It is becoming reshaped by hyperconnectivity and digitalization, increased automation of work, introduction of network based governance models, the rise of many impactful and potentially disruptive technologies that can shut down many industries and influence our ways of living - nanotechnologies, genetic engineering, flying autonomous drones, and more⁶. Rapid technological change and resultant societal transformation demand new skills and new models of learning that will be fast, flexible, and increasingly personalized. Our civilization - especially the urban one - becomes reinvented, and so must be our educational system.

Figure 1: Learning and contributing in two different paradigms.



Driven by technological and societal changes, the world of jobs transforms accordingly. One of key manifestations of this is the transition from a single job career towards multiple careers. Educating for one profession in a lifetime was feasible when knowledge doubling happened in hundreds of years - and now, the doubling is happening in months or even days. Also, the shortening of the knowledge half-life time occurs. Existing systems cannot accommodate it, and a shift to life-long learning is required. Still another pragmatic reason for a change is the system

⁵ <http://www.unesco.org/new/en/education/themes/education-building-blocks/literacy/resources/statistics>

⁶ <https://rda.worldskills.ru/project/future-skills>

is open in the sense that the experience gained through our activities is not fed back into the less-experienced generation. Closing of the loop is not trivial.

Figure 1 illustrates how a person could develop and contribute in the old industrially-situated system of the 20th century and the emerging new system of the 21st century. These systems are fundamentally different.

Finally, a growingly impactful community of leaders and changemakers sees a totally different role for education. Movements such as Fridays for Change or Extinction Rebellion highlight the ultimate irrelevance of existing education in the light of existential threats that humanity is facing. Yet it is possible that education can become more than a service to existing elites and their outdated agenda. It is a sector that shapes worldviews, mindsets and skill sets of young people and adults alike, that essentially “programs” the way our society works. It is also a sector of safe experimenting and prototyping, a space of collective learning. And so, rather than reproducing the existing civilizational paradigm, education could embark on producing a paradigm shift for humanity: it could model, test, establish and scale up the practices of the civilization of responsibility, of sustainability, of peace, of open-heartedness and compassion, of mindfulness, of thriving. It can become a cradle, or a sandbox, for the civilization that emerges to evade existential challenges to humanity and fulfil our collective potential⁷.

Figure 2: Three framings of the demand for transformation (from GEF,2018)

'Civilizational transit' : focusing on emerging social practices that help us recognize ourselves as a truly planetary species (e.g. Macy's Great Turning, Eisenstein's More Beautiful World etc.)	Key discussions : how can education help us reinvent our relationship between ourselves, with our ancestors / descendants, and with our planet
'Rebuilding urban civilization' : focusing on life quality & social impact (e.g. Sharing Economy, Scharmer's Capitalism 4.0, Florida's 'Reinventing Cities' etc.)	Key discussions : new models of education that should complement existing ones (e.g. urban learning communities)
'More of the same' : increasing economic efficiency / productivity / competitiveness in 21 century	Key discussions : education is broken but could be fixed by introducing better pedagogies / ed tech & new curriculum

Most notably, these three framings of the need for change are not mutually exclusive - but more likely nested one within the other. We need to make education more inclusive, accessible, and relevant to the needs of our current societies. We need to make it more flexible, learner-focused, and increasingly life-long. And we need it to become future-prone, future-fit, and future-shaping - with the focus on learners and social relevance. Consequently, a shift towards a new paradigm is required. The new paradigm must involve a renaissance of both human values and

⁷ <https://futuref.org/educationfutures>

vision in action transforming human learning and leadership that fosters lifelong learning and “right livelihood” for a healthy world. Our greatest challenges may be our greatest inspiration: to learn how to create a thriving future for ourselves and the planet together.

3. Multiple avenues of necessary changes⁸

Existing educational institutions and systems, more often than not, tend to invest in conventional industrial processes and models that continue to reproduce outdated “ways of knowing”. While both digitalization of education and increased connectivity help the transition to a new model of education that may be of greater relevance to demands of learners and other stakeholders; they cannot be seen as a “magic bullet”. Educational technologies are important but not indispensable for the transition needed, as they are the means but not the goals. What is needed is a true human renaissance of values, purposes and ways of being that embody learning for life and with life. The emerging paradigm that is called into being assumes the need for a holistic, rather than fragmentary change to the content of education, its methods, its organization and governance, and more.

