

Creativity and innovation

through lifelong learning

Creativity has always been an admired personal characteristic but now it is becoming an important objective also in lifelong learning. The knowledge society demands people with better education and abilities to work with ideas. This article argues that education systems have trouble finding ways of adapting to the need for innovation and including creativity in current teaching and learning processes.

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One reason for a weakening role of risk-taking and creativity in schools is that education policies today are preoccupied by the principle of marketisation that assumes that competition and information are the best ways to improve education. Instead, we should rethink the meaning and nature of both creativity and innovation and what they mean to lifelong learning. This would require building trust within education systems and focusing on a broader range of intelligences. Creativity and readiness to work with innovation can be enhanced through lifelong learning when learners (1) are encouraged to change their daily routines, (2) experience changes in the environments in which their learning takes place, and (3) are enabled to find their natural talent. This article also encourages lifelong learners to learn how to be wrong – that is a key to unlocking creativity.

HOPE OUT OF CRISIS

A time of crisis often creates new ideas and alternatives to traditional action. It also challenges old ways of thinking. At the moment we are in the midst of global turmoil. Global financial services are collapsing, economies are in a steep downturn and iconic enterprises are disappearing from the map of the business world. It is difficult to understand fully all causes and effects of these global events. No-one knows precisely how the future will take shape within the next decade. Although predicting the future is difficult, we do know something about it. The following three global change factors, all relevant to this article, have consequences to thinking about and re-conceptualizing lifelong learning in the future. These three change factors each represent different time perspectives and vary therefore in terms of their impact on current thinking.

(1) By 2050, according to the Intergovernmental Panel on Climate Change, we will reach a critical ceiling of the carbon dioxide (CO₂) level (554 parts-per-million, or ppm) in the atmosphere (Sachs, 2008). That will take us to an irreversible path of changes in the Earth's climate that will risk many forms of life as we know them. Conventional ways of solving that problem, such as reliance on individual efforts, voluntary change of behaviour or hoping that markets will lead the way are becoming insufficient. Community based responses together with inter-governmental and collaborative efforts will be needed.

(2) By 2035, according to UNESCO, more people worldwide will be graduating through education than ever before. This is for many reasons: growing secondary and tertiary education age cohorts; new forms of receiving qualifications through virtual education institutions; and higher educational demands of the knowledge society. Suddenly degrees and diplomas are worth little.

(3) Within the next year or so, according to the International Labour Organisation (ILO), due to the financial crisis and economic downturn, more than 50 million people will lose their jobs (ILO, 2009). Many of these jobs will be gone forever. At the same time there are four million jobs that are not filled because of shortages of skilled people. Job rotation is speeding up and most people have to learn new knowledge and skills several times during their working lives to remain employed.

The current global crisis, including the three change forces above, requires new ways of thinking and acting in order to find sustainable solutions. From an educational point of view this raises two possibilities. First, given the magnitude and complexity of global challenges, only genuinely new ideas and innovations will be sufficient in provid-

ing alternatives that lead to a more sustainable path of development. This will require investing in development and innovation in the key areas of technology, social organizations and ecology. Second, since the world is not likely to return to stable times with permanent jobs and steady economic development, the key competences needed in the future have to reflect more than before, as Hargreaves (2003) has insisted, flexibility, risk-taking, creativity and innovation. This is a challenge for formal education in general and lifelong learning in particular.

TWO MODELS OF EDUCATION

We should use the creative minds – ideas, imagination and innovation – even in the absence of external pressure. Appeal for more creativity and innovation in education comes, not from the education community but from a global emergency and the urgent need for change. The main reason is that all national education systems are based on two underlying models. As Robinson (2001, 23) has stated, 'there is an *economic* model and an *intellectual* model and there is assumed to be a relationship between the two'. The economic model of education is industrialism that views education as the production of knowledge and skills for predetermined markets. Teaching and learning are sequenced to manageable units and programmed by a timetable. The logic of this model is based on a belief in competition and information as the key drivers of educational improvement (Levin & Fullan, 2008).

