

Alberto ZUCCONI*

WHAT KIND OF EDUCATION IS NEEDED TO NAVIGATE THE FOURTH INDUSTRIAL REVOLUTION?

Abstract: The fourth industrial revolution is going to bring great and rapid changes, the negative effects will be greater than the benefits if we do not plan and manage effectively this revolution. Understanding the complex processes in motion is crucial as well as developing effective tools for governance. We can manage wisely this revolution, increase the positive effects, reduce and mitigate the negative ones if we make it person and people centered and sustainable. We need to make available for everybody scientific and emotional compasses. An effective person-centered education will be needed to navigate the rippling currents of change.

Interdisciplinarity, Intersectorially, Sociology of knowledge, Facilitators of change, Effective tools, Resilience, Sustainability, Person Centered Education. Person and People Centered Approaches.

INTRODUCTION

We are entering the so called 4th industrial revolution and the impact is going to be all pervasive and of much bigger magnitude than the previous industrial revolution. The incoming changes, approaching at an accelerating speed will be impacting everything and everybody and will be blurring the lines between the physical, digital, and biological spheres, they will affect all the bio-psycho-social dimensions, our narratives and even what it means to be human.

If not planned effectively and farsighted the results could be very problematic for all life forms on Earth.

If we manage the 4th industrial revolution with the same blindness and forms of denial with which we managed the 3rd and the 2nd revolutions, the negative the effects will be exponential. But we are not impotent, we can manage wisely this revolution, increase the positive effects and mitigate the negative ones since Tecne is designed, made, and managed by human beings. What will be the outcomes of the

* President, Person Centered Approach Institute (IACP), General Secretary of the World University Consortium (WUC), Treasurer World Academy of Art and Science (WAAS)

fourth industrial revolution for human and natural capital will not be determined by some mysterious evils, but as in the past by human beings.

We cannot be naïve and just hope that technology will automatically improve our lives and better satisfy our needs; new and effective tools for understanding and governing such epochal changes are needed as well as facilitating awareness in all the stakeholders about the dangers and opportunities offered by the incoming changes.

Effective education is going to be crucial, the fourth industrial revolution could be an unprecedented success if we will be able to manage the complex processes of this revolution and at the same time intentionally and effectively assure that each innovation, not only brings change but will also foster a more humane, sustainable and prosperous future for all. For effective governance we need effective tools, one needed tool is a clear understanding of the crucial role played by the processes by which we humans construe the experience of ourselves, of others and other of life forms. In other words we think we live in reality but we live in a socially construed consensus reality; ignoring that may create for us crucial blind spots and diminish our coping capacities and resilience.

Another tool needed is more effective metrics than the ones we presently use to measure reality and what we call profit, productivity, good education etc. To win these challenges effective and person & people centered education will play a crucial role.

THE PROBLEMS WE MUST FACE

The trouble with our times is that the future is not what it used to be.

Paul Valéry

There is a large amount of scientific evidence that our present relationship with ourselves, others and the planet we live in is the main variable influencing all life forms and the planet itself, a dramatic epochal change referred to by scientists as the Anthropocene (Crutzen and Stoermer, 2000).

The human population's exponential increase favored by the first, second and third industrial revolutions in numbers, production and consumption behaviors has produced such dramatic and exorbitant costs to ourselves and all the lifeforms. The number of people on the planet is set to rise to 9.7 billion in 2050 with 2 billion aged over 60. (United Nations Department of Economic and Social Affairs, Population Division, 2015).

According to the last The Living Planet Report, the problems are getting worse as populations and consumption keep growing faster than technology finds new ways of expanding what can be produced from the natural world. This had led the report to predict that by 2030, if nothing changes, mankind would need two planets to sustain its lifestyle.