A. *Content & learning methodology*

- *Skills for Adaptation & Mastery*: as we are moving towards the age of massive uniqueness of our work and industries, professional competences become increasingly granulated, calling for personalized ways of developing them. Also, our ability to succeed in different contexts depends on a set of ‘21st century’ skills, including some “soft” skills that help us adapt to various contexts, and “existential” skills that help us live our lives in the best way possible⁹.
- *Learning for Complexity & Strategic Uncertainty*: as our society becomes more complex, we must learn how to make socio-technical systems “antifragile” and able to cope with uncertainty and diversity - and that calls for cultivating system thinking, and applying evolutionary frameworks of system action. Also, recognizing interconnectedness of systems (ecological, cultural, economic, political and technological) requires perspective taking, seeing things through the eyes of others, and engaging in empathic communication that enables system sensing. This approach could lead to systems that are not only evolving, but also resilient; i.e., capable of recovering quickly in the presence of major and unexpected disruptions and attacks.
- *Sustainability and Regeneration Oriented Education*: in order to implement sustainability, education needs to move towards action-based learning and model sustainable / regenerative relations, engagements with communities, etc.
- *Holistic Education*: as each person finds identity, meaning, and purpose in life through connections to the community, to the natural world, and to humanitarian values such as compassion and peace, holistic education aims to call forth from people an intrinsic reverence for life and a passionate love of learning.

⁸ This section is derived from *Learning Ecosystems: An Emerging Praxis*, Ch.2.2 (Luksha, Spencer-Keyse, Cubista, 2020)

⁹See *Future Skills* report by Global Education Futures & WorldSkills <https://futuref.org/futureskills>

- *Self-Guided Lifelong Learning*: self-guided learners are able to set goals, define pace and needs, attract and create necessary learning resources, and immerse themselves into a variety of learning experiences.
- *Joy and Play*: play as both the experience supporting learning and joy as one of the purposes of our being becomes one of important facets of education, through different formats of gamification and playification.
- *Diversity and Active Inclusion*: cultivating ability to have conversations that bridge differences and that lead to peaceful negotiations and allow to create safe spaces and empower people of different race and ethnicity, belief systems and gender identity, as well as people that have been underprivileged in different ways.

B. Learning approaches & frameworks

- *Knowledge at Our Fingertips*: an ever increasingly distributed model of learning via the Internet, in various forms such as online libraries, games, online newspapers and encyclopedias, webinars and courses, and other structured learning environments. Coupled with more traditional face-to-face ways of learning, it enables all forms of *blended* learning that combine online and physical activity.
- *Project-Based Pathways*: project-based learning prepares students to solve real world problems, encouraging them to gain knowledge and skills by investigating and responding to a question, problem or challenge through learning by doing and authentic experiences.
- *Experiential Learning*: Many professions and trades require physical laboratories related to projects. Laboratory kits must be developed so that they could be delivered to students situated far away from a learning distribution centre. New methodologies must be developed to include virtual reality (VR), augmented reality (AR), mixed reality (XR), and other digital reality (DR) environments to facilitate effective development of the intended experience. Co-laboratories should also be developed to share the delivery burden and increase the diversity of experience gained. Since the rate of developing impactful experience varies from one person to another, personalized teaching and learning must accompany this approach.
- *Collective Learning Processes and Journeys*: enabling people to collectively explore, co-create and co-evolve across disciplines in interesting and stimulating ways allows us to experience “belonging to something bigger.” This can generate and maintain meaningful collective purposes, identities, and actions that stimulate co-creation, collaboration and collective learning. Collective processes can engage peer-to-peer learning and generative conversations, among other approaches.
- *New Roles of Teachers*: changing learning environment and moving towards value-based, trust-based interactions requires teachers, leaders and other educational change makers to obtain new skills such as facilitation, moderation, group dynamics management and situational leadership.
- *Digitally enhance pedagogies*. Modelling of learning and cognitive processes must also enter into a new era, not in isolation from, but in symbiotic relation with human-

compatible machines^{10 11 12}. New ways of measuring learner achievements and learning processes (including biometric measurements) open avenues for a finer, more personalized and timely, feedback to learners that can greatly enhance their capacity to learn.

C. Organization & governance of learning processes

- *Evolving Assessment*: evaluation and assessment can be experienced as valuable and encouraging feedback, and in order to do so it needs to take into account social and emotional intelligence, creativity, ability to cooperate and co-create, as well as other critical skills of the future. Measurements need to be done in new and dynamic ways, as “creative profiles” describing a range of multi-modal abilities, and assessed in ways that do not destroy curiosity, creativity, and cooperation, and allow people to learn by mistakes.
- *Rise of New Providers*: the variety of places and ways to organize education grows due to the development of online technologies, but equally due to expansion of face-to-face formats that form a completely new learning landscape (e.g. education clubs, live libraries, and flying universities). They are based on diversity and interaction of different approaches and methodologies, making it possible to choose from a range of what suits best one’s personal learning style and worldview.
- *Networks & Platforms for Learning*: network-based education weaves learners and providers into a web of interconnected learning spaces and processes, creating flows of information that allow such systems to become increasingly flexible and adaptive, while at the same time becoming increasingly global. In addition, digital platforms and tools such as badging systems help integrate providers and connect learning experiences into larger learning journeys.
- *New Role of Cities & Regions*: learning processes move outside of specialized institutions and into distributed networks of learning opportunities that exist on city or regional level - so that whole territories become “spaces for learning for life”.
- *Support-oriented and Shared Governance and Leadership*: national and local governments and other major stakeholders recognize the increased variety of learner types and needs, and learning models to support them, and engage a wider set of leaders representing grassroot civic governance and teacher / learner driven initiatives.