The intellectual model, in turn, views intelligence primarily as an academic ability that is dominated by memory rather than by broader intellectual, interpersonal or creative processes. This model assumes that intelligence can and should be measured to determine individuals' educational progress. The problem now is, according to Robinson (2001), that the eco-

conomic model is outdated and the intellectual model is inadequate for the needs of the sustainable knowledge society.

Education policies rarely attempt to challenge these two underlying assumptions of schooling. Instead, education reforms today aim at raising standards, extending time for learning or having more computers in schools. These and other efforts will remain an insufficient means of improving the quality of education unless the economic and the intellectual models of education are reconsidered.

Education for a sustainable knowledge society should rely on a *human ecology* model that uses a holistic approach to help people solve problems and enhance human potential by using their natural talent through learning, prevention of life collaboration and empowerment. Human ecology explores how social systems relate to and interact with the ecological systems on which they depend. It integrates, as described by Marten (2001), long-standing ecological principles with more recent concepts from complex systems theory. Human ecology proposes improved, alternative ways of organising our lives in our societies. It requires the use of imagination, creativity and collaboration to reduce poverty and inequality, enhance the environment and improve wellbeing for all in a sustainable way. This is the rationale behind this article.

EDUCATION FOR A SUSTAINABLE KNOWLEDGE SOCIETY

Knowledge and innovation are the main sources of progress in modern knowledge-based economies. Indeed, knowledge plays a key role in increasing human capital, which is one of the main drivers of economic progress and sustainable development in knowledge societies. It is not primarily what indi-

viduals know or do not know, but their skills in acquiring, utilising, diffusing and creating knowledge that are important for the future. Formal education, especially at pre-tertiary levels, has been criticised for outdated conceptions of knowledge, often characterised as *academicism*. The basis of knowledge in this view has been the positivist scientific method. Therefore, knowledge has been viewed as objective and knowledge-formation as a linear, cumulative process. The ideal of knowledge has been understood as static, eternal and free from subjective values and interpretations.

Due to the breakthrough of new scientific paradigms in economics, mathematics, natural sciences, neuroscience, nanotechnology, cognitive sciences and information technologies, knowledge is now seen in a new light. It is seen as relativistic and diverse in terms of its interpretations. It is created through multiple processes, including hermeneutic and subjective 'scientific' methods. This shift in the paradigm of knowledge has created a challenge for all forms of education. Education should focus not only on transmission of information but also on construction and transformation of knowledge which are fundamental processes in knowledge-intensive and innovation-rich societies. However, many countries are moving to the opposite direction: what seems to be valued is conventional academic knowledge in selected core subjects that can be reproduced in knowledge tests using standardised intellectual processes. The logic of an innovative society, however, is simple: There is no creativity without trust that allows people to try new ways of thinking and working, in other words, taking risks. Furthermore, there is no innovation without an environment in which people can come up with original ideas that have value, in other words, where they can be creative.

Rethinking creativity

Creativity is often seen as a special ability that some people have and some do not. It seems to relate to artistic self-expression through arts, music, drama and dance in which some of us are naturally talented. This is, however, a narrow view of creativity. Any activity that engages intelligence can be creative because intelligence itself has multiple dimensions and is indeed creative. Imagination feeds creativity and creative ideas give meaning to our life. Therefore, everyone has creative abilities and talent of some kind. The challenge is that we are not always aware what our creative capacities are, or how to use them in situations that are not directly related to particular creative processes. There are four facets of creativity that are important when rethinking its role in improving education at all stages.

First, to be creative means to design and make something new that is meaningful in any context of activity. In other words, it is about having original ideas that have value (Robinson, 2001). These original ideas may be related to poetry, physics, economics or, for example, to practical aspects of cleaning the house. Different intelligences are related to different forms of creativity but the basic nature of the process is the same. Traditional schooling gives priority to just one or two of these intelligences, often logical-mathematical and linguistic ones, and values them further by basing success or failure on them. But creativity includes much more. It includes many different ways of thinking, communicating, doing and behaving that are equally important.