The WHO reminds us that the destruction and pollution of the environment has dire consequences for people's' health; globally, 23% of all deaths are estimat-

ed to be attributable to the environment, and 22% of disability-adjusted life years (DALYs). In total, the number of deaths linked to the environment amounts to 12.6 million per year (based on 2012 data). This burden could be lessened significantly by reducing risks (WHO 2016 a).

There are also other kinds of mounting problems around the world and in particular in the most prosperous countries. Paradoxically, on one side we have since the second world war an exponential increase in the availability of material goods, services and connectivity, on the other a significant increase of the number of people that feel disconnected, are depressed or burdened by narcissism, consumerism, self-exploitation and lack of meaning (Han, 2014).

There is evidence that depression predisposes people to myocardial infarction and diabetes, both of which conversely increase the likelihood of depression. Many risk factors such as low socioeconomic status, alcohol abuse and stress are common to both mental disorders and other non-communicable diseases. There is also substantial concurrence of mental disorders and substance use disorders. Taken together, mental, neurological and substance use disorders exact a high toll, accounting for 13% of the total global burden of disease in the year 2004. Depression alone accounts for 4.3% of the global burden of disease and is among the largest single causes of disability worldwide, 11 % of all years lived with disability globally, particularly for women. The economic consequences of these health losses are equally large (WHO, 2013).

The World Health Organization remind us that every year more than 800 000 people take their own life and there are many more people who attempt suicide. Every suicide is a tragedy that affects families, communities and entire countries. Suicide occurs throughout the lifespan and was the second leading cause of death among 15–29-year-olds globally in 2012. The number of suicides increase in moments of crisis with a breakdown in the ability to deal with life stresses, such as financial problems, relationship break-up or chronic pain and illness. In addition, experiencing conflict, disaster, violence, abuse, or loss and a sense of isolation are strongly associated with suicidal behavior. Suicide rates are also high amongst vulnerable groups who experience discrimination, such as refugees and migrants; indigenous peoples; LGBTI persons; and prisoners (WHO 2016 b).

To make things worse the combining effects of climate change, the acidification of the oceans, the desertification of large parts of the planet, the increasing deforestation, the increasing destruction of biodiversity, interact with other explosive realities. There are still enormous numbers of people suffering from hunger, ill health, wars, terrorism, violence, unequal access to resources and opportunities, racism and many forms of discrimination and injustice. Many people are forced to live their homes and countries by warfare and ethnic or religious fanaticism enlarging the growing numbers of refugees and migrants that in an escalating spiral are the innocent targets of the fears and bigotry of some citizens of the nations where they seek refuge.

A mounting number of scientist warn us that we, are fast reaching a tipping point where mitigation and /or reversal of trends will be not be within our reach if we do not act promptly and effectively (IPCC, 2007, 2012, 2014).

The fourth industrial revolution could help us to exit from this human-produced quagmire, but only if we will be capable of effective planning and governance.

For sure the fourth industrial revolution will create new problems. It is estimated that massive unemployment of unskilled labor and disappearance of some jobs becoming automated by computerized machines will be one of the effects of the changes looming ahead that we will need to deal with: It is estimated that in the next 10–20 years the number of jobs threatened by new technologies will be around 47% of the total in the United States and between 40% and 60% in Europe (Degryse, 2016).

Rising inequalities is another; according to Credit Suisse's Global Wealth Report 2015, the richest 1% of the population now owns half of all household wealth. Oxfam's new report states that 62 individuals control more assets than the poorer half of the world's population. Researchers such as Richard Wilkinson and Kate Pickett have found that unequal societies tend to be more violent, have higher numbers of people in prison, experience greater levels of mental illness and have lower life expectancies and lower levels of trust. These inequalities will create even more fears and backlash against change. The rising of interconnectedness will bring rising dangers on security, cyber terrorism and like in an Orwell scenario, all these smart machines and smart customized services, if we do not plan wisely the internet of Things (IoT) and smart machines to not only smart, but also people centered, the cyber revolution may deprive us of our right to privacy, creating an all-encompassing planetary Big Brother' effect.