¹⁰ Yingxu Wang, Sam Kwong, Henry Leung, Jianhua Lu, Michael H. Smith, Ljiljana Trajkovic, Edward Tunstel, Konstantinos N. Plataniotis, Gary Yen, and Witold Kinsner, "Brain-inspired systems: A transdisciplinary exploration on cognitive cybernetics, humanity, and systems science: Towards autonomous AI," IEEE SMC Magazine, vol. 6, no. 1, pp. 6 - 13, Jan 2020

¹¹ Mason Dambrot, Derrick de Kerchove, Francesco Flammini, Witold Kinsner, Linda MacDonald Glenn, and Roberto Saracco, Symbiotic Autonomous Systems. White Paper II. Piscataway, NJ: IEEE Future Directions, Oct 2018, 227 pages. <https://digitalreality.ieee.org/images/files/pdf/SAS-WP-II-2018-Finalv3.2.pdf>,

<https://symbiotic-autonomous-systems.ieee.org/white-paper/white-paper-ii>

¹² Witold Kinsner and Roberto Saracco, "Towards evolving symbiotic cognitive education based on digital twins," in Proc. 18th IEEE International Conference on Cognitive Informatics & Cognitive Computing, ICCI*CC18 (Polytechnic University of Milan, Milan, Italy; July 23-25, 2019) pp. 13-21, Jul 2019.

4. The awakening through COVID-19

In January 2020, a new virus started to spread across the planet, quickly reaching out to all continents but Antarctica, sufficiently contagious and deadly to be recognized as the worst pandemic in 100 years. Coronavirus, or COVID-19, was hardly a surprise to epidemiologists and futurists who have been forecasting “the threat of new and reemerging diseases and immune microorganisms”¹³ among the largest risks for years. However, governments and businesses around the globe were largely unprepared to deal with the situation, and a worldwide cascade of lockdowns of cities and regions came as a shock to the economy and society. The lockdown forced societies to go into self-isolation – and to move all activities online whenever possible.

The educational sector, obviously, was among the first victims of this decision. As a result, it faced perhaps the largest disruption in its whole history: within a month and a half, literally the whole world stopped going to schools and universities. As of April 2020, over 1.7 billion learners of all levels are currently staying at home, 90% of all enrolled learners in the world¹⁴. The majority of schools and students were forced into different forms of online learning through online learning platforms and specialized apps.

Massive online learning was frequently touted as the future of education, and many futurists anticipated that it could possibly replace face-to-face education completely one day. However, the actual transition in the first weeks demonstrated negative effects¹⁵ such as:

- Mass-scale use of untested methodologies of teaching and student assessment, and also interruption to the normal flow of teaching and assessment that can influence anticipated long-term learning outcomes.
- Decline in the socio-emotional and physical wellbeing of students (due to increased screen time and lack of activities that complement cognitive learning, such as peer-to-peer interaction and physical exercises), and equally of teachers (due to significant changes in the way of teaching and the amount of adaptation it required).
- Intensified pressure on parents and families who now have to take responsibility for organizing learning processes and rhythms to make sure students are engaged and focused on learning - as well as to support students' acquisition of skills necessary for online learning.

Most importantly, much like governments and businesses, education systems were not prepared for the transition, and hundreds of thousands of schools and millions of teachers were thrown into the deep water and had to learn on the go how to build their online curriculum and

¹³ http://107.22.164.43/millennium/Global_Challenges/chall-08.html

¹⁴ <https://en.unesco.org/covid19/educationresponse>

¹⁵ As it is still early to provide comprehensive assessment of the situation, the evidence is still more anecdotal, e.g. <https://voxeu.org/article/impact-covid-19-education> or <https://blogs.worldbank.org/education/educational-challenges-and-opportunities-covid-19-pandemic>

use new teaching tools. The ongoing quarantine has caused a massive learning process for the education sector, and that after the COVID pandemics schools will face a “new normal”. We can suggest some recurrent statements regarding possible future scenarios¹⁶:

1. *Online & EdTech are here to stay.* EdTech has played a critical part in establishing continuity of education systems all over the world, and despite all hurdles school systems are quickly adapting to use online teaching methodologies. It also becomes evident that some assumptions around EdTech are faulty: it has to enhance human-to-human interaction rather than replace teachers and peer students with robots and simulated environments. Online pedagogies will continue to evolve, and further investment in the digital field and creation of network based learning models is inevitable. Being online invites teachers to use the tremendous resources of the internet to both make knowledge accessible and facilitate the acquisition of skills - implying a new role of teachers as curators and facilitators of learning journeys¹⁷.
2. *New curriculum for changing realities.* COVID-19 is anticipated to become a major disruptor for existing models of economy, calling in increasingly “physically disjointed” value chains, digitally enhanced, automated and unmanned solutions¹⁸. As a result, transition to “future skill” demand will likely occur very fast, and the relevance of traditional curriculum and pedagogies will be challenged at scale. However, what is required from schools is not to focus on some kind of new employability skills - but to increase general adaptability of students by helping them be open-minded, creative, emotionally intelligent, and collaborative. This requires a new set of methodologies for the experiential learning - both in schools and at a distance.
3. *Nurture the human dimension.* Human connections are essential for the wellbeing of teachers and students, and the efficacy of learning processes. Socio-emotional learning and experiential learning should become the foundation for the curriculum and pedagogies.
4. *Rising role of multi-stakeholder partnerships.* The current crisis highlighted the need for efficient partnerships between teachers, administrations, learners, and families - all of which ought to be supportive of each other and playing towards shared goals. Other important partners that stepped in to support education are technological companies, media, trade unions, local and religious communities, and many other players. The resilience of educational systems will only be established if these partnerships continue to be cultivated, and if hierarchy-based “industrial” education systems give way to decentralized local learning ecosystems.
5. *Future anticipation capability.* Even if futures are increasingly uncertain, it does not mean they cannot be anticipated - and as the Corona Crisis shows, with better anticipation capacity many negative consequences can be reversed.

¹⁶ Derived from a number of online conventions on “education after COVID”, including WISE & Salzburg Seminar online conference, Mifras & Nomada roundtable, Weaving Lab discussion series, Learning Planet meetings, etc.

¹⁷ <https://www.weforum.org/agenda/2020/03/4-ways-covid-19-education-future-generations/>

¹⁸ [https://www.project-syndicate.org/commentary/covid19-great-economic-mismatch-by-dennis-j-snowier-2020-](https://www.project-syndicate.org/commentary/covid19-great-economic-mismatch-by-dennis-j-snowier-2020-04)

Education systems, teachers and students **have to become future fit** (Smitsman, Laszlo, Luksha, 2020). For school systems, this implies the need to place mechanisms that would pivot when disasters strike. Many analysts agree that the COVID-19 pandemic is probably an outstanding event - but we can anticipate other "black swan" events of a similar magnitude and impact to happen in the coming decades. Many other risks are brewing in our increasingly complex and strategically unpredictable civilization - climate crisis impact on the biosphere and human systems, risks of global political, social, and economic turmoils, novel risks of disruptions to vital technological and economic systems (Internet, energy, transportation etc.), possibility of a new world war, and more. **The current crisis is an invitation to relearn ourselves and reimagine education.**

5. Are facing a new Sputnik moment?

Education is becoming not only necessary, essential and quintessential, but also existential. It is apparent that with COVID-19 crisis we have entered into another Sputnik moment.

The Sputnik Moment

Humanity has experienced many paradigm-changing events. Just over 60 years ago, a small satellite, Sputnik 1, was placed in the Earth orbit by the Soviet Union, and we realized how great an accomplishment that event was. Many teachers use the recorded beep sounds from Sputnik 1 to open their lectures and tell the students what happened on October 4, 1957, the Sputnik moment, and how we wanted to learn more, and how that inspiration led to dreams about the Moon and more¹⁹.

China's Sputnik Moment 2

Almost 60 years later in May 2017, a 19-year old Ke Jie, the best player of the ancient 2.5 thousand-year-old game of Go, lost the game to Google's AlphaGo. Not once, but three times. This was the Sputnik moment for Zhongguancun [jong-guan-soon], the Silicon Valley of China²⁰. The event started a fire in the Chinese AI community. Actually, they seemed to be ready for that moment, after 280 million Chinese watched the previous March 2016 five-game Go series with the Korean player Lee Sedol. In July 2017, China announced a plan to become the centre for global innovation in AI theory, technology, and applications by 2030.

¹⁹ Alex Joffe, "Coronavirus: A Sputnik Moment for Science Education," Begin Sadat (BESA) Center for Strategic Studies, Paper No. 1,536, April 20, 2020.
<https://besacenter.org/perspectives-papers/coronavirus-a-sputnik-moment-for-science-education/>
<https://besacenter.org/wp-content/uploads/2020/04/1536-Coronavirus-as-Sputnik-Moment-Joffe-final.pdf>

²⁰ Kai-Fu Lee, *AI Superpowers: China, Silicon Valley, and the New World Order*. Boston, MA: Houghton Mifflin Harcourt, 2018, 272 pages. {ISBN-13: 978-1328546395, hbk}
https://www.amazon.ca/AI-Superpowers-China-Silicon-Valley/dp/132854639X/ref=tmm_hrd_swatch_0?encoding=UTF8&qid=&sr=

When IBM's Deep Blue defeated Garry Kasparov in 1997, the Sputnik moment did not occur. It was not because the chess board had only 8 by 8 squares, while Go had 19 by 19. The core reason was that AlphaGo used AI algorithms that were much superior to the Deep Blue algorithms. These algorithms are becoming very disruptive not only to industries but also to people. Job losses in the range of billions may occur in all types of professions. Profound inequality could also result from the winner-take-all economy²¹. The advantages of "cheap labour" may also vanish.

