

Systemic Innovation, Education and the Social Impact of the Systems Sciences

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Education, in and of itself, is neither irrelevant nor outmoded. However, the current need to educate a planetary citizenry under conditions relevant to the living context of our planet is palpable. A new education paradigm is emerging to address this need, and it takes its cue from the life sciences—biomimicry, ecosystem studies, permaculture and the like, and from the sciences of complexity—complex adaptive systems theory, second order cybernetics, social systems dynamics and the emerging field of systemic innovation. This article explores both the pressures for such a new paradigm of education, tracing their sources to contemporary dynamics in society and environment, and outlines of the new paradigm in education that is emerging in various parts of the world. Key to this new paradigm is the emphasis on lifelong learning and empathy oriented education, both critical ingredients to the transformative role of education for individual and collective thriving.

Keywords systemic innovation; thriving; empathy oriented education; socio-technical systems design; future society

We are at the very beginning of time for the human race. It is not unreasonable that we grapple with problems. But there are tens of thousands of years in the future. Our responsibility is to do what we can, learn what we can, improve the solutions, and pass them on.—Richard Feynman

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INTRODUCTION

In his forthcoming book on *Thriving Strategy*, Dino Karabeg (2017) considers how the Club of Rome coined the term ‘global problematique’ to describe the complex entanglement of the collective challenges humanity faces at any given point in time. He suggests the need

now to create 'solutionatiques'—systems of shared solutions that arise from the connected intelligence of leaders and designers of innovation.

SYSTEMIC INNOVATION AS PARADIGM

Contemporary approaches to the development and implementation of advances in sociotechnical systems change tend, at best, to emphasize the synergetic relationship between human beings, technology, society and the environment. New ways of living, of creating value and of raising not only standard-of-living indicators but also—what is far more important—quality-of-life indicators require an augmented and expanded treatment of innovation in the context of societal evolution. This becomes an especially keen concern in the domain of educational technology, which can all too easily be driven by the profit to be derived from simply technifying education (Chase, 2015). When education is technology pushed rather than learning pulled, society ends up with moving in mechanistic directions rather than in holistic and systemic ones (Cody, 2014). For this reason, systemic innovation is a key approach to future creating, life affirming and opportunity increasing education development (Webley, 2013).

According to standard usage, an *innovation* is the concretization of a practical idea that augments human capability for action with societal impact, existing as an intermediate phase between the conceptual *invention* of an idea and its marketable *diffusion* in society. Advances in science and technology have created unprecedented opportunities for human development and well-being, and yet, such advances have brought with them certain 'side effects' (Meadows *et al.*, 1972) that now threaten the stability of societies and ecosystems the world over. Population growth, social inequities, hunger, armed conflicts, water shortages, pollution and climate change—to name but a few of the issues that, when taken together, comprise the *global problematique* of our time: each of them is related to every other, and together they form

a complex challenge for societal development (Merry, 1995). As was explored in the special double issue of the *Journal of Organisational Transformation and Social Change-JOTSC* (2012) dedicated to 'The Fundamental Concept of Growth: Limits in an Unlimited World?', the finitude of resources on our planet (Ehrlich *et al.*, 2012) calls for new forms of production, distribution and consumption (Lomborg, 2001) ... and for new ways of researching, developing and innovating social and technological change in order to answer the call (Kysar, 2003). By framing systemic innovation as the distinguishing characteristic of 'rational creative action', Erich Jantsch suggested that it is a general way—indeed *the* rational way—of applying human creative capabilities (Jantsch, 1970). This, of course, coincides with the main message that the systems movement has in store for humankind (Laszlo and Laszlo, 2003)—namely, that the enterprise of knowledge creation and development be internally coordinated and articulated so as to serve the evolutionary interests of life on Earth ... and beyond. For the systems sciences, this opens up a vast new creative frontier. The 'Leadership and Systemic Innovation' Systemic Inquiry Group of the International Society for the Systems Sciences¹ is presently being redesigned to become an institutional space where this work may be further developed.

