
Learning in the Knowledge Age

A Request for Feedback and Interest.

Barry Wansbrough, MEd • Fall 2006



A PARTNERS FOR ACTION MODEL

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EXECUTIVE SUMMARY

During the Nineteenth Century, industrial production was the leading source of the generation of new wealth, and the public education system was built to equip Canadians to work in that economy. Today we still have essentially the same educational system and structure that was developed over a century ago, however the major generation of overall wealth has shifted to the services sector (68%), and the generation of new economic growth and wealth is in sectors that require skills in knowledge management and innovation.

'One of the few institutions that have escaped relatively unscathed by the disruptive technologies of the past 50 years is "school". By and large schools have avoided change by ignoring, banning, or trying to co-opt new technologies. Only the personal computer and the Internet are now starting to have an impact. The fact remains that our great-grandparents could walk into most of today's classrooms and recognize almost everything they see.'

David Thornburg, The New Basics, 2002

This new era of economic development is known as the Knowledge Age. (KA)

At the same time, Canada has been transformed by waves of immigration that have transformed our cities into global villages. However, our schools were designed for homogeneous populations of largely British origin outside Quebec. Immigrants were expected to assimilate. That has changed and we now embrace cultural diversity. We must harness these new multiple energy sources - new immigration, and the generation of new wealth in the emerging economy - to reach new levels of quality of life for Canadians. But the schooling system has not transformed itself to meet the challenge.

As a result, in four major categories, the educational system is hurting rather than energizing the growth of new wealth creation and Canada's prospects of maintaining and enriching our quality of life. These four areas are:

organizational structure;
embracing of our cultural diversity;
a curriculum that is designed for the Knowledge Age; and
the generative technological supports common to modern, thriving enterprises.

A new form and structure of schools will nurture into a powerful new engine to keep Canada in a top-ranking position globally in terms of quality of life. As with the original investment in education for the Industrial Age, there is similar need for that investment for this age. The potential rewards are huge.

SUMMARY OF RECOMMENDATIONS

The first step is to consolidate the executives in the Ministries and Boards into autonomous organizations with culturally and professionally diverse corporate directors, and appointed CEOs with the mandate to lead and manage the vision, mission, values, goals and budget for his or her organization – formerly the board of education.

The teachers must organize and deliver the program, and they must have the decision-making power to do so in their schools within the organization's mandate. They must be supported by remunerated and enhanced professional development for the new process.

The operating process must shift from 'teaching subjects to classes' to 'helping students to learn'. This will involve both teacher and student teams organized not by 'classes' and 'timetables', but through working teams with managed/appointment-based schedules in studies, resource studios, labs and centres.

Very importantly, we must remodel the physical structures and ambience of the schools to better accommodate our modern, culturally diverse society. The schools must be welcoming, accepting and engaging learning environments for people from all cultures.

We must restructure the curriculum so that core, basic literacy is largely mastered by the end of Grade 6, the transitional new curriculum for the KA by the end of Grade 10, and the preparation for further learning by the end of Grade 12.

Finally, the whole process must rest on a comprehensive information and knowledge base to support learning, collaboration, continuous reporting and feedback to students, parents, teachers and boards, and general administration.

To kick-start the process, we should begin with a pilot in September 2007.

This whole paper is really an executive summary itself. Each of the topics would rate whole chapters in a detailed proposal. That is neither practical nor desirable at this stage, so while many of the details have, in fact, been researched and worked out, this paper outlines the essential, bare-bones concepts and practical recommendations.

1. ORGANIZATION

The Present State of Education

During the Industrial Age, our educational organizations were designed and developed to educate and train individuals who could work effectively in the key industries and institutions of the time (e.g. the foundries, factories, telephone exchanges, and the offices of the age). We now live and work in the Knowledge Age, which is dominated by businesses in sectors such as information technology, Internet services and products, innovative designing of new services and products, computer-assisted processes of all kinds, and the biomedical industry. To meet the needs of this new economic era, we must transform our schooling practice and curriculum.