China's Sputnik moment has not only altered the course of AI developments, but also sparked something very transcendental to human life. When the game progressed and Ke Jie realized around 2 hours and 51 minutes that all his talent, knowledge, diverse strategies and experience could not overcome the machine, he removed his glasses and wiped his tears.

All those who have seen it, supported him in the fight. The machine has won, but he became a champion to many. Sympathy, Solidarity. Understanding.

Sputnik Moment 3

We are now experiencing another Sputnik moment due to the COVID-19 pandemic, revealing how inadequate our scientific, engineering and technical capabilities and education are.

We must change at the roots of education with the clear objective of reducing the rampant one-dimensional profit-oriented economic paradigm with its consequences of self-serving greed and complacency. We must remind both ourselves and human-compatible machines²² about effective altruism²³ interwoven with the value of life^{24 25 26}. We must teach that life is much more than a dispensable commodity. We must also realize that to achieve that level of engagement in

²¹ Amy Webb, The Big Nine: How the Tech Titans and Their Thinking Machines Could Warp Humanity. PublicAffairs, 2019. https://www.amazon.ca/Big-Nine-Thinking-Machines-Humanity/dp/1541773756/ref=tmm_hrd_swatch_0?_encoding=UTF8&qid=&sr=

²² Stuart Russell, Human Compatible: Artificial Intelligence and the Problem of Control. 2019. https://www.amazon.ca/Stuart-Russell/dp/0525558616/ref=tmm_hrd_swatch_0?_encoding=UTF8&qid=&sr=

²³ Peter Singer, The Life You Can Save: How to Do Your Part to End World Poverty . Random House, 2009. <https://www.thelifeyoucansave.org/the-book/>

²⁴ Yuval Noah Harari, 21 Lessons for the 21st Century. New York, NY: Singal, 2018 https://www.amazon.ca/Lessons-21st-Century-Yuval-Harari/dp/0771048858/ref=tmm_hrd_swatch_0?_encoding=UTF8&qid=1589176072&sr=1-2

²⁵ Max Tegmark, Life 3.0: Being Human in the Age of Artificial Intelligence. New York, NY: Random House, Vintage, Knopf, 2017. https://www.amazon.ca/Life-3-0-Being-Artificial-Intelligence/dp/1101946598/ref=tmm_hrd_swatch_0?_encoding=UTF8&qid=&sr=

²⁶ Steven Pinker, Enlightenment Now: The Case for Reason, Science, Humanism, and Progress. New York, NY: Viking, 2018. https://www.amazon.ca/Enlightenment-Now-Science-Humanism-Progress/dp/0525427570/ref=tmm_hrd_swatch_0?_encoding=UTF8&qid=&sr=

process of creating a better world, one has to intertwine Isiah Berlin's fundamental "freedom from" with "freedom to"²⁷.

COVID-19 has a considerable chance to accelerate the transition from the old industrially-situated system towards a new paradigm, an ecosystemic-situated system.

6. New leadership for the paradigm shift²⁸

The last decade saw remarkable evolution of paradigms and approaches in governance all over the world, a transition from a centralized, hierarchy-driven governance towards a polycentric, distributed, and network-driven one. As the gathering by Global Education Leaders Partnership & Global Education Futures acknowledged in 2017²⁹, new types of governance is currently emerging in education, including:

1. Transition from hierarchy to “networked” governance, implying that development of education occurs not by centralized top-down promoting of new “educational reforms”, but by cultivating suitable approaches bottom-up.
2. Design of new tools that support this bottom-up development: “scanning” and “pulling” educational innovation competitions and acceleration programs, grants provided to schools and teachers, maps and professional networks of innovators, and creating incentives and promotions for innovators.
3. Cultivation of communities of practice for new education paradigm practitioners that can creatively search for opportunities for design and implementation of innovations (having sufficient time and resources to reflect, discuss, and experiment)
4. Taking into consideration the diversity of various regions and schools (economy, resource availability etc.).
5. Using education as a key vehicle for socio-economic development at the regional and national scale.
6. Changing role of governments that become facilitators of “fair game” opportunities and equity while maintaining growth of diversity.

These shifts can be seen as numerous symptoms of a paradigm shift that currently occurs in governance and leadership approaches. There is a potential for cultivating a new way of thinking and action in education and beyond, which is more organic, nature and organism based, closer to how it seems our biological systems operate - rather than machine-based mechanistic premises that the industrial civilization operated upon. This unleashes the power of different ways of organising ourselves, our minds and our relationships that create the potential

²⁷ https://en.wikipedia.org/wiki/Two_Concepts_of_Liberty and http://cactus.dixie.edu/green/B_Readings/I_Berlin%20Two%20Concpets%20of%20Liberty.pdf

²⁸ Major part of this chapter is derived from *Learning Ecosystems: An Emerging Praxis*, coauthored by Pavel Luksha, Jessica Spencer-Keyse, and Joshua Cubista (2020).