EVOLUTIONARY CHALLENGES OF SOCIETAL TRANSFORMATION

A critical concern lies in the fact that in the face of increasing complexity and a volatile, uncertain, complex and ambiguous future, many leaders, institutions and structural societal conventions appear to be preparing for the world of yesterday instead of that of tomorrow. If we are to respond appropriately to the demands of increasing complexity and to move across the 'complexity barrier', new approaches will be needed. Alternative futures for regulators, investors and

¹ Formerly named 'Curating Emergence for Thrivability' http://www.iss.org/world/special_integration_groups

technological and social innovators are often framed as a dilemma: either leave things as they are and try to cope with the growing instability and risks generated by our relationship with technosphere and with nature, potentially leading to a decline or destruction of humanity, or move towards a 'singularity scenario' where the advancement of the technosphere will save humanity by solving our problems of entanglement, complexity and interdependence at the risk of leaving the majority of population behind 'the barrier of transition' and possibly throwing us further out of alignment with nature. This scenario is sometimes presented as an inevitable yet necessary contingency for the next evolutionary leap of life on Earth for a burgeoning humanity.

We believe this dilemma of choosing the 'lesser evil' is false, because a third option has begun to manifest as both a desirable and feasible alternative. This option is premised on the notion that the 'complexity barrier' can only be crossed with a collective breakthrough where a significant proportion (a critical mass) of the human population shifts to a new state of proactive co-evolution within the technosphere. The main precondition of this scenario is that such a society would be, in the words of Buckminster Fuller, 'working for 100% of humanity ... without ecological damage or disadvantage of anyone'. This is the 'wisdom-based society' scenario (as it will only occur through cultivation of collective wisdom) or 'thrivability' scenario (achieving the state of 'thriving' or 'flourishing' for all life—human and other—and the life support systems of the biosphere as a whole). It is this scenario that provides the greatest hope for humanity, although it will require a 'revolution of consciousness'. Technological advancement is necessary but not sufficient to the development of individual and collective potential. The main risk that this scenario aims to prevent is one of the 'dehumanization' of people, relying more on (digitalized) protocols, processes and structures, than on our collective humanistic drive to evolve, connect and thrive. (See Figure 1 for the outline of the four dominant scenarios.²)

² This figure, and the analysis behind it, represents the work of Pavel Luksha and Global Education Futures group.

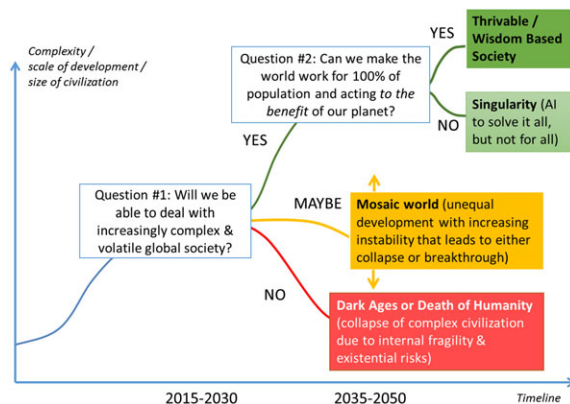


Figure 1 Key 'bottlenecks' of the civilizational transit. [Colour figure can be viewed at wileyonlinelibrary.com]

Accordingly, one aspect of a scenario that would 'work for 100% of humanity' would be creating a means of including everyone in this process, creating and implementing it, and overcoming differences in instrumental values for the sake of shared foundational values. This could be achieved by creating new educational orientations that encourage collaboration and co-creation on various scales, ranging from small groups to nations, to the planet as a whole. In this scenario, the cultivation of collective wisdom becomes an organic, natural process of the co-development of human communities at various scales. Another aspect that is no less important is the cultivation of a new way of relating to 'living' nature, where humans come into relationships of 'thrivability' within the biosphere (Russell, 2013).