Second, creativity can be part of both individual and collective thinking and action. Building creative communities has become an important aspect of learning organisations and institutions that are operating at the edge of creative businesses and innovation industries. Sawyer (2007) goes one step fur-

ther and reveals that creativity is always collaborative – even when we are alone. Just as individuals can learn and develop their creative capacities, so can communities. But there needs to be a systematic plan to do this and also adequate feedback systems that reward good creative performances.

Third, creative processes that aim at generating original ideas that have value should involve deliberate application of earlier learned knowledge, skills and attitudes. Any new idea is not necessarily a product of creative thinking. Wild solutions to a complicated problem are not necessarily creative either. They need to be based on valid knowledge and crafted using proper skills. This is the essential link that connects creativity to academic disciplines, such as mathematics or economics.

Finally, everyone has some creative abilities, in other words, we can all be creative. In education the challenge often is to help students find their own creative passion to learn and do things. Most people think that they are not creative or that they are only able to use their creative skills in certain special situations, such as in design, drawing or making music. Emphasis on human ecology requires that many more will find their natural talent and use their creative capacities for their own development. Being creative is not of itself an admirable thing; it should be based on values and lead to development.

Revisiting innovation

Innovation is the extraction of economic and social value from knowledge. It involves putting ideas, knowledge and technology to work in a manner that brings about a significant improvement in performance. It is not just an idea but rather an idea that has been made to work. This means that innovation and entrepreneurship are required. Therefore, living in and working for a world of innovations requires funda-

mentally different attitudes, knowledge and skills from the citizens. Technological adaptation and innovation have been the main drivers of economic growth in developed countries since the World War II and are proving to be important factors also in many developing countries (Chen and Dahlman, 2004). Therefore, in order to be able to contribute successfully to the development of innovation in the sustainable knowledge economy, education systems need to include working with and learning from innovations as a part of education policies. Innovations linked to future development and changes have three characteristics that are also relevant to lifelong learning.

First, the process of innovation is non-linear rather than linear. This implies that in order to work in an innovation-rich environment one has to develop mindsets able to identify and understand non-linear, systemic processes. Teaching and learning have traditionally been conceptualised as linear, deterministic procedures. Therefore, shifting the focus of education to address the needs of working with innovations requires rethinking teaching and learning as non-linear, non-deterministic and complex processes. In the professional development of teachers and in school improvement this means exploring and expanding the existing pedagogic conceptions and beliefs, and upgrading the current knowledge base related to teaching and learning. Education policies and curricula should pay more attention to meta-cognition, i.e. learning how to learn and how to understand the process.

Second, innovation is most often a collective process created and maintained by a group of people rather than by one inventor. In this sense innovation requires shared knowledge and complementary skills from more than one person. In order to promote these collective and creative qualities, education at all levels needs to focus on

‘learning to learn together’ and working productively with other people, for instance through co-operative learning.

Third, innovation is an organic entity and the process of innovation can be characterized as a complex or even chaotic process of self-organisation (Hirooka, 2005; Prigogine, 1997). This means that knowledge and skills that are related to innovation are attained through active construction rather than direct instruction and accommodation. Therefore, teaching and learning in schools should be viewed as systemic processes that rely on principles of active participation, social interaction, dialogue and reflection.

The aim of many knowledge society strategies is an innovative society that provides security, happiness and prosperity to all citizens in ecologically sustainable ways. Lifelong education and learning are essential for achieving that dream. Nations’ dreams and visions differ in detail but the main idea is the same. For example, Himanen (2007) has suggested that for Finland this dream would be a genuinely caring and creative Finland. All modern national and multi-national strategies include the idea of creativity and innovation. Economic policies, especially at the time of fiscal disorder, count on strengthening investments in innovation and technology. Ecological sustainability will only be achieved through further creative solutions to emerging global problems. In fact, as Sachs (2008) eloquently asserts in his book *Common Wealth*, the global challenges of over-population, energy shortages and climate change can only be solved by new collaborative and creative actions of all nations. How can global education policies promote better mutual trust among nations, companies and individuals that is the conditional basis for risk-taking and creativity? Both trust and creativity are needed to fulfil the global dream of a secure, safe and ecologically sustainable world for all.