WHAT TO DO?

We can do several things for planning and governing the fourth industrial revolution in a people centered and sustainable way; they all have a common denominator: to ensure that the planned changes are person, people and community centered and sustainable. It is imperative to identify the barriers to achieve these goals and work effectively to identify, remove or reduce them (Norgaard, 2011); (Zucconi, 2013).

Some of the variables that will effectively foster a more humane and sustainable future for social and natural capital:

- More awareness
- More empathy
- More capacity for respecting oneself, others and the world
- More responsibility (in the sense of the ability to respond)

Since reality is socially construed in order to have a fourth industrial revolution that will protect and promote human and natural capital, we need to educate everybody to give their contribution to reach that goal.

CREATE AND APPLY EFFECTIVE METRICS AND TOOLS TO PROMOTE SUSTAINABLE CHANGE

Our relationship with ourselves, others and the world is an important determinant of our mental, physical, and social health. People and societies that are alien-

ated from parts of themselves, relate to others and the planet in alienated and distorted ways.

At present, the way profit is calculated in a mechanistic reductionist way, the so called „bottom line”, at the national level is the GNP whose standards completely ignore the destruction of human and natural capital. With a more realistic and sustainable approach there are at least 3 variables that account for the so called Triple Bottom Line (TBL) that measure economic, ecological and social results. The Quadruple Bottom Line (QBL) also takes into consideration the cultural aspects, including governance. (Zucconi, 2013).

Recently an Inclusive Wealth Index (IWI) has been formulated, it has a broader way of measuring natural capital, such as forests, produced capital, such as roads and factories; and human capital, including levels of education, knowledge, and creativity. The preliminary findings indicate that it is possible to trace the changes of the components of wealth by country and link these to economic growth, underlying the impact of declines or increases in natural capital as an economic productive base (UNU-IHDP, 2012). Effective economic growth can be attained only through ecologically conscious green or blue economies (Pauli, 2010). We need to apply effective metrics and in need we can create new ones. We need to use in all the future planning and project management some effective human capital and environment impact assessments scales, or use tools already available like the Health Impact Assessment (HIA) to measure and make predictions of health consequences (WHO 2016 a). If such assessments are performed at the planning stage we can have projects with a sustainability, people-centeredness, quality, vulnerability and resilience focus.

USE SCIENTIFICALLY VALIDATED PEOPLE-CENTERED TOOLS

The Person-Centered Approach is a scientifically proven effective way to create solutions on a win-win basis. The Person-Centered Approach is a systemic, holistic approach applied successfully on all the helping relationships and in interpersonal relationships including conflict resolution. This approach focuses on health not on illness, on capacities rather than on limitations; empowers and promotes well-being and resilience by facilitating the development of the potentialities of individuals, groups and organizations, helps people to grow and take responsibility for what they do rather than fostering dependency.

The Person Centered Planning (PCP), a scientifically sound and process-oriented approach to empowering people. It focuses on the people and their needs by putting them in charge of defining the direction for their lives.

The People Centered Approach (PCA), a scientifically validated, interdisciplinary and intersectorial approach designed to be employed on large scale projects focused on fostering the maximum level of effectiveness in protecting and promoting human ecologies and natural ecosystems and promoting sustainable change. The People Centered Approach (PCA) is a values oriented approach based on Equal Rights, deep respect of all form of life, cultures and traditions. The PCA promotes

empathic understanding, mutual respect and effective communication and collaboration among different stakeholders with actions of empowerment & resilience.

IDENTIFY THE BARRIERS TO SUSTAINABLE PERSON CENTERED CHANGE

Notwithstanding the seriousness of the threats, and the urgency to deal with them, many obstacles remain in the way of effective, community, national and international governance. The lack of awareness of the magnitude of the problems and the changes needed in the behaviors of all the stakeholders to manage the serious mounting challenges facing humanity is in part due to barriers of a sociological and psychological nature that impede effective coordinated actions of the various stakeholders. The underlying mechanism at work in the promotion or resistance to change or the denial of threats like climate warming vary from culture to culture: how reality is socially construed and how individuals and organizations construe their experiences and narratives is relevant for the understanding of the promotion of change needed to promote sustainable governance as well how to deal effectively with the barriers to change.

