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*Le grand débat sur la compétitivité
canadienne ... et les collèges ?*

La pierre angulaire du grand débat sur la compétitivité canadienne est l'apprentissage. Ce débat nous exhorte à bâtir un système et une culture qui misent sur l'apprentissage continu. Les façons de voir et de faire actuelles ne conviennent plus.

En nous basant sur l'étude approfondie du Conseil des sciences sur les stratégies technologiques dans quinze différents secteurs de l'économie canadienne, nous présentons les stratégies et les actions requises pour accroître nos capacités technologiques et notre compétitivité dans le secteur privé et pour en évaluer l'impact sur les collèges communautaires.

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Nommée présidente du Conseil des sciences du Canada en 1990, Janet C. Halliwell avait auparavant exercé les fonctions de directrice puis de directrice générale du Conseil de recherche en sciences naturelles et en génie. Elle a notamment été membre de la Commission consultative nationale sur les publications scientifiques, du Comité interministériel des grands projets scientifiques et du groupe international des organismes participant à l'étude du changement global.

**The Great Canadian Competitiveness
Debate ... and the Community
Colleges ?**

The Great Canadian Competitiveness Debate has «learning» as its cornerstone, with exhortations to build a system and culture of lifelong learning. The status quo is inadequate. Drawing on the intensive Science Council study of technology strategies in 15 sectors of the Canadian economy, this presentation will characterize the strategies and actions necessary for enhanced technological capability and competitiveness in our private sector and examine the ramifications for community colleges.

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Janet C. Halliwell was appointed President of the Science Council of Canada in 1990. Previously, she had been first Director then Director-General of the Research Council in Natural Science and Engineering. She has also served on the National Advisory Commission on Scientific Publications, on the Interministerial Committee of Major Scientific Projects and in international organizations concerned with the study of a changing world.

Conférence 3B2

Collèges
créateurs d'avenir

Colleges
creators of the future



Association des collèges
communautaires du Canada



Association québécoise de
pédagogie collégiale

Ladies and gentlemen:

The real challenge facing us today is **whether Canada will belong to the twenty-first century**. How strong is our will and do we have the right stuff?

In answering that challenge, your response is of particular importance.

You are in the centre of the vortex of change. You are an enormously important player, in what has been the most privileged country in the world.

Why important? - because as I will discuss - the road to the twenty-first century moves through the sparsely populated territory of "knowledge". This is your field; you have the mandate and the opportunity to play a central role. Yours could be the fastest-growing industry in Canada - certainly the one in the most demand!

And you are operating in what many have considered a privileged country - one of the world's most successful capitalist states. We have been selling our resources and living well off the proceeds. In fact, looking back over history you could almost define Canada by looking at the way we used to create wealth. Keith Spicer is fond of saying that we have created the world's most awkwardly-designed country: twenty-six million inhabitants scattered along a series of abandoned canoe routes! Will our resource industries be the canoe routes of the future?

This is the starting-point for my talk today. I'm going to explore the notion that the community colleges in Canada are poised for action; poised with latent potential! You have enormous opportunity and responsibility. Now, what have I left out of this picture?

The first flaw is that your moment of opportunity is fleeting. Canada is running out of time in which we can respond to the economic realities of a globalized economy that runs on the fuel of knowledge. Our traditional sources of wealth no longer guarantee continued prosperity. The second flaw is that we have a lot to learn; our educational institutions aren't functioning as well as they should. The third flaw is that Canadians have yet to embrace workplace-oriented training. If the Community Colleges don't rise to these challenges, they will be rapidly by-passed. And the flip side of my theme is this: we don't have a choice; Canada has no choice but to call on your help. Today's world does not stand still; countries either advance or collapse on the basis of their use of knowledge and skills.

I'm going to talk about this idea in two steps. First, I'm going to describe the world forces creating the intense demand for learning in all its dimensions moving from the high level issues to

the firm level. Next, I'm going to propose some conclusions from these trends, as far as Community Colleges are concerned.

First, then, the world around us.