In any business or public organization, success comes from identifying the key engines of production and service and subsequently training well-qualified people so they can be managed for best outcomes. Public systems, such as schools, both provide and support the workers necessary to fuel those engines of production and, when these systems are complementary, the whole of society benefits.

That complementary relationship between schools and the engines of the economy was firmly in place until the end of WWII, a relationship well-equipped to provide Canadians with the skills needed to work and thrive in the Industrial Age. What was new and energizing about the Industrial Age schooling system? It provided compulsory, free, public, universal schooling to ensure the population possessed the basic skills in the 3 R's – reading, writing, and arithmetic, which allowed them to read instructions and follow orders. Many students left school after Grade 10, and only 6% went on to university and two-thirds of those graduated.

Today, however, it is difficult to find a job without at least a college certificate, and businesses require high school and/or college graduates to fill promising positions. Specifically, Canada now needs 90% of students to graduate with solid skills from Grade 12 with 70% of them prepared to go on to further learning for work, college or university.

Increasingly, our current manufacturing base (the driver of economic growth in the Industrial Age) is moving to offshore factories that offer cheap labour. While it is still robust in many areas, manufacturing contributes less than 21% to Canada's GDP, mining and natural resources 8%, and agriculture 2%. By contrast, the services sector accounts for an impressive 68% of GDP.

The problem is that our schooling system has been set up for a largely industrial economy - even following an agricultural calendar. But today, we live in a world where the new wealth and improving quality of life will come from innovative ways we can identify and solve complex problems.

Governor General Michaëlle Jean in comments delivered at her inauguration, September 27th, 2005, and on the topic of youth violence on February 22nd, 2006. made these points:

'We must give our young people the power, even more, the desire to realize their full potential'.

'Education is part of the solution. We must give Canadians the tools to thrive in the knowledge economy.'

'...we must eliminate the spectre of all the solitudes and promote solidarity among all the citizens who make up Canada today.'

To solve those problems and build new wealth, students will need to graduate from educational institutions or work place training with the ability to collaborate, solve complex problems, deal with intensely individualized corporate and personal products, and understand what developments of technology have anticipated this shift – best illustrated by the new Web 2.0 technology and processes (explained below) . What we need is a school system designed to support it.

We do not have the appropriate structures and our schools are languishing as a result. Like many resourced-based organizations built on the old economy, our public schools are unable to produce balanced budgets. They are losing students due to population changes and dropouts. They are also losing young teachers. They are facing rising costs despite the falling enrollments; and struggling tentatively, e.g. zero tolerance, with completely new demographics; and, as higher levels of government watch, slashing services that once made them competitive with the very best private schools.

What happened? The Knowledge Age is what has happened, and schooling for the Knowledge Age is an exciting new story – one that needs telling.

What is the ‘Knowledge Age’ and where does it lead?

Whereas the market for the Industrial Age was the demand for more goods and products, today, the market demands that ideas be turned into productive services.

This new age is called the Knowledge Age because it is now becoming possible not only to store numerical data in huge electronic banks, but to store, classify and sort people’s ‘knowledge’ in specific topics: thoughts and ideas of what they ‘know’ about people, processes and information.

Today, the source of the new wealth is in the creative analysis of this ‘knowledge’ from combined information banks reconfigured into a new product, largely in the services’ sector. For example, IBM and BP are companies that started as icons of the former age, nearly failed and re-invented themselves, IBM from computer manufacturer to business services, and BP into an organization of many self-directed sub-units. Its re-branding from British Petroleum to Beyond Petroleum is a classic. The Big Three American auto manufacturers still grapple with the challenge. The leaders in the redefined Web-information sector include Google, with its drive to be the knowledge base for nearly everything, (e.g. Google Earth, Google Trends, and the complete electronic library of published and video works), Amazon and eBay.

The goal of the KA organization is to transform from a provider to an accommodator. The foundation for this is a unique, open and compelling data and thoughts bank.

DNA of Knowledge Age Organizations:

Decision rights : dispersed to the functional bases

Information: gathered, analysed and shared through complex technology used to build innovative practice

Motivators: flexibility, engaging working environments (some out-of-office), participation and rewards for thinking and contributing knowledge to the base.