The concept of 'thrivability' is a step beyond sustainability in which resilience is achieved within systems and communities. While 'sustainability' implies 'minimizing harm' to the natural environment while continuing the process of societal development (so that resources are not depleted and the environment is not polluted), and 'resilience' implies that sustainability is achieved under a variety of conditions beyond 'normal' ones (i.e. the system is able to withstand shocks that challenge its viability), the idea of 'thrivability' implies that social systems (human individuals and their communities) can realize their maximal potential and prosperity. Thrivability includes 'bringing awareness to what it means to be alive in psychological, biological,

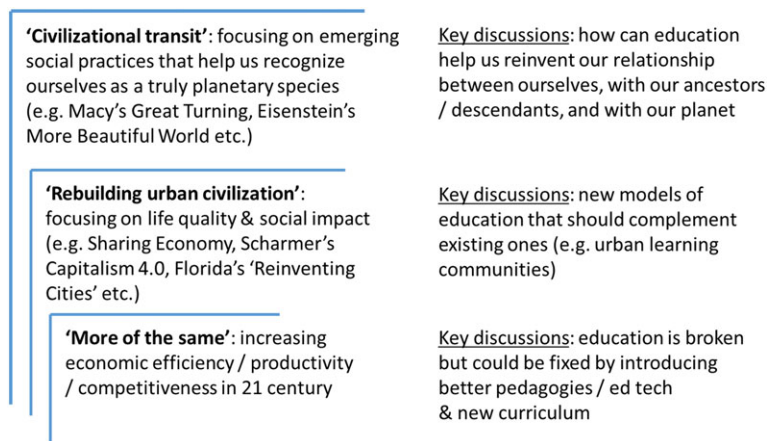


Figure 2 Framing educational redesign. [Colour figure can be viewed at wileyonlinelibrary.com]

cultural and systemic dimensions’ and ‘leading flourishing, full life, while acting respectful to your environment through non-destructive non-violent relationships or the ones that embed restoration’.³ In other words, thriving implies finding a new equilibrium between human individuals and our collective being and becoming, within and beyond the biosphere.

TRANSFORMATIVE ROLE OF EDUCATION AND SOCIAL INNOVATIONS

The role of education as a transformative power has often been downplayed and portrayed as a vehicle driven by the needs of national governments and regional economies. However, education holds the potential to be much more: Not only does it serve the current and emerging societal demands but it can also become a method for the transformation of our society. Education can be an avenue both for what will be needed in the future in terms of skills and knowledge and for what can be enabled through those skills and knowledge becoming widespread within the global population.

Serious choices now lie before us: Will social innovations and educational systems of the

future serve existing economic, social and political agendas (such as closing the skills gap or improving national competitiveness)? Will educational ecosystems develop new opportunities for collective living and being such as through sharing and regenerative economies and other solutions for beneficial human endeavour? Will we foster capacities for learners to collaboratively address the fundamental challenges of the current civilizational models and to help curate civilizational transformation towards a planetary eco-friendly civilization?

We indeed can include a variety of responses to such questions; in fact, ‘higher’ levels of societal, economic and cultural shifts would include ‘lower’ levels of societal transformation (Figure 2). As an enabler of such transformation, education can become a ‘cradle’ for new civilizational models, a ‘sandbox’ where new ways of living, working, playing and creating are collectively tested and distributed. This is what systemic innovation applied to the domain of education is all about.

The main challenge/opportunity facing our society is to move towards a ‘wisdom-based society’—a society unified by collective wisdom by which we can steer our civilization through increasingly complex dynamics. We have such wisdom within us, and our communities, and we know when actions are beneficial or harmful to ourselves, our families, our communities and the world around us. A transition is possible and

³ These are participant statements from sessions run by Global Education Futures & the Protopia Labs Futuriser at a gathering on “Education for Thrivability” (Cyprus, September 2016).

needed on both an individual and a collective scale; education can be a source of societal transformation addressing global challenges through the co-creation of civilization-wide solutions.

PRACTICES FOR THE FUTURE

As our society and world become increasingly complex, moving towards a thriving and wisdom-based society represents the optimal scenario from survival to thrival. Co-articulating a compelling vision of the future that integrates educational ecosystems as laboratories for societal transformation and prototyping innovations towards this aim can support the continued definition of new educational models, new meanings, new behavioral patterns and so on, across the lifelong and self-directed learning spectrum.