Canada is in trouble. Our competitors are closing in. Some of the facts are startling:

- We have dismal productivity growth – our manufacturing productivity over the past ten years has been dead last among the G-7 countries.
- The use of knowledge inputs in many parts of the private sector is dismal. The technology strategies of our firms are simply not up to the level of their competitors.
- In some areas our economy is seriously short of technical skills – there has been a 30 per cent decline in enrolment in computer and engineering technology classes in the past five years; yet, in other areas, there is severe unemployment – further indication of the discordance between the functioning of our economy and the educational systems.
- In medium-technology products, we've run a consistent trade deficit; and
- in high-technology products, our performance is deteriorating.

In sum, we did better competitively in the 1950's and '60's than we did in the eighties.

What's at stake is nothing less than the livelihoods of our children, the levels of education we can afford, the health care we value, the kind of environment we cherish, and the social justice that has become a part of the Canadian heritage.

But I'll be the first to admit that the linkage between these deeply-felt needs and the word "competitiveness", is not easily grasped. This is not a subject that has gripped the public mind.

It is time we woke up.

There have certainly been some attempts to stir the sleeper. In fact, sometimes I think that the background noise from the "Great Canadian Competitiveness Debate" is causing people to tune out, rather than perk up. What has this great debate revealed?

Professor Michael Porter has been one of the most-quoted sources in this debate. He told us nothing new, but he gave us something valuable. He eloquently and clearly placed before us the cogent argument for change: change in the way we work and in the values we hold towards work. Let me spend a few minutes with Mr. Porter.

He did, after all, describe the environment your graduates will work in, in eloquent terms.

Porter said that Canadians are ill-equipped to respond to a rapidly-changing competitive environment. We are too set in the "comfortable insularity" of an old economic order; one that provided insulation from external pressures and fostered few internal challenges. We had a paternalistic government, protected market and lax individual and business attitudes. For a long time, this old order had provided well for Canada; it gave us the second-highest standard of living in the world. But times are changing.

Increasing globalization of trade and investment, accelerating technological change, and more rapidly evolving company and country strategies are creating a new order; a new competitive environment. On this fast new playing field, our competitive shortcomings are being pitilessly exposed. We tended to compete by offering low-cost natural resources, for example; but with the emergence of low-cost competitors and material substitution, we either change our resource industry strategies or move to a low wage economy. The old order discouraged efficiency and lost potential wealth; it sapped dynamism and saddled us with higher-than-necessary prices in the domestic market. Capabilities that are essential to success in the new order – science, technology, innovation and training – are not only in short supply; there are now real barriers standing in the way of developing them and deploying them in functional organizational structures.

Porter pointed a finger at Canada's unusually high degree of foreign ownership as a particularly daunting challenge but not necessarily a negative one. In the new age of global business, transnational companies are determining how to reconfigure their activities. They have to decide where to put their "home bases" and their "product line mandates". The fear is that Canada is in danger, not of foreign take-over, but of foreign pull-out. He urges Canada to make a number of changes so that both foreign and domestic companies will want to locate in Canada.

The key to these changes is ongoing improvement and innovation and a social environment that is attractive to investment. Although we are in a global economy, national differences do shape the patterns of competitive success. The question to ask ourselves is what are the key elements of the right national difference: "do we have the right dynamic environment for our firms?"

Once again, Porter captured current knowledge in an accessible form, characterizing Canada as exhibiting a frailty that jeopardizes its whole economic structure. Porter issues challenges to each sector. Governments have magnified industry's dependence on them, for example, and created barriers to upgrading through weak competition laws, high tariffs and government ownership of

firms. He is particularly critical of interprovincial trade barriers and ineffective procurement policies. **Labour** policies have paid too much attention to income support and too little to skills upgrading. **Business** has been too complacent, acting as if the economic free ride would continue forever behind tariff walls and too prone to blame governments. Our R&D structure is not well-aligned with requirements for upgrading; the links between publicly funded institutes and industry are poor, and the lack of qualified people is becoming a constraint.