Structure: customer driven, team managed, Theory Y directed.

Present day leaders require the skills and qualities that establish the organizational climate and mandate. Workers, the new wealth builders, are now require the ability to think critically and to find creative and innovative ways to execute that mandate. Hence, they all need to be armed with the traditional basic skills and knowledge plus those new ones now critical to wealth growth in the Knowledge Age.

The problem is that the system that should be providing the skills helpful to living in the new age has not kept pace. To operate successfully in this new age, students will have to have a whole new set of skills and attitudes in whatever they will do. The structure and operation of schools must change to mirror the new reality. If we invest in these changes, we have a major chance to achieve our main social goal – to maintain and enrich our quality of life.

2. CULTURE

Anchoring a Strong, Diverse, Collaborative Society

Canada has come to official multiculturalism very recently. While we have always had communities based on very different cultures, they have traditionally been expected to assimilate into the dominant English or French societies. Even though they were here first, Canada's Aboriginal population has faced the same attitude, and accommodating that fact is an important part of the new challenge.

On what is an already complex cultural base, we now have recent and rich, diverse new cultural communities predominantly from the Indian sub-continent, Asia, the Caribbean, and Africa. With minimal discussion or collaboration with the provinces, the federal government has left the municipalities to cope with the consequences: new programs needed in the changing social fabric, unemployment, poverty, language acquisition, gang disputes and new crime.

While the great majority of immigrants have coped remarkably well and our cities have been transformed into global villages, the effects of immigration on public schools have been dramatic and, unfortunately, not positive.

The point is that the senior levels of government's lack of understanding that social change incurs additional cost coupled with education's systemic inflexibility has seriously undermined our students' learning prospects.

In Ontario, schools were designed for homogeneous populations of largely British origin. Of course there was a rich multi-cultural community already. In a typical Grade 13 class at Jarvis CI in the 50's, there could be 25 different nationalities represented among the 35 students in the class. They were all expected to assimilate into the predominant British culture. Most of them did.

Now we need to find a schooling model of common values and goals that goes as far as possible to accommodate and conserve the diverse, multi-cultural communities while educating them all for the new age. Prominent features of these school environments include: A welcoming and respectful school and staff; teams of students working in a problem-based curriculum and grouped by personal learning profiles, personal interests and goals; a rich school community life; reflective spaces for individual thought and contemplation; attractive and spacious common meeting places; strong student leadership and community service, in and out of the school; a basic behavioural expectancy of 'do no harm' as set out in the system's mandate; respect built on skills and helpfulness; and viable options and interventions for students in distress.

At the core, our students should expect to gain solid academic achievement and to have the means for all to achieve it. They should expect to participate in school and community life; they should emerge from the end of their schooling with the skills they need to succeed; and they should expect to adhere to Canadian laws and constitution.

Of course there is an investment involved in transforming the schools (see page 15), but to have a system in which the vast majority of students have both the confidence and the means they need to build a productive future, a common future, and one in which the teachers have the restored pride and confidence that they are leading the team – that will be the best investment possible.

3. CURRICULUM

For the Knowledge Age

We have known for some time that our curriculum has been out-of-date, but the reforms have all sought to restore and test the old standards rather than to set new ones. The teachers have come under much closer scrutiny and have unfairly borne the brunt of the blame for what has been almost totally a systemic failure leading to falling standards. At the same time, vastly different students with different needs and skills will not thrive in an environment that is insensitive to their futures. For example, English as a second language instruction, which should form the basis for helping new foreign students to integrate into classes, has been woefully weak.

There have been many suggestions as to what should go into a new curriculum. The Partnership for 21st Century Skills based in Washington, DC, has one of the most best-researched lists. Their 'Results that Matter' paper focuses on the following six key elements that I outline here.