²⁹

https://www.globaledufutures.org/images/people/GEF_GELP2017_TransformingEducationforComplexity_report.pdf

of moving into a new stage of civilization development. The emerging format of a learning ecosystem is often touted as a new paradigm of education, contrasted with the existing educational system.

The essence of what it means to learn “ecosystemically” is multifaceted. Ecosystemic “ways of being” are interconnected and seek to form patterns and rhythms that synchronize related parts of society. Learning ecosystems are not isolated “responses” to challenges that the educational system faces, rather they support the integration of other sectors towards collective learning - e.g. integrating various types of innovation, entrepreneurial, and innovation ecosystems in hi-tech clusters. Learning across multi-stakeholder groups fosters opportunities for uncommon collaborations and, when partnered with intergenerational and lifelong learning opportunities, set the stage for a radical shift in how education systems are organized. There is no standardized “one size fits all” approach to a new paradigm of learning in our complex times - and learning ecosystems, by their nature, are locally-attuned systems that respond to local learner and stakeholder needs.

A working definition of learning ecosystems suggested in the 2020 GEF report on *Learning Ecosystems: An Emerging Praxis* proposes that:

- Learning ecosystems are webs of interconnected relationships organising lifelong learning.
- They are diverse, dynamic and evolving, connecting learners and community to foster individual and collective capacity.
- They are dedicated to co-creating thrivable futures for people, places and our planet.

Around the world we see a wide spectrum of emerging approaches to leadership that share common ground as it relates to affecting local and global positive change. This kind of leadership reflects the shift that is required to shift from the industrial education system approach towards the ecosystemic approach. Literature in the business field has already begun to explore the requirements of “ecosystem CEOs” who need to learn to work differently as they are expected to handle multiple, often emerging elements which require new practices, dynamics, and relationships. The focus then moves to collaboration in this distinct new approach³⁰. Below are the differences we have identified as emerging in leadership for learning ecosystem leaders.

Table 1. Contrasting industrial and ecosystemic leadership models

Industrial Leadership	Ecosystem Leadership
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³⁰ <https://www.russellreynolds.com/en/Insights/thought-leadership/Documents/Beyond%20the%20Corner%20Office%20Leadership%20in%20a%20Multi-Company%20Ecosystem.pdf>