The current emphasis on competition and information as the key drivers of educational improvement combines two traditions in public education that have previously been only loosely connected, namely, public accountability and student assessment. During the past twenty years test-based accountability has held school, teachers, and students increasingly accountable for learning as measured by knowledge tests. The logic of market-driven educational development relies on the following assumptions (Sahlberg, in press):

1. Competition in the economy as a whole drives efficiency and improvement and should be applied to education as well, so that competition among schools will lead to better outcomes for students.
2. In order to be able to compete, individual schools require much more autonomy.
3. Parents and students need to be able to choose the schools of their choice.
4. Parents and students, in order to make their decisions, require comparable measures of learning achievement and educational quality of all schools, based on a single national curriculum.
5. What all students are expected to know and be able to do needs to be expressed in learning standards or outcomes in order to make comparable measurements of student achievements and school performance based on externally prescribed curriculum.

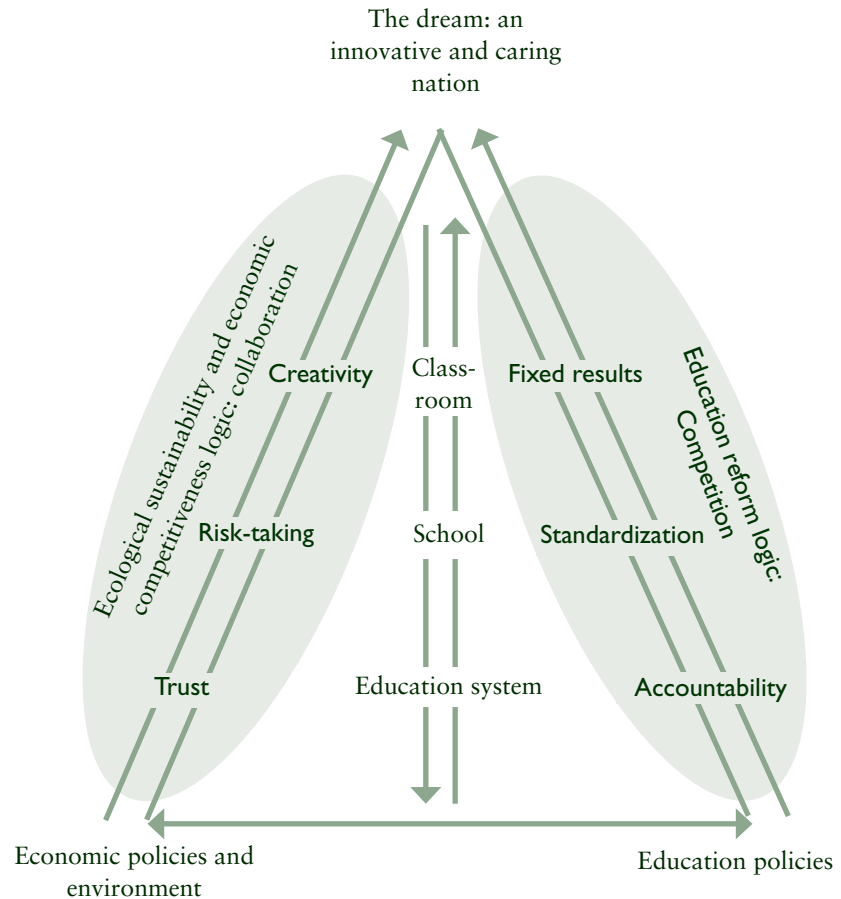
The education reform logic derived from these assumptions is that of competition. It has resulted in test-based accountability in the education system, standardisation of school practices and teaching for pre-determined results in classrooms, as shown in Figure 1. This logic, however, is quite different from how ecological sustainability and national economic competitiveness are established. Fostering trust, enabling risk-taking and thereby building condi-

tions for creative thinking and action are the key drivers of collaborative and sustainable ecological and economic development. Economic policies (wealth creation through market competition) and environmental policies (preserving ecological balance for the common good) can be seen as contradictory. Economic success is often a matter of win-lose relationships with competitors. Nevertheless, within economic organisations, creativity and productivity are enhanced by trust, risk-taking and collaboration. Accountability, standardisation and fixed results in and between educational institutions inevitably lead to both internal and external win-lose relationships

based on narrowly defined measures that work against collaborative relationships and the creative use of imagination that are so vital for the challenging decades ahead.