Key Building Blocks of New Curriculum

Core subjects are the 3 R's, with new R's that include competence in the main computer applications, word processing, spreadsheets, presentations and some programming. All this should be in place by the end of Grade 6. This would also include the key concepts of all the subject groups that middle school students will not take in their senior, Grades 11 and 12, years.

The new, 21st Century content also includes global awareness, financial, economic, business and entrepreneurial literacy; civic literacy; and health and wellness literacy.

Critical to this new curriculum are the learning and thinking skills: critical thinking and problem-solving skills; communications; creative and innovative; contextual learning; and information and media literacy.

Information and communication technology (ICT) skills are discussed in the next topic of this section of the paper.

Necessary life skills to build into the curriculum include leadership, ethics, accountability, adaptability, personal productivity, personal responsibility, people skills, self-direction and social responsibility.

Finally, there must be a revised assessment model for this new curriculum. All five elements of the curriculum must 'count'. They must be consciously built into the program, some with time and some in process, attitude and actions, and all be part of the overall reported outcome.

4. THE COMING OF WEB 2.0

In addition to those six core curricular elements, technology will be a major factor in the development of a new curriculum. One of the biggest disappointments in education over the past 20 years has been the complete failure of technology to inform core learning due to the confusion as to what role it can play in schooling. The big money went into computer games.

Our young people generally have a much better idea of what the future is bringing than we do. They're already busy adopting new systems for communicating (instant messaging), sharing (blogs), buying and selling (eBay), exchanging (peer-to-peer technology), creating (Flash), meeting (3D worlds), collecting (downloads), coordinating (wikis), evaluating (reputation systems), searching (Google), analyzing (SETI), reporting (camera phones), programming (modding), socializing (chat rooms), and even learning (Web surfing).

Marc Prensky, "Listen to the Natives", Education Leadership, January 2006

While some improvements have been made (i.e., GIS, publishing, music labs, robotics) it is clear that much more needs to be done to integrate technology into the learning modules.

In their own time and on the computers at school (if they can get away with it) students use new communications (e.g., instant messaging) and information technology for engaging and communicating with their peers, playing games, for entertainment, and for seeking information. At their level, they are already in the new age as citizens, but not as students. With some of the Web sites, they are able to communicate on common subjects of interest with hundreds of millions of others. That world is disconnected from school, but not from the lives of the students or workers out in the new economy.

The difference between the adult users of the conventional communication technology (e-mail, cell phone, Web searches, and online purchasing), and the younger users (YouTube, MySpace, IM, iPod, iTunes, Wikipedia, MMO's like WOW) has been explained as that of Web 1.0 thinking and Web 2.0 thinking. Web 1.0 describes traditional, personal computer and phone uses. By contrast, Web 2.0 describes a collaborative, creative, participatory community of users.

In the world of business and wealth generation, Web 2.0 works from a dense, unique and open database. The key is to identify the base (all goods in eBay's case, and books and video in Amazon's), and to then find the broadest clientele possible. Customers are the main source of wealth, not because they buy your software application, but because they visit your site, use your data base, perhaps for a per item hourly cost, and added to that, advertisers pay per viewer.

What Web 2.0 systems do that Web 1.0 did not do is to vastly expand and make accessible the number and particularly the form of data 'objects' go into the electronic knowledge bank. The traditional data banks stored numerical or electronic data or lists. Web 2.0 is based on 'thought' knowledge: what customers know; not just what they ordered, but what they might like in the future. It is anticipatory.

Every organization can benefit from building these knowledge banks. How could this thinking and practice transform schools? Just imagine a school where all of the students and teachers have, at their finger tips, the information they need already personalized for their learning and working styles and lives along with the templates they need for complex problem-solving. These school problems include schedules, reporting (on demand and with relevant, personalized suggestions for consideration), and a rich base of tiered problem sets and interactive lessons and simulations that form the base of the curriculum. Students are active and engaged, and teachers are supported in providing the personal attention to the students and parents, time that now goes into stressful former age planning and administration.

The Web 2.0 model fits completely with the whole KA system. It is a key component for enriching our quality of life. Which environment do we want our students in?