In order for these frames to be infused within societal practices and for new systemic literacy and for patterns to take root that foster anti-fragility, they must become massively distributed skills, mastered by a critical mass of people. Some of the most interesting and promising advances in education along these lines involve empathy-based learning and a concomitant emphasis on Empathy Oriented Education. In recent years, there has been a rise of an empathic consciousness amongst the diverse peoples of the world. This phenomenon has been largely catalysed by global technologies of communication. As Peter Russell notes,⁴ a growing sense of the interconnection between parts of a whole serves as both an expression of coherence and as a driver towards further coherence. The Internet, now expected to reach 66% of humanity by the year 2020, represents an extra-somatic form of this bio-organismic need for interconnectivity. Russell's work expresses this need in terms of the emergence of a 'Global Brain'. The emerging global environment is characterized by unprecedented information flows that foster new levels of connection, collaboration, consciousness and compassion.

⁴ See *The Global Brain* (Tarcher 1985) and *The Global Brain Awakens* (Element 2000).

In this context, linear, reductionist, single-discipline, mechanistic thinking is not only hopelessly out of date; it is increasingly irrelevant—even dangerous. Education purportedly prepares learners to take control of their life. However, those who find themselves only caring for their own thriving cannot participate in the co-creation of flourishing futures for all of humanity with the rest of life on this planet. The need to focus *also* on the thriving of others and ways to provide convivial contexts for them to engage with life is increasingly a requisite survival skill. This frame evokes exploration of, and engagement with, the way in which learning, playing, talking, dancing and all aspects of life as art connect us to *ourselves*, to *each other*, to the *more-than-human world* and across time to *past and future generations* of all beings. These are the four intertwined dimensions of systemic thriving. Empathy Oriented Education engages learners across all four dimensions through dynamics that encourage consciously connecting, intertwining and cultivating the bigger story of our individual and collective being and becoming. The quality and character of this story depends on the way in which each learner is empowered to author their life along these four dimensions. Such contextuality is a key leverage point in Empathy Oriented Education for thriving. As suggested by Laszlo and Russell (2013), that foster empathy and serves thriving would include these four integrated dimensions:

- *Intra-personal* refers to inner flourishing, listening to self, cultivating knowledge of self, intuition and empathy.
- *Inter-personal* refers to conviviality with others, communities, learning with and from each other, engaging in open, considerate, joyful action in order to enable collective wisdom.
- *Trans-species* refers to ecosystemic listening to and acknowledgement of our interdependence and ultimate unity with nature and all living beings.
- *Trans-generational* refers to evolutionary, integral, hearing the flow of what was, what is being and becoming, finding ability to play one's own part in this dance.

By consciously, purposefully and intentionally curating each of these dimensions *in dynamic relationship to the other three*, it is possible to foster empathy-based learning—both personally and in the sense of our larger humanity—to take on the mantle of evolutionary co-creator of a connected, compassionate, coherent and consonant World Narrative.

Based on a recent survey of middle school children in the northern and southern hemispheres of America (Laszlo K. and Laszlo, A. 2016), practical life skills and exposure to other cultures are considered important things to have in school. Contemporary school age children also agree that in the future, everyone is going to need to know a second language—or maybe we will develop a ‘universal’ language. They consider that it will be increasingly important to keep up to date on current affairs in the world and therefore that schools should focus on encouraging empathy and the ability to both listen and hear oneself and others in addition to such practical learning as financial literacy and how to deal with emergencies. The youth surveyed believe that school environments should be more interactive and more pressure free and that music should be allowed and class discussions encouraged. They want to be able to pick what they should learn and be assigned less homework, overall. There appears to be an emerging consensus that schools will indeed be more technology based in the future, but that books, pens, pencils and paper will not disappear or be entirely replaced. In order to better address developmentally appropriate learning patterns based on cognitive processing capacity, school would start later in the day and would encourage music, art and extracurricular classes. In general, they thought that schools might adopt more of online learning management systems, including virtual reality teaching/learning experiences, but that holographic proxies would serve as stand-ins for both students and teachers only if they were sick or would otherwise have to miss class. In general, there was a strong sense that greater emphasis need be placed on learning about empathy and how to be empathetic, on appreciating and valuing diversity and on connecting to and with nature.