The solution does not lie in spending more money. The solution lies in acting and spending differently - working smarter. Our challenge is to redirect government policies, company strategies and educational strategies to develop and build on our strengths.

In essence we have a doctor's view of a stubborn patient: we are overweight, our arteries are clogged, our muscles feeble from under-use, and - worst of all - our brains have atrophied. In a nutshell, we have to adopt a new regimen of exercise and challenge.

Hard on the heels of Dr. Porter comes the federal government's "Prosperity Initiative". Two papers have come out seeking to "stimulate a national discussion on the factors that determine our current and future prosperity". They are called "Prosperity Through Competitiveness" and "Learning Well, Living Well". With the patient having admitted to being sick, we should come to an arrangement on a cure.

The federal plans start off with a call to arms: Canada is less able than before to provide good, high-paying jobs. We have been slow in developing and using new technology; our record on training and education is not adequate; our domestic markets don't work well enough to promote growth; we are not linking suppliers and users of investment capital; and our sectors have difficulty working together.

The solution is that we need to adjust:

- firms need to improve productivity and develop new markets, with a stress on translating science and technology into products;
- people need to learn constantly, and be prepared for many careers; and
- governments have to establish a competitive environment.

All these reports deal with the issue of competitiveness at the level of the nation or the industrial sector. That's all well and good, you might say, but it's a bit far from my problems at the Community College level. Well, let me bring it closer to home.

The Science Council of Canada has contributed extensively and persuasively over time to this debate at a level that brings things closer to home – to the level at which specific strategies can be identified and you can start to see the relevance in your training strategies. Neither sectors nor nations actually compete, only firms do. It is ultimately at the level of the firm that notions of the linkages between competitiveness and careers must be understood. And it is at that firm level that the skills training an individual has received is challenged and put through its paces.

In a recent set of fifteen detailed studies on Sectoral Technology Strategies, we demonstrate that across a wide spectrum of business activity, the keys to competitive success are innovation and the timely identification and application of new technologies in a globally-focused organization. Moreover, the reports clearly show that the onus of this innovative activity is inescapably at the level of the individual firm and its management. Organizations that deal directly with these firms to supply them with "human talent" – organizations like Community Colleges – are in fact at the forefront of Canada's fight to be competitive! You are suppliers of the most important input – the intellectual resource. But you cannot be simply a reactive supplier; you must take a leadership role.

The first thing to appreciate is how firms become competitive – the new dimensions of competitiveness and hence what skills your students will likely need. It would also benefit them to know how their careers are likely to change, as firms adapt to competitive pressures.

Let me list some of the more important firm-level competitive changes under way today – and they are profound – as we move to the concept of agile production. Agile production is a total systems capability in which research, design, development, supply, marketing, distribution, sales and services are deployed in an integrated fashion to produce a greater variety of quality products and services more quickly and at an acceptable cost, all in a manner sensitive to customer demands and global trends. Let's look at the specifics.

1. There is a fundamental redefinition of the manufacturing company. It is no longer simply a site for production. Rather, it is a capacity to conceive of new ideas for products and processes – a place for thinking.
2. There is a change in the definition of a firm's business. Increasingly, the core business area is defined in terms of the functionality of the product, not the product per se. For example, a product line can be seen as new materials rather than steel. Rivalry is leaking in from outside traditional "industry" groups, and firms must take care not to be "blind-

sided" by developments in other fields - the so-called invisible competitors.

3. Competitive firms increasingly measure themselves on their inherent human abilities or core competencies, not on the final product that comes out of the factory. The core competency of the firm involves the collective knowledge embodied in the people within the firm, especially as it relates to their ability to coordinate and integrate various skills and production technologies.
4. The emerging mode of lean production (as compared to mass production) employs flexible people and flexible techniques that cope routinely with change. Intellectual capacity is effectively deployed throughout the organization.
5. Firms are adding value beyond the discovery of ways to cut costs; they are gaining advantage through product sophistication, quality and linkage to others, rather than simply cost.
6. Major changes are taking place in technology development. It is increasingly being driven by consumer expectations and demand. Response to consumer demand is vital.
7. Change-making new technologies are increasingly the result of the fusing of different technologies, rather than simply technological breakthroughs.