The Top 10 game rentals boildown to 3 genres: run and run, boxing, and battling guns. The Japanese games are different and not from America.

Dan Bradbury, Backbone, May 2006

THE KA SCHOOL

The essential change in KA schooling is that the primary emphasis changes from one of ‘instruction’ to one of ‘engagement’ – for everyone.

It is not "utopian" or "naive" to think that learners can make responsible decisions about their own learning; those words best describe the belief that any group of people will do something effectively and enthusiastically when they are unable to make choices about what they are doing.

Alfie Kohn, Phi Delta Kappan, September, 1993

That means that the students, under supervision and direction, are doing work they consider to be their own, not work that seems mainly important to the teachers. With a new emphasis on intentional interaction among cultures and communities, as well as among individuals, the depth of interaction expands exponentially. It’s a powerful engine for intellectual growth, and one that promises the same for our quality of life.

A Student’s Life in the KA School

The first thing students will notice will be the welcoming nature of the school, its attractive ambience, and the sense of respect that pervades. Then they will find themselves with their teacher/manager planning their program with a small team of others, not based on fixed timetables, but on scheduled appointments in the resource areas they need for the time they need it. They will have key lessons on crucial concepts in each subject area, and then work on interesting problem sets to build their knowledge bases. They have much more input into what they do. From the provincial system’s inclusive and comprehensive information base, they have online access to a rich knowledge bank including the great lessons on key concepts.

They will notice that much more emphasis is placed on community life in and out of school. At the appropriate age, they will be expected to participate regularly as part of their curriculum as educational assistants in the resource areas.

This is fundamentally different from class ‘group’ work: in the KA model the students do not control the standards or key skills and concepts of the system. They are proscribed. The students do control how, where and when they meet them.

Students will enjoy the co-curricular activities and the attractive common meeting, gathering and reflective places. They will be less lonely.

Right from the start, students will be immersed in the culture of the living and working world around them. What they will need in later life certainly includes the skills and knowledge from school, but they also need to ingest the ambience and body language in the halls that some think make up 50% of what students learn in school. What a huge leg up.

A Teacher's Life in the KA School

The essential change for the teachers is that when discussing practice and program, teachers are covering their own professional agendas at a table of peers. They are not looking at the next level up. They are planning the program, not waiting for instructions from above. They control the local budgets, and collectively, within the mandate of the Board, influence the Board's global budget. They have up to four months training and preparation for which they are paid.

This training with the other members of their team will introduce them to the Board's information base, and that will allow the team to plan and prepare the program for the students in their 2-year level unit.

In middle and senior years, teachers are responsible for the management of 5 teams of 6 students each, and direct or assist in one of the resource centres, labs or studios. They will be the dynamos of the schools.

By running the schools' programs in a way that complements other vital organizations of wealth production and quality of life enrichment, teachers can prepare their students for the real lives of the future, and restore a sense of pride and respect for themselves and our educational institutions.

Parents and the KA School

Within the board's mandate, parents will have online access to all of the pertinent information including continuous reporting with suggestions as to what help is best for their child at the time. As their child progresses, relevant information about post-secondary and working futures is built in to the system for them. They will also have personal contact time with the teachers. They will be better informed.

For many parents and especially, but certainly not only, newcomers to Canada, their concerns about their children's futures are the source of major stress. Education is a huge component of that stress, especially as the job market has changed so dramatically. We have seen, not just in the GTA, but in France and the U.K. too, what happens when students do not see the system as helpful to their futures and drop out. What a difference an inclusive and relevant system would have made.

There was earned confidence in and respect for the system when it was obvious to all that it was preparing our young for better lives. There will be the same respect when the system is transformed to do the same for the present generation. That will make a signal difference on every front.

GETTING THERE

There are two imperatives to put in place to realize our futures: the investment and the plan.

The Investment

A once only capital investment is needed to transform the system into one that will better enable us to keep and enrich our quality of life. Once established, the new system will operate at the present global rate of about 5% of national GDP. That is a benchmark to keep us competitive. Today, in addition to the operating expenses for the system, there are large supplementary funds regularly added to repair its constant failures. They will not be needed in the new, relevant, model.

