Have you ever experienced a moment in which you have a profound sense of joy in the potential of humanity . . . a glowing feeling of confidence that mankind is going to be okay after all? It’s the kind of experience in which you begin to feel really calm and centred.

I had that experience recently when three children, ages 12, 14 and 16, made a presentation to the 1998 Systems Thinking in Action Conference in San Francisco.

The Systems Thinking Conference organized by Pegasus is an annual learning event at which Peter Senge, author of *The Fifth Discipline*, and 800 systems thinking practitioners from business, education, health care, government, and academia gather to learn about what people are discovering from their experiences with organizational and whole system transformation.

While I usually leave this four-day learning event refreshed and excited about the incredible breakthroughs in applied systems thinking that are being achieved by learning organizations from over 20 countries around the world, this time I was simply filled with a warm sense of optimism for the future.

While there were more than 50 workshops to choose from, I was attracted by the presentation title: *Starting Early: How K-12 Students are Becoming Systems Thinkers.*

The workshop program outline for the conference read: “As more and more businesses recognize that skill in systems thinking is an essential element of basic management literacy, they not only seek knowledgeable recruits, but also look for ways to build internal capability. Learn how one school district has organized to teach teachers and students alike how to use systems thinking and systems dynamics, as three public school students and one of their
system dynamics mentors share some projects and the tools and techniques they have used.”

As someone who teaches systems thinking skills to adults, I was most intrigued by the following line in the brochure: “Long before they become the sought-after leaders of tomorrow, these students are cultivating the mental models and skills required to make decisions and take effective action based on deep understanding of the dynamics of the systems that will affect their lives and their work.”

As a parent of two young children, I’m deeply concerned about the confusion, chaos and frustration being experienced by the education system. I worry that while my children will be living in the knowledge economy, they are still being trained for the industrial era.

While I was keen to see children that have had systems thinking training from the start, I was also energized by the hope expressed in the program outline. While there were a few other workshops being conducted simultaneously, the course description screamed out at me the words “kids” and “hope”.

In my imagination I visualized a world in which everyone was able to explore their own and other people’s thinking while they worked cooperatively together to continuously improve the world around them. That’s the ultimate promise of the knowledge economy.

But to successfully shift from the industrial society to the information economy will require a fundamental change in the way we think and behave. In the new economy, because knowledge will expand very rapidly, we must also be able to accelerate the rate at which we learn.

Systems thinking and system dynamics are a set of skills and tools that enable teams of people to tap into their collective intelligence and solve complex problems. Many would say that such skills and competencies are essential for survival in the information economy.

In his book, Teach Your Child How to Think, Edward de Bono points out that teaching children to think is vital. He argues that thinking skills,
rather than content knowledge, will be required in the rapidly changing world of the future. De Bono points out, “they will be growing up to live in a complex world. Information, qualifications and professional skills will not be enough. They will have to be able to think things out on a business, professional and personal level.”

Unfortunately, it seems from reports around the world that most education systems are still trapped in old paradigms about teaching content, rather than “learning how to learn”.

World knowledge about how humans learn and the incredible advances in brain research that have occurred over the past 5 years have not yet been incorporated into most school systems.

The paradox is that while most teachers love to learn, many are so angry and so frustrated by externally imposed reforms, they are not open to learning. As a result, we see incremental reforms to the system while maintaining the same old assumptions about the learning process itself.

That’s why I was keen on attending this workshop on how K-12 students are becoming systems thinkers.

The seminar started with a highly informative explanation of how the Catalina Foothills School District in Tucson Arizona implemented a fully integrated approach to systems thinking and systems dynamics within individual classrooms, the school and the district itself. Project manager Joan Yates explained that two important reasons for their success were that the change process was “bottom-up” and highly participative.

After we heard from the grown-ups at the workshop, we had the most extraordinary opportunity to hear and experience clarity of thought from three children who had been learning and practicing systems thinking since Grade Five.

The audience -- veterans from learning organizations, business people, teachers, college professors, leading consultants, public policy professionals and leading industrialists -- sat spellbound at what often felt like real wisdom coming from the children.

“I’m 52-years old and have been trying to learn more about systems thinking from the experts at this conference, but I’ve learned more about systems thinking from these young people than from any of our top speakers,” said one woman in the audience at the end of the students dialogue.

These young people showed us how they apply systems thinking tools and techniques in their school work -- in analyzing literature; in understanding lessons in history; in learning about chemistry; and for examining contemporary issues facing American society.

A 16-year old young woman showed us how she used the Escalation Archetype from causal loop diagrams to analyze the historical lesson learned from a colonial conflict between the British and the French.