REALITY

Reality isn't what it used to be

Walter Truett Anderson (1990)

In the age of globalization and of growing complexity, in order to meet the challenges of our present and future we need new and effective ways to facilitate the capacity of awareness & integration of our ways of knowing and of behaving. We need to foster a new socio-psychological literacy for billions of people; a socio-psychological compass, a needed holistic/systemic way of being in relationship with ourselves, others and the planet, to enable us to navigate in the rippling currents of change.

Nowadays decision makers and experts still seem not to take notice in their blueprints for governance of how individuals, communities, societies and cultures are fully immersed in the ways they call and perceive as reality, that in effect is not quite what they intend — reality as an objective fact- What they call reality is the way individuals construe their experiences of the so called reality at the personal and societal levels.

The ways individuals and communities construe their experiences can be very useful in helping them coping effectively with their circumstances only if they have a clear understanding of how problems are generated and how they can be resolved or mitigated.

As the history of humankind amply shows, the construction of experience mistakenly taken for objective reality can, with the best intentions, create destructive boomerang effects, immense sufferings and even the downfall of some empires and civilizations.

The way we still use some dysfunctional metrics to measure growth is one of the many examples on how we can make ourselves blind to the obvious: We can still read in the daily news that the economy is growing even when society is bent in effectively destroying its human and natural capital, impacting negatively present and future generations and behaving like a cancerous growth does in a living organism.

Understanding why the drawing national borders with a ruler might look neat in a map of post-colonial nations but that blindness will provoke chaos and immense suffering for generations and spread in larger areas as the present social pandemic of violence seems to indicate. Only blindness can explain the recent behaviors that some of the most advanced nations have adopted in Iraq, Syria, Libya, the Middle East. Only blindness can explain the lack of preparation for the consequences from the dislocation of immense numbers of people running for life away from their war torn countries that risk their lives to have a chance in more safe and prosperous countries that in turn witness a rise in fear insecurity, that generate the rise of populist politics, racism and violence.

„The world of everyday life is not only taken for granted as reality by ordinary members of society in the subjectively meaningful conduct of their lives. It is a world originated in their thought and actions, and is maintained as real by these.“

Berger & Luckmann, 1966, page 19

What is perceived as real varies from society to society and is produced, transmitted and conserved through social processes. Our perception of reality is largely modeled from beliefs and assumptions that are typical of the society and culture in which we belong. What we know, what we consider true and right, the behaviors we adopt, all are influenced by the social/cultural environment in which we live. This process happens through the internalization of a „reality“ that occurs during the socialization process.

We need new and effective ways of coping with our rapidly changing realities. A way to become aware on how we construe our experiences of what we call reality: the relationship with ourselves, the others, the world. We need to foster at every level of society awareness of the social construction of reality, of our powers and responsibilities for the present a future of humankind & the whole planet (Anderson, 1990, 1997, 2016).

Socio-cultural and personal constructs are the ways communities and individuals construe their experiences at the emotional and cognitive level. The social and personal constructs are interacting and influencing all the time the social and individual dimensions.

Some of the variables influencing us are:

— Our relationships with significant others (parents, siblings etc), by the roles that they give us and the by the ways of being (constructs) we introject and become part of our personality, influencing the ways on how we relate with ourselves, others and the world.

— The social environment through the imposition of societal norms.

— The narratives we absorbed from kids fables, cartoons, movies, TV, social media, popular heroes.