The payback we can expect will come from our growing per capita GDP. Presently that stands at \$30,850, and places us 9th globally, and 13th in terms of purchasing power parity down from 8th and 11th two years ago, and 2nd at the end of WWII. There is a gap of about \$9000 per capita between Canada and the U.S. If we could close just half of that gap through a new educational system and the growth it produces, the return to Canadians would be \$135,000,000,000, annually.

To transform the Toronto public board, for instance, given the 15,800 teachers and 558 schools, would take some \$1.34 billion or \$2.4 million per school, including training, technology and facilities. That is less than the \$2 billion GM is investing in its outdated Canadian operation. For the whole province's 4800 schools, the cost would be about \$11.5 billion – and that over some five years.

It's hard to imagine a better investment.

The Plan

Given the will from political, educational, business and community organizations, there are funding and resources to start. We are, fortunately, in a good economic position and ready for a new boost.

There is no obstacle to preparing for and starting a pilot school for the year 2007-2008. To prepare the information knowledge base, wire and renovate the school, and provide professional development for 7 unit teams of teachers will cost \$3,260,000 - \$5,000,000 (bare bones to some extras).

Conclusion

We know we must do something to fix the dysfunctional educational system. We are losing far too many students and teachers, and we also know that the curriculum, especially for the middle two-thirds of students, is not nearly as engaging, relevant or productive as it must become. There is a logical and affordable option that will pay for itself very quickly - if we move now, before the rest catch on. It worked for our Industrial Age predecessors. Are we as smart as they, or will we let the quality of life for our children and grandchildren slip by default?

Let's test ourselves on this and pass, with distinction, as a team.

ACKNOWLEDGMENTS

Caroline Cakebread with James Mitchell has been of invaluable help in the editing of this paper, from over thirty pages down to sixteen, and seeing it into a readable form. Michael Robertson, as always, gave valuable and generous help. Huge thanks to them.

References

Below are key references regarding the paradigm shift and the elements to build a new educational system. A more comprehensive list is posted on the Web: www.lika.ca

Paradigm

Most of the explanatory work concerning the shift to include the macro (cosmic forces) and micro (sub-atomic) elements to the well-known molar (Newtonian) understanding of the operation of the universe and things within it had been completed by the early 1980's. During the 1980's, there was a huge new impact from Hawking and Gleick that had a major impact on organizational thought. Since then especially large, complex organizations have been forced into rethinking or dying.

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Organization

The main trigger for this paper is the article in the Economist, January 21st, 2006, special section, 'The new organization'. It, in turn, was sparked by John Roberts' The Modern Firm. It led to an interesting journey. W. Edwards Deming just after WWII started the move to reaching top quality production by the systematic elimination of flaws. Peters and Waterman then started the 'excellence' movement, with Peter Drucker and Peter Senge offering powerful models for institutional/organizational reform. Large organizations have been forced to reform or die. Educational institutions are among the last to hold out for the Industrial Age systems.

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Culture

The first of two key sources for bring this element into focus is Her Excellency, Michaëlle Jean, Governor General, in her inaugural speech of September 27th, 2005. In that speech and subsequent speeches, she clearly addresses the issue of youth violence, the imperative of effective education for the new age, and embracing diversity. Just at the same time, former Canadian Chief Justice, the Hon. Frank Iacobucci, was quoted in the Toronto Star, November 24th 2005, eloquently reinforcing that mandate.

This multi-cultural element is incredibly complex and important. On it rests our prospects of a rich future. There are excellent organizations with deep understanding, the Maytree Foundation, for instance, and to suggest that this paper covers the issues completely or accurately would be wrong. But there must be a start to pull the elements together, and this is one try. There is much inter-cultural tension in our

society, often not to do with events in Canada. Cultural issues that definitely are Canadian relate to the relationship of Quebec to the other provinces, and to the very important issue of reaching a productive and honourable settlement with our Aboriginal citizens.

Much of the background for this issue comes from the Toronto Star.

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