Underlying all this, the organization of companies is undergoing profound, but often slower than expected, change as a result of the implementation of information technologies, and only the tip of their potential is being felt today. Here we have to deal with social change as well as technological change.

The character and pace of the world economy are being changed and this is where "agile" firms must function. In the past fifteen years, the world's economy has grown faster than the rate of consumption of raw materials. Much of this new growth rises from trade in knowledge-intensive goods and services. This knowledge-intensive work is being done on a global scale. The foreign direct investments of technology-intensive multinationals have themselves grown three times faster than world trade. And an expanding share of this world techno-trade reflects temporary advantages that result from shifting leadership in technology niche areas. In this new world of innovation, classical trade theories that hold technology as a "static endowment" have little to offer.

For the first time in history, a nation's limits are being set by mental attributes. We are living in a time when dreams have value. The size of our vision today determines the size of our pocket-book tomorrow.

So - we need intellectual capital.

Ideas obviously move faster than things. Traditional concepts of competitiveness are concerns for economic growth and current investment, and trade - the ability to meet the challenges of current international markets. But Canada's performance in these areas must be evaluated over time and in terms of the new, emerging dynamics of world trade. Research, technology and innovation are three of the more powerful dynamic forces.

So - the time dimension is important; research, technology and innovation are key.

Competition today is about managing our changing sources of wealth and well-being, and these are becoming elusive. We are placing an emphasis on elements that are ephemeral or at least human; we are saying that industrial planning is planning for people. As capital and technology flow freely across borders, it is the people and their skills which become the irreducible core of a nation. Their attributes - their vision, their leadership, their drive to excellence - embody the competitive opportunity for Canada.

So - to summarize, we need people with talent and vision in deploying technology in a dynamic world.

There is one final point about this process that will affect your students: the transformation to a "learning" culture is happening faster and faster.

Ninety per cent of all the scientists and engineers who ever lived are alive today. Their discoveries touch every part of our lives; they have resulted in a world where knowledge and its applications are the most sought-after commodities. And every five years or so, the total amount of world information doubles. The sum total of all human knowledge amassed throughout history to 1992 is only one percent of the information that will be available to the next generation in the year 2050! Managing this snowballing of our knowledge base makes information technology a key asset. More and more people are being brought onto the global network every day. And technology is tacit. It is vested in people, not in paper, and is cumulative. With knowledge, workers are not easily replaced. This puts a premium on knowledge, and on those who teach it.

The hands of the clock of technological change will continue to spin faster and faster. There is no inherent "friction" in a knowledge economy - there is nothing to slow it down.

Or perhaps there is. Canada is not paying enough attention as a society to the role of education. This is the fuelstock of a knowledge economy, and we have cause for worry.

Again, the facts are startling. At the most basic level, illiteracy is rampant. We have 25-30 per cent of high school dropouts. Fifteen per cent of our high school graduates are functionally illiterate. Worst-case scenarios developed in the United States estimate that, by the year 2000, 70 per cent of all adults will be functionally illiterate. We have not been in a worse situation since the invention of printing itself. Only 100 years after Gutenberg produced the first printed book, half the population of Europe had developed some degree of literacy. It has taken us only a few decades to retreat to the cultural level of the Middle Ages before Gutenberg.

This is saddling our entire society, including business, with an unprepared workforce. A 1990 study found that more than half of the high technology companies surveyed said they had difficulties in recruiting and retraining scientific and technical staff. One-third reported the same problems with skilled trades workers. By way of contrast, in the new economies of Asia, bus loads of young schoolchildren eagerly tour companies, on a regular basis. They develop a sense of excitement about working in business.