It would appear that many of the emerging practices of new education—fostering lifelong learners and community-based learning and creating varieties of educational ecosystem designs—already serve the thrivability scenario in many regards. The focus on thrivability creates an anchor point for such practices, envisaging them not as dispersed efforts to ‘fix’ different parts of existing education systems, but as an (increasingly more concerted) effort to create education systems that are truly appropriate for the 21st century and beyond. These practices are established on three layers of social organization:

1 Individual learning practices that include the following:

- Inspiring self-direction and creation of one’s own learning ecologies—or *self-guided learner pedagogy/andragogy*. Forming learners (instead of ‘knowers’ focused only on accumulating static knowledge).
- *Curriculum around meta-competencies* including different methods of thinking, or emotional and social intelligence, in project-oriented and practice-oriented learning, while encouraging access to facts and data, focusing on how information is integrated and discerned. Nurturing diverse forms of intelligence and the ability to connect these forms in myriad ways to adapt to current and emerging conditions.
- *Rise of holistic education* forming whole people, prepared to deal with the social and affective areas of their lives, rather than to function merely as professionals with limited perception of life and social reality.

2 Collective learning practices (within and for communities) that include the following:

- *Blending collective creativity* and play, art and real-world proactivity, storytelling and story-dwelling.
- *Fostering collaboration* and an appreciation of reciprocity to co-create systemic synergies.
- *Teaching how to be ‘thrivable’*—being generative so as to expand or evolve the systems within which we live.

3 Finally, global practices that include the following:

- **Mindset** - know-why
 - Emergent Worldview
 - Visions of evolutionary leadership
 - Systems and evolutionary thinking
 - Interdependencies of global dynamics
 - **Knowledge**
- **Skillset** - know-how
 - Collaborative skills
 - Strategic conversations for effective communication and action
 - Thrivability principles and practices
 - **Practice**
- **Heartset** - care-why
 - Learning from nature
 - Syntony Sense: creative and intentional aligning with the dynamic harmony of our broader environment
 - **Awareness**

Figure 3 Competencies of evolutionary systems leadership

- Cultivating *ecosystems for lifelong learning*: generating 'glocal' evolutionary learning communities that co-create meaning in a shared and participatory way (including the development of global online learning processes that enhance collective learning).
- In content, process and platform—*empowering a globalizing citizenry*, helping them to grasp and solve both local and global challenges (including, but not limited to, use of 'action-based' online learning platforms).
- Building on and transcending sustainability principles, focusing on curating emergence in complex adaptive systems.

An important characteristic of future-oriented education innovation is its fusion of scientific and ethical knowledge, as suggested by the notions of evolutionary sense ability and response ability. Instead of just addressing questions of 'know how', such study of sociotechnical systems must also provide the means to begin dealing with questions of 'know why' and 'care why' in regard to the way in which we live, work and learn together (Figure 3).

CONCLUDING REMARKS

The emerging paradigm in the sciences suggests that we live in a holographic and highly integral

and interdependent world (Laszlo E. & Laszlo A, 2016). The picture of reality depicted by this paradigm is like a dance of universe and cosmos—with the universe comprising the entirety of manifest being (all phenomena we experience and know through our five senses) and the cosmos comprising a deeper and even broader reality (the noumena that undergird and give rise to the universe). We cannot access the cosmos through our five senses alone, but we can know it as an expression of primordial consciousness beyond space and time. Metaphorically, this is the dance of heaven and earth. As educators, our axiology tends to veer more towards one or the other. But in this metaphorical context, which is more important for a flourishing garden, the seeds or the greenhouse? Without the seeds (which represent 'earth'—the systemic leverage points for creative synergy), nothing grows and no potential is realized. Without the greenhouse (which represents 'heaven'—the requisite systemic nurturance space), nothing grows and no potential is realized. To curate the dynamics of thrivable education, it is necessary to create opportunities for seeds to grow and the roots to connect such that new visions may emerge and flourishing interdependencies arise. It is also necessary to set attractors that provide individual inspiration for collective aspiration, showering light, water, air and fertile soil in delicious combinations and quantities for the garden to come

into full flourishing. The constant dance between doing and being—between creating conditions for learners to flourish and getting out of the way so that they can thrive authentically—this is the same dance of universe and cosmos, expressed on a different scale. And just as the dynamics of the quantum world are at a different scale than the dynamics of our experiential world, they operate according to different parameters and produce different patterns. But the music of the dance is the same.

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