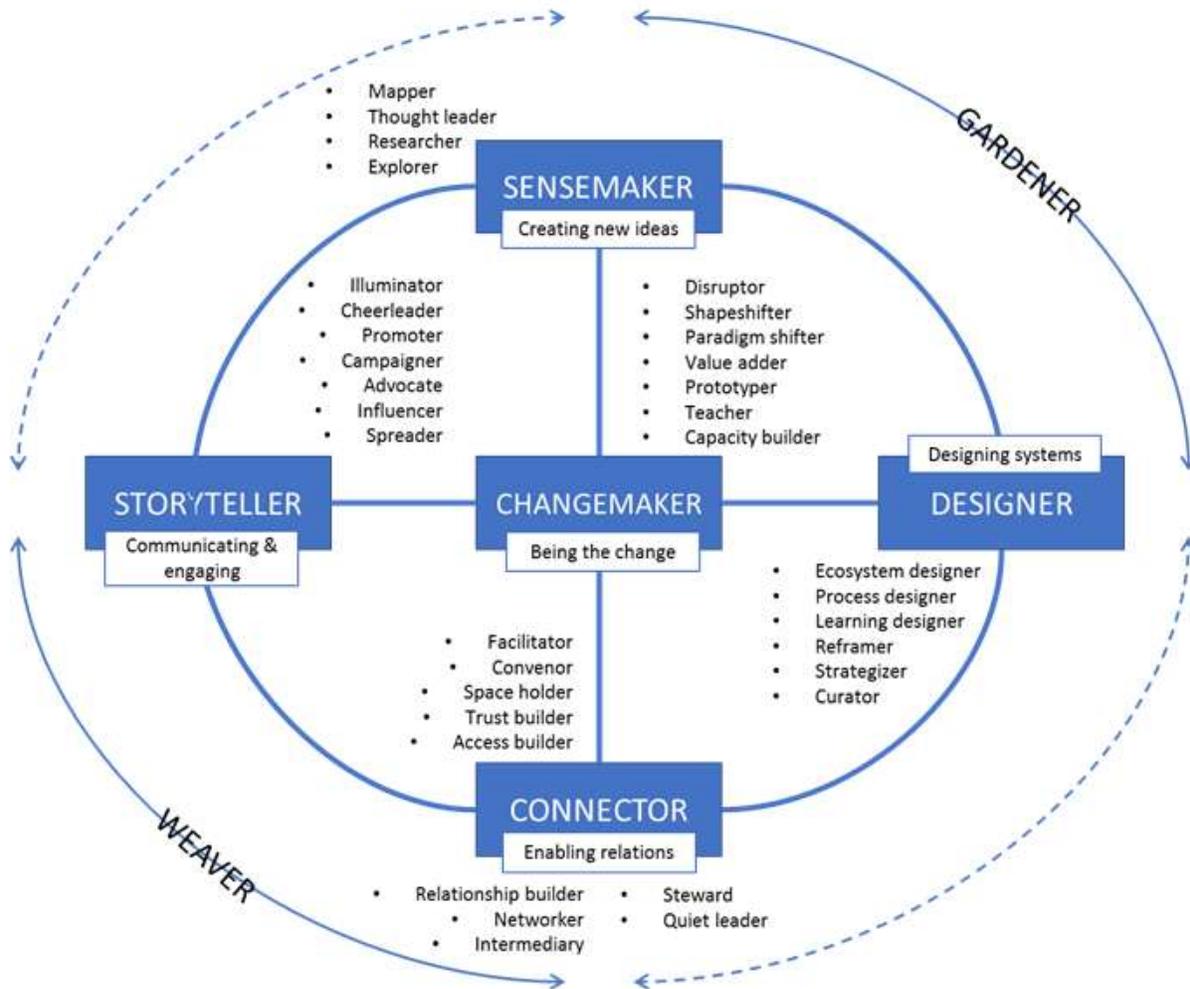
<p>Hierarchical, top down power structure and flow. Focus on people being a means to an end and people rely on the structure which is linear and logical. Communication is typically talking at and transmitting data.</p>	<p>Horizontal/flat networks and communities structure working in the flow of all directions. People are recognised and valued at the individual and collective level, as interdependent, complex beings leaning into ambiguity. Communication is typically active and deep listening, enabling vulnerability with questions and storytelling.</p>
<p>Command and control with an authoritative approach to relationships. They might use fear, manipulation of charisma as tactics and reward, threat, & demand compliance. The goal is to cultivate a work culture that encourages separation, segregation, & self-centeredness.</p>	<p>In service to others, fluid authority and transparent authenticity relationships. They are collaborative and might use facilitation, enabling, wisdom and humor as tactics. The goal is to cultivate a work culture of integration, empathy, & compassion for others.</p>
<p>Closed and guarded around information using routine processes. You either succeed or fail and should be afraid of the latter with a tendency to focus on short-term goals.</p>	<p>Shared, co-created across boundaries, fostering creativity innovation using lifelong learning and regenerative processes. You are encouraged to experiment, take risks and learn with a long-term view prioritised. Feedback loops are used.</p>
<p>Representation of the workplace is often homogeneous.</p>	<p>Representation of the workplace is diverse.</p>
<p>Competitive mission, with an intention to win and drive others out.</p>	<p>A collaborative mission which they align internally and externally, paying attention to the webs of the system to work with others who share their values.</p>

How do ecosystem leaders identify their roles in relation to this new paradigm, and how do they see different kinds of roles begin to emerge across the ecosystem? When asked to identify and share, there were five major categories that presented themselves within a spectrum of what we call gardening and weaving in evolving learning ecosystems (Figure 3):

- Connector;
- Storyteller;
- Sensemaker;
- Designer; and

- Changemaker.

Figure 3 The proposed model of the ecosystemic paradigm leadership.



As shown in Figure 3, the **changemaker** is at the heart of transforming learning and education. This is at the centre of their aspiration and aim: to be the change they want to see in the world, as well as to create the change locally, sometimes just for people and/or the planet. This role ranges quite widely and showcases the multifaceted aspect, as well as the multitude of ways we can operate from a space of identifying as a changemaker. Some focus predominantly on the sensemaking aspect as their contribution to the ecosystem, which might be in the form of generating new ideas. This could also look like a social entrepreneur who has a great shapeshifting ability as they are often on the ‘frontline’ developing relationships and figuring out the best way to add value to the entire ecosystem.

The emerging role of ecosystem **storytellers** have a particularly significant role at this time, as the myths we tell ourselves play a huge role in how we perceive, act and behave in the world. Joseph Campbell, in *The Power of Myth*, defines the function of a mythology as “the provision of

a cultural framework for a society or people to educate their young, and to provide them with a means of coping with their passage through the different stages of life from birth to death.”³¹ A myth then is ultimately bound to the society and time in which it occurs, interconnected with culture and its environment. We are living in the myth that science solves everything which connects us together, but in the 70s the same idea was brought into organisational studies as a uniting myth. It is a story we tell to one another to figure out what is meaningful and what is not. Storytellers in the ecosystem now play the role of showing the way of what is possible, this could be at the micro level up to the meshwork level.