— The formal and informal education we receive

For all the above reasons we need to educate everybody to understand the social and individual processes that are at the base of the construction of the narratives we call reality. That what we call reality is a consensus reality and is largely shaped by our beliefs. If our socially construed and personally construed beliefs are made conscious and their values explicit we can examine them and verify if some of our beliefs are obsolete or dysfunctional, so we can update and change dysfunctional ways of thinking and feeling with more functional ones; a process that is characteristic of fully functioning persons (Rogers, 1965).

EFFECTIVE EDUCATION

No other institution in the world is as powerful in shaping our future, since with the educational process much of the social construction of reality occurs. Education is where the minds of the new generation are shaped about what is real.

(Dewey, 1897, 1924); (Rogers, 1969,1983); (Freire, 1970); (Foucault, 1980); (Zimmering, 1994); (Morin, 2001,2007 a, 2007 b).

Francis Bacon, said that knowledge is power, most people will agree with that, but is not automatically self-evident that that to have faulty knowledge is to lose power, a form of socially inflicted harm. Present education stifles our natural learning abilities.

All lifeforms survival depends of effective and rapid learning how to adapt their behaviours to environmental changes. We need to retool and upgrade all levels of education. Formal and informal education at any level need to offer people the knowledge, skills and attitudes that will enable them to become effective facilitators of change.

This new education needs to be people centered and empower people to be in contact with themselves, others and the world in which they live with the natural qualities of respect and empathy (Vincow, Gershon. 1997); (Lambert & McCombs; 1997); (Catalano & Catalano 1999); (Thorkildsen, 2011); (Zuconi, 2013); (Costa, 2014);

If I am able to be in relate to myself with respect and empathy, then is much more easier and natural to relate to other human beings even those with different beliefs and customs with respect and empathy. This is not mere wishful thinking there is ample scientific evidence accumulated that shows that people able to relate with respect and empathy to themselves not only are they able to have relationships with other human beings with respect and empathy but they are going to perceive life around them, to attune themselves empathically with all the life forms. This way of being is not exceptional, is just typical of mentally healthy human beings. (Rogers, 1969, 1977,1983); (Zuconi 2013). (Silani, Zuconi, Lamm, 2013).

Unfortunately centuries of spreading alienation have made lack of contact and chronic reification „normal”. Those alienated individuals that relate to themselves, others and the world, like something that can be turned in a commodity and sold for monetary gain are considered smart and successful. The results are irresponsible environmental exploitation, social injustice and the destruction of our planet.

Is encouraging to see what Pope Francis is saying in his encyclical *Laudato Si'*, an effective call to an 'ecological conversion', of every good christian, a person that in his/her feelings and behaviors respects all the different human beings and all the living creatures. If spiritual, political leaders, and opinion makers will give a congruent message of respect and empathy with all the life forms, this common calling would be an excellent teaching and such motivational narratives would have significant positive results.

Our success will depend on how we organize learning, since learning is for our species the empowering and adaptive way to accelerated change. Human educational activities and organizations may represent the most important way for humans to promote our own survival and to save our planet. The World Academy of Art and Science (WAAS) has launched a project with other sister institutions called World University Consortium (WUC) to create a space open to all the stakeholders to brainstorm and retool education to serve people' urgent needs to better cope with the present emergencies (www.wuc.org).

Effective people centered education is needed to create more aware and resilient citizens who will integrate knowledge, promote collective wisdom, build a sustainable society, in which duties and responsibilities are equally important as rights and opportunities.

Promoting change cannot be done in a mechanistic reductionist way as Jasanoff, (2011) reminds us, different civic epistemologies shape different responses to the anthropogenic changes (Norgaard, 2011): the construction of public knowledge varies from culture to culture and from community to community, different epistemologies and different hermeneutics need to be kept in mind in the promotion of change because what may work in a community is not automatically effective in another.

In order to be effective the new paradigm of education shall avoid becoming a one way worldview, as it is important to protect the biodiversity it is important as well to protect the human creativity and the plurality of narratives and cultures, all united in their common goal and effort to protect and respect all life forms.

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