“Today, all over the world there are school systems that utilize the five disciplines of a learning organization.”
“It’s a reinforcing loop”, said the young woman, “they had to find a way to break the pattern to end the conflict.”

While the escalating causal loop diagram is not difficult to understand intellectually, we could tell that this young girl really did understand the nature of a behavioural dynamic that sucks the life out of many adult-run organizations today.

Adults often have difficulty recognizing repeating patterns of escalation that won’t end until someone breaks the pattern. That’s the archetype that was in place throughout the arms race between the U.S. and the U.S.S.R., and it’s a common pattern of thinking and behaviour in most human organizations and systems today.

Where I live -- Ontario, Canada -- the citizens watch in complete dismay at the escalation of the battle between the government and the teachers’ unions.

The pattern is clear: government loses, unions lose, citizens lose, teachers lose, and, kids lose. But we can’t seem to break the dynamic. The confrontations keep escalating, each blaming the other.

I kept reflecting on these circumstances as I listened to these Arizona children who naturally recognize patterns of behaviour over time, and understand the consequences of not breaking the pattern. That filled me with real hope for a better world.

A teacher in the audience responded: “Wow, this is really great! But do you kids ever use stuff outside the classroom?”

“Sure,” the children responded as they gave several examples of how system archetypes appear as realities in their daily lives.
Imagine children -- like these ones -- who automatically recognize that behaviours like “dissing” in the schoolyard will lead to greater conflicts. They break the pattern because they understand that nobody ever really wins from escalating conflicts.

The image of a whole generation who are able to see a bigger picture and avoid repeating past patterns of flawed thinking and behaviour certainly energized me.

In the field of organizational transformation and whole system change, adults who have been schooled in traditional linear thinking styles often struggle to see the common patterns of behaviour -- the “fixes that fail,” the “shifting the burden,” and each of the archetypes that characterize organizational life.

The audience -- rooted in their own experience of how difficult it is to change the way we think and behave -- were clearly moved by what they were experiencing during our dialogue with the children at this workshop.

These kids were different. Their thinking was not fragmented and linear, it was holistic and integrated. These children actually thought in terms of behaviour-over-time. They quickly saw patterns in complex systems. They spoke in terms of relationships of effect between variables -- instead of explaining who or what was at fault, or where the “blame” belonged.

These kids were thinking through the lens of dynamics tools with ease. They were thinking -- without the mental blinders of linear thought processes -- and comfortably accessing their multiple intelligences.

It would be wonderful to have these children sit down with the warring factions in the education sector and draw causal loop diagrams that explain the dynamics of escalation and why everyone will lose unless someone changes the pattern.

As someone who has spent the last five years helping adults “learn” systems thinking, the experience of listening to these children was really encouraging.

In my experience, many adults find it difficult to “unlearn” the assumptions that have formed the underlying structure of thought in the industrial age. We continue to hold mental models of reality that are deeply embedded in our linear, mechanistic thinking patterns and habits.

Leaders throughout much of society continue to cling to Newtonian assumptions that prevent them from seeing a larger picture of reality -- or from seeing the leveraged actions that would actually achieve the objectives that they say they are attempting to achieve.

When we are trapped in our fragmented and linear thinking patterns we continue to respond with “quick-fix” solutions: downsizing, restructuring, re-engineering, centralization. These were the responses that made sense when the dominant worldview was rooted in the assumptions of the industrial age.
Where breakthroughs have occurred in recent years, systems thinking skills, techniques and tools were used by adult learners as filters that allowed them to see a richer interpretation of reality and enable them to discover the key leverage points in their systems.

But these children from Tucson very comfortably and quite naturally saw the world’s complexity as patterns. They understood the systems that they live in as organic living systems that can be better understood by analyzing their dynamics and inter-relationships.

You could sense how these children thought differently. How they could cut through complexity and see the real issues with clarity.

In his book, *Seeing Systems*, Barry Oshry points out that we humans spend our lives in systems: the family, the classroom, the team, the organization, etc. He says that when we don’t see systems, “we fall out of the possibility of partnership with one another; we make up stories about one another; we become antagonists when we could be collaborators, and we become strangers when we could be friends.” The children that we saw at this workshop had developed the capacity to “see systems” with clarity.

They are being prepared for a world where people will think together in teams to continuously change and adapt. Without such capabilities people -- and nations -- will be in serious trouble.

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In Canada, it is vital that we fundamentally change our education system if we are to maintain our current standard of living.