In many educational situations, if Figure 1 is correct, there is a discrepancy between economic and sustainable development policies on one hand and the education policies on the other. According to a growing number of research and progress reports around the world, competition-driven education policies have increased standardisation and test-based accountability in many education systems (Hargreaves, 2008; Sahlberg, in press). This, in turn, has narrowed curriculum, promoted teach-

Figure 1. Conflicting forces of change between education and economic policies in building an innovation nation.



er-centred pedagogies and shifted learning time from arts and music to reading, mathematics and science. As a result, many more students than before have not experienced ‘being creative’ in school or being able to learn in their ‘element’, as Robinson (2009) calls it. The main emphasis of modern formal schooling in many places is on finding the correct answer, or on being right. That is, of course, important but we also need to be prepared to be wrong.

LEARNING TO BE RIGHT – AND WRONG

Most conventional education teaches us to avoid being wrong. This is the very principle of ‘knowing’. During the course of their formal schooling, people learn that being right is rewarded and being wrong is, more often than not, punished. There is a remarkable difference between the behaviour of learners in the first grade and in adult learning classes. Most first-graders believe that they have some creative talent and are thus not afraid of trying new ways of thinking or doing things. They give answers to teachers’ questions bravely without fear of not getting it right. In a typical adult learning class, however, most learners think that they are not creative and many of them are scared to give a wrong answer or say something silly. According to Robinson, most of us lose the confidence to try out new things as we grow up. He says that ‘ironically, one of the main reasons this happens is education. The result is that too many people never connect with their true talents and therefore don’t know what they’re really capable of achieving.’ (Robinson, 2009, xi)

Teaching is typically based on a curriculum that presents content to be learned as sets of ‘rights’ and ‘wrongs’. Mastery of that curriculum is then tested using tests of knowledge that normally require reproducing the right answer or choosing one from a small

number of options available in the test. The global educational reform movement with standardised modes of teaching and prescribed learning outcomes often consolidates convergent processes of learning that aim at avoiding being wrong (Sacks, 2000). But people need to be prepared to be wrong when they are learning or engaging in creative acts. That is a key to unlocking the available natural creative capacity in every learner and classroom. “Mistakes” often produce new products, such as text messaging features in mobile phones that was ‘invented’ by such smart mistake.

Creativity and innovation are interconnected. Creativity is innovation in that it connects things not previously connected. The challenge for lifelong learning is to allow, enable and encourage learners to make these connections. This is a considerable challenge, given the educational history of most learners. Many have learned that they only have limited creative talent. Some see themselves disconnected from creativity and being able to make anything original. This peculiar self-image is stimulated by conceptions of creativity as a personal innate characteristic that some have and some lack. Lifelong learning has therefore an important part to play in providing learners with opportunities to develop their creative capacities.

CREATIVE ASPECTS OF LIFELONG LEARNING

In recent years there has been a growing understanding of the role of creativity in human capital development. This has also increased the promotion of creativity within education systems. The development of creative thinking underpins two important global strategies: sustainable ecological development and national economic competitiveness. Both strategies depend on the creative capital of nations and are therefore directly linked to education systems’ power to address risk-taking,

creativity and innovation at all levels of education.

These global strategies also motivate many nations to reform their education systems. As part of this process, lifelong learning is also being re-conceptualised. The need to integrate creativity and innovation into lifelong learning requires adult learning curricula to be reshaped so that learners become confident individuals and active citizens capable of creating new ideas in their communities and societies. The benefits of creativity are being increasingly recognised. It is related to improved motivation, self-esteem and, thereby, learning achievement. Other positive gains related to creativity in education include people becoming:

- more sensitive and open to new ideas;
- able to solve problems using alternative approaches and techniques;
- more attracted to exploring and discovering things for themselves;
- more willing and able to cooperate with others;
- better learners.