These various roles are bound by the two overarching elements of **gardening** and **weaving**:

- *Weaving* is the process of nurturing trust and creating relations between people through curating circles, hosting conversations, and empowering others to step forward and take the lead. It works as “weaving” the tapestry of social relationships within an ecosystem, whereby its many participants align in vision, values, goals, and strategies. Here, an ecosystem leader works with what is *available*, strengthening communities and relations within an ecosystem.
- *Gardening* is the process of creating circumstances for systemic change, and more actively bringing this change forward through the cultivation of new opportunities and the facilitation of the existing ones, and even mitigation or “pruning” of certain opportunities and processes less desired. Here, an ecosystem leader works with what is *possible*, guiding the evolution of an ecosystem towards desirable more outcomes.

Ecosystem leaders do not constitute a special new position, but a new model of leadership that can be exhibited by literally any type of a player or stakeholder within education, such as:

- *Teachers, Educators, and Innovators* can launch and facilitate their own communities of practice to connect learning to local places, opportunities for personalisation and passion, rhythms and rituals, development towards emerging new facilitation styles.
- *Organizational Leaders* can cultivate conversations within their organization and with other leaders in their sector how to become more ecosystemically oriented, and prototype the development of their own ecosystem by nurturing the capacity of their teams to organize ecosystems.
- *Young Professionals and Women Professionals* can develop entrepreneurial environments to ease their transitions from the learning environments to creative environments, and establish the transfer of experience from themselves but also from seasoned professionals.
- *Young People, Parents, and Families* can organize peer-to-peer learning events, and also support transformations of their learning institutions, as well as help to map their local learning ecosystem and its resources.

³¹ <https://www.amazon.co.uk/Power-Myth-Joseph-Campbell/dp/0385247745>

- *Funders* can develop new models of funding and new metrics of impact that can help cultivate synergies within the project portfolio as well as projects supported by other funders, to help connect them into ecosystems.
- *Policy Makers* can engage grassroots leaders and embrace multi-stakeholder oriented approaches to policy making, build authentic relationships, and cultivate long-term purpose oriented communities of practice that can stand behind policies you institutionalize. etc.

The journey of creating learning ecosystems is not an easy one. It requires personal courage and stamina, it asks for a lot from the team members and the community, and it invites work that can span generations. But this may be one of the most meaningful ways to spend the time and the energy of a leader in education and beyond. In this time of transition and upheavals, we need new islands of stability and thriving to emerge, and leaders that will carry forward the evolutionary transition of our civilization in a peaceful, non-violent, yet powerful and self-evident way of becoming.

7. Our proposal as a GL-21 Working Group

As a working group, we recognize the need to model “the change we want to see in the world”. We, therefore, believe that the group’s exploration and initiatives should already manifest some principles of the 21st century leadership in education, including ecosystemic leadership.

The following suggestions from our group will be the focus of our work between May and December 2020 (during main stages of the project):

1. Use the GL-21 related e-conferences in June 2020, as well as in Geneva & Toronto (October 2020) to hold conversations, panels and workshops on new models in education and of leadership for education. These activities could address issues, opportunities and challenges within the formal system and beyond. The results should be published in the most impactful fora.
2. In partnership with Global Education Futures, WorldSkills, IEEE, ACM Societies, Global Education Leaders Partnership, Learning Planet, Weaving Lab, University for the Planet, and others - conduct a series of global sessions on the future of skills, learning and education leadership in the post-COVID-19 world. The sessions should engage industry experts and educational professionals from the existing & emerging sectors of the global economy.
3. Launch a series of conversations with learners on the future of learning and new models of leadership, beginning with communities in Canada, US, Russia, Western Europe, South Africa, Mexico, Brazil, Colombia, Argentina, and other countries engaged in the development of such new models.
4. Similarly, engage in a series of conversations with groups of female learners, e.g. IEEE Women in Engineering.
5. Develop methods of collecting data related to the new models in education with emphasis on cognitive development of learners.

6. Develop new approaches to identifying and measuring an individual's
 - (i) current level of knowledge,
 - (ii) gaps in the required knowledge;
 - (iii) kind and level of skills,
 - (iv) gaps in the skills that will be needed in the near and long-term future;
 - (v) the level and rate of cognitive development; and
 - (vi) the gaps in cognitive development.
7. Identify best collections of data on educational processes, and finding the best repositories of such data (e.g., the IEEE DataPort has been developed to be much more than a repository of data, and a source to reproduce research results).
8. Formulating possible implementations of the cognitive digital twins and symbions, as proposed by Kinsner.

Our proposed agenda for GL21 virtual conference on June 15-19:

We propose to hold sessions of the Education group that explore aspects of the new leadership model explained in this position paper:

- Ecosystem Thrivalists: new model of leadership for learning ecosystems
- Universities as leaders and hosts of societal transformation
- Creating skills for the future (joint session with WorldSkills)
- Leadership for Diversity & Inclusivity (joint session with GlobalMindED)
- Supporting & empowering practices for Teachers as Change Leaders
- Cultivating Learner Agency & Leadership (joint session with Global Education Leaders Partnership)

We also propose to hold an additional session on cocreating vision for the future of education with young professionals and leaders - a facilitated session led by Weaving Lab experts as a part of "Post-COVID futures in education" project