I believe that a supreme, across-the-board effort is needed to re-focus our human energy for national survival. The economist Robert Reich has a book out called the Work of Nations. He puts in perspective the kind of total effort we need to make to get ready for the Information Age. To quote Reich:

"The real economic challenge facing the United States in the years ahead - the same as that facing every other nation - is to increase the potential value of what its citizens can add to the global economy, by enhancing their skills and capabilities and by improving their means of linking these skills and capabilities to the world market...[we need] to encourage new learning within the nation, and to smooth the transition of the labour-force from the old industries."

This means that education becomes the number one job in the nation. It means we need educators in our factories, our service industries, our health care facilities, and in almost every other sector in addition to our schools. Our nation becomes a school. Our students are in fact all our citizens, in every community. And making the key connection between the citizen and learning, the student and the workplace, should be the nation's Community Colleges.

In the new knowledge economy the linkage between consumer and business, private individual and corporate citizen, grows tighter all the time. The linkage lines should be particularly strong in the institution designed to bridge, through education, the citizen and the workplace - the Community College.

To bring things to a useful starting-point, I suggest that we look at the present users of your services, your students. Can we detect any patterns that would lead to a "customer preference" for Community Colleges as the "point of contact" with the knowledge world?

First, you are well aware that our citizens, by and large, seem to be realizing that more education is a good thing. The recent Profile of Higher Education in Canada noted that more than half of the 25- to 44-year-old population group has reached the post-secondary level today. This is a considerable change over the situation a generation ago, when only eight per cent of this age group had continued their education beyond high school.

Perhaps this is due to the fact that some of the economic realities of the knowledge economy are starting to sink in. Let's talk about that status symbol of the 1990's - a job! People are realizing that the higher the level of education today, the lower the rate of unemployment - four per cent for people with post-secondary education, versus 18 per cent for those without. Further, the higher the level of education, the higher the salary - and the faster the salary grows!

Finally, we are heartened by the fact that the number of college diplomas granted has doubled since 1970. Almost three-quarters of those were in career programs, emphasizing that students are very interested in the business interface.

On the down side, while university enrolment has continued to climb, college enrolment has levelled off since the early 1980's. This tells me that there is a problem; the Community Colleges are not the first-to-mind choice of knowledge-hungry people. Why is that? You have likely spent much of this conference examining this issue. But I would like to draw attention to the Economic Council's recent publication A Lot To Learn.

As I've been dealing with "competition", I'm going to re-cast its findings in competitive, almost industrial, terms. If you were to momentarily consider yourself as producers of education, we could judge your product by looking at your performance rating. What is the "customer satisfaction" rating for your delivery of "coping skills"? You would want to ask both your customers - the students - and your end-users - the business organizations that do the hiring. You need to be able to get from these groups a firm statement of "benefits delivered".

The first realization is that the task of asking the question is extremely hard. The Economic Council found out that the linkages between the customers, the education producers, and the end-users were fragile. Canada lacks institutional mechanisms to ensure that labour-market signals are clearly understood. This applies equally to the students taking the courses, and the institutions in charge

of "delivering" the expertise. Further, there seems to be a lack of coherence in the learning continuum. That is, there are few clear pathways between vocational schools, colleges, and apprenticeship streams. Students suffer from accreditation programs that are not transportable, and lose linkages between the various elements.

While information is sketchy, there is evidence that there is room for improvement on behalf of both customers and end-users. As far as the student "customer" is concerned, some facts point to a less-than-perfect fit in preparing people for the real job market. The Economic Council's figures on apprenticeship programs show that, of the 84 occupations studied, only two occupations could be considered as having a "good" correlation to labour-market demand conditions. This suggests that insufficient effort is being made to synchronize the supply of apprentices with the demand of employers for occupational workers.

Another "satisfaction" index, albeit indirect, comes from the success of rival institutions such as private-sector vocational colleges. While their fees are relatively high, they typically graduate students in a shorter period of time, so that foregone earnings are minimized. In addition, these private colleges boast a significantly higher placement rate.

For the ultimate "user" community, the satisfaction level can be improved. The business community is getting more vocal about the shortcomings it sees in its potential employees. More than half of the companies in one survey reported problems in recruiting and retraining professional, scientific, and technical staff; a third reported similar problems with regard to skilled labour.