People who have the opportunity to develop their natural talent and creative skills will be better prepared for life and work. The world is complex and changing rapidly. There was a time when a good academic qualification guaranteed a job for a lifetime, but not anymore. Most people will have to learn for new professions and adapt to several careers in the course of their lifetimes. Most employers today – and certainly in the future – want to recruit people who can work with ideas and see connections, are innovative, communicate and work well with others, and are good problem-solvers. Although the inflation of formal qualifications and degrees will continue, confident and creative individuals will always be in demand in the future.

CULTIVATING CREATIVITY

In this article I have argued that creativity and innovation, now becoming as important as 'literacy', should have a central place in lifelong learning policies. But there is always a gap between intention and actual practice. Creativity can be learned and developed in the same way as other forms of human intelligence. Sometimes role-plays, learning through drama, music or dance are used as stimuli for new ideas, emotions or ways of doing things. My favourite example of enhancing creativity and innovativeness among adult learners is a long-term development project titled Creative Problem Solving in School that was carried out in Finland in the 1990s. The aim of that project was to introduce creative problem solving in teachers' professional development. Teachers practised new attitudes, ways of thinking and skills for solving problems in more creative ways, using techniques and methods such as mind mapping, brainstorming, holistic mapping of the problem situation and *synectics*. These methods helped teachers to become more creative learners, and also equipped them with new techniques that they used with their students to practice creative problem solving.

As a conclusion, I will offer four ideas for lifelong learning policy-makers and practitioners to ease the shift from policy to practice in incorporating creativity and innovation in education systems. Some of the following ideas draw from my experiences on the Creative Problem Solving in School project mentioned above.

Changing the way we normally do things. Changing one's habits is a good way to be more creative. This may be as simple as walking a different route to school or work, having different seating arrangements in meetings, or serving dinner on new plates. Changing daily routines provokes the key question: Could it be done in another way? Exploring this question in different sit-

uations, including those related to learning or working, may bring along original ideas that have value, thus enhancing creativity.

Changing the working and living environment. Another concrete way to enable creative thinking is to make changes in one's habitat. Rearranging office, living room or garden may stimulate new perspectives on daily issues. Switching a job with someone for a day or a week may be a critical trigger for new ideas. Creativity is part of the culture and therefore changes in our immediate environment can help us to think and act differently. Changing the school timetable from 45 minute periods to half day learning blocks (with adequate recesses to refresh), only using text books which are available online, making creative use of social networking tools as a component of learning are some examples of a changed environment.

Learning to be wrong. Being right is the goal of education but it is not enough for success in an unpredictable and complex world. Creativity is often blocked by the fear of appearing to be strange or wrong. Being prepared to be wrong is an important part of being creative and having original ideas that have value. Providing learning environments free from the fear of being wrong establishes the trust that is a critical condition for creativity to flourish. Communication, cooperation and respecting others are the most effective means of building trust in a community. Rewarding effort and ideas, not only rewarding correct answers, is also essential for promoting creativity and innovation in teams and organisations.

Finding natural talent. Formal schooling is typically designed for average groups, not for individuals. That is why many people do not realise what they are good at when they are in school. Although learning after formal schooling is often driven by one's personal interests, a lot can be done to re-

shape learning environments to better meet each learner's natural abilities. Lifelong learning is important also in helping people to find their natural talents that they never discovered while in school. The hope that we have for the future is to adopt the new concept of human ecology. Human beings can change the course of life on Earth. Jonas Salk once said that 'if all the insects on earth disappeared, within 50 years all life on earth would disappear. If all humans disappeared, within 50 years all species would flourish as never before.' New human ecology requires rethinking human capacity and creativity as they are now understood in education. It also requires a better appreciation of the potential of human imagination in searching for sustainable solutions to heal our crowded and destabilising planet. Educating whole persons, not only some aspects of their human intelligence, to cultivate their creative abilities, and to find their natural talents are the keys to that new human ecology.

'The future isn't what it used to be', said Yogi Berra, the baseball player. It could in fact be much richer, more challenging and more interesting than the past. In order to be able to cope with that future in a sustainable way we need to give creativity and innovation more central places in our lives and certainly in our education. Lifelong learning can be an important medium in doing that.

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ENDNOTE

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