Reports over the past few years from the Organization for Economic Cooperation and Development (OECD) and the Conference Board of Canada have predicted that Canada’s standard of living will slide inexorably below the OECD average over the next two decades -- unless we change.

The OECD projects that Canada’s standard-of-living could drop as much as 25% over the next two decades because Canada has a relatively high proportion of less-educated citizens with poor literacy skills when compared to the rest of the G7 countries.

And its not just schools that are stuck. The Paris-based international body and the Conference Board in Ottawa also point out that a number of key sectors of the Canadian economy are not adjusting and changing at the pace that each of the other industrialized countries are achieving.

The expectation is that when there is a down-turn in the economy, there will be no “soft-landing” for much of Canada’s manufacturing sector when they discover the consequences of not adapting their systems and processes.

The reality of the knowledge economy is that the key to survival is “learning how to learn”. To survive, each of us must be capable of continuous up-grading of our skills.

The Collegium of Work and Learning, an educational think tank
based in Toronto, warns that our primary and secondary school systems are still preparing students for the old economy. They point out that while people will increasingly become self-employed, or more independent in their jobs, the education system continues to prepare people to be employees in very command-and-control structures.

Today, all over the world there are school systems that are being transformed into learning organizations that utilize the five disciplines of systems thinking, team learning, shared vision, mental models and personal mastery.

On the horizon is the possibility of a new generation that has the capacity to see systems naturally.

The question is: is our education public systems and its leaders up for such a challenge? Can our education systems play a leveraged role in preparing society for a very different world? Will the leaders in public education move quickly enough to change the system? Will they have the courage and the wisdom to embark on their journey without a detailed plan?

While there is considerable evidence from the corporate sector that learning organization processes and practices can lead to increased creativity, innovation, productivity and growth, in the education sector, there is still only anecdotal evidence that such practices lead to improved learning outcomes.

Reports from many educational jurisdictions are that many people are still stuck in turmoil -- often unable to step back and see a bigger picture or new possibilities. “Blame,” “finger-pointing,” “power politics,” “fear” and “anger” dominate the environment until it becomes intolerable.

Those jurisdictions which have broken through the chaos and turmoil seemed to have done so because there was a critical mass of people -- particularly teachers and principals -- who generated a powerful shared vision of what they wanted their education system, and their school, to become.

Joan Yates, the system dynamics project manager for the Catalina Foothills School District in Arizona explained that their school board succeeded because commitment came at the highest levels within the organization.

Resources were obtained for staff training, capacity-building and on-going support. Ms. Yates told us that “the greater the degree to which systems thinking is implemented in the classroom, the greater the degree to which systems thinking can be implemented and sustained in the organization, and vice versa.”

She drew this for us as a reinforcing causal loop (see diagram on this page). But the Catalina school system did not explicitly set out to become a learning organization. Explains Ms. Yates, “We started using system dynamics before Peter Senge had written his book and before we ever heard of the expression ‘a learning organization.’ We were actually just trying to become the best middle school we could be.”

Being the “best we could be” emerged as the shared vision held by a
critical mass of teachers, principals, parents and administrators. There is nothing more powerful than a shared vision of the future that a group of people want to create together.

As Senge says, “a shared vision is not an idea. It is, rather, a force in people’s hearts, a force of impressive power. It may be inspired by an idea but once it goes further -- if it is no longer an abstraction. It is palpable. People begin to see it as if it exists. Few, if any, forces in human affairs are as powerful as a shared vision.”

The Catalina transformation was bottom-up and voluntary. It started with one school -- Orange Grove Middle School -- and then spread incrementally. “There has never been a district-level goal to become a learning organization,” says Yates.

While there were a few courageous leaders at the community, school district, school building and classroom level from the very beginning, the organization avoided dependency on any one leader.

“Our results have come about as a result of visionary and courageous leaders at all levels of the organization and community,” says Joan Yates.

I learned that successful transformations in the education sector -- like the corporate sector -- need to be bottom-up, not top down. It was the Arizona teachers themselves -- often inspired and facilitated by principals -- who led the transformation.

I learned that when there are visionary and courageous leaders at the school district, school and classroom levels, resources and commitment to being a learning organization can follow.

But mostly I learned -- or I had a glimpse of -- how clearly children can think and act when they continuously apply systems thinking tools, techniques and practices in their schoolwork and in their lives. I got that understanding where it matters: my heart, not my head.

That’s why I’m feeling more confident about the future of humanity.

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Quantum is an innovative company specializing in knowledge products and tools for organizational transformation. The firm focuses its practice in high technology, health care, education, and in industries that are transforming to meet the challenge of the knowledge economy.