It is obvious that the "fit" problem demands solutions from both education producer and end-user client. Business must be clearer about its needs and expectations. But business is not all-knowing, and may not have the vision needed to see the changing needs in respect of human resources. This is a great opportunity for the Community Colleges. The way is clear: you can become the nation's leading experts in the design and filling of career openings for your clients. You are in a position of potential power.

This requires you to lead, not react. It needs intellectual leadership to be able to forecast trends, interact and forge even tighter partnerships with the business community, and take the necessary steps to ensure the value of your "product" - new entrants that have the critical skills and flexible aptitudes for the job market of tomorrow.

It means taking new approaches to alleviate customer concerns. One of the findings from the Economic Council, for example, was that vocational programs are held in disrepute.

Why not leapfrog this concern by offering employers a guarantee of consistent standards. Graduates of your institutions could be rated at some appropriately high level of quality. You would have a reputation for producing gold!

And take the issue of matching the employment positions with qualified graduates. Some of you are doing this now, but it seems to me that the Community College that goes the furthest to plan and implement courses, in direct collaboration with local employers, will have constructed the ultimate product - a person with the skill and capability mix for the local market. You should be in demand from both students and business - both sides of your pipeline!

What I am really saying is that your "business plan" can match, indeed influence, the innovative spirit of the knowledge economy itself. Get in front of the needs of your market.

When you have established your satisfaction leadership, you need to guarantee that you stay in front. You need to ensure your courses recognize the changing forces that concern your end-users. Let me re-cap the Science Council's competitiveness dimensions, adapted for educational implications:

1. production facilities as a place to think?:
Beyond a specific skill or vocation, teach students how to think inventively; teach them the core skills of analysis and problem-solving. Their brains are the tools of tomorrow.
2. threat of being blind-sided by other fields?:
Prepare your students for the fact that they will be in a constant learning mode throughout their career - and that it can be rewarding and fun. What's more, insist they consider some general courses addressing overall trends in other fields.
3. core competency is the main strength, instead of product line?:
Assure your students that the best defence against being laid-off is to contribute to the expansion of the firm's knowledge - perhaps with the continuing feedback and help of the local Community College!
4. lean production with multi-skilled workers?:
Encourage students to master more than one skill, and be mentally flexible enough to switch assignments rapidly. They are no longer learning a craft, a trade or a vocation; they are learning how to learn a craft, a trade or a vocation.
5. cost efficiencies no longer the main event in value-added production?:

Emphasize creativity and a commitment to quality. Provide some creative courses in product enhancement, market research and customer contact.

6. consumer expectations driving demand?:
Winning businesses will be those with employees that are trained to search out customer expectations. This is a global scramble for customer appreciation, so students must be aware that their job competitors are not only sitting at the next desk; they are designing products a continent away.
7. leading technologies coming from a fusion of different disciplines?:
Advise students to expand their networks of interest, perhaps through "synergy" conferences at the Community Colleges!

Instant access to information and control of knowledge means that each individual has more capability than ever before. Ensure all students are self-starting, self-bossing knowledge workers through information technology!

At the end of this process, the Community Colleges should aim to offer the most transforming experience available, one driven by concern for organizational competency and adaptability in a competitive world. Further, you will be able to address the positive side of innovation. Your students will be aware that technology and change means more than increasing efficiency. If increasing efficiency is the only goal, then cost-cutting measures will inexorably squeeze all the jobs out of the production processes.

Competitive innovation, and careers based on it, means more than that. It means concentrating on the idea that prosperity depends on using innovation for job creation. It means that your graduates and their colleagues have to be trained to look for new opportunities, new products, new potentials. Only by using innovation for growth, not efficiency alone, can we prosper.

Let me end with an observation of Canada's own Marshall McLuhan. He said that the future of work would consist of people who learned their living!

This is absolutely correct, and very profound. Canada's Community Colleges are in the "futures" business - and it is a future of learning and "learning a living". You are poised for action, and Canada desperately needs your participation.

Thank you.