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**Savoirs, savoir-faire, savoir-être:
in praise of professional wroughting and wrighting**

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A think-piece designed to provoke discussion
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An inquiry into the future of British Columbia's post-secondary education system.

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On the nature of a think piece

A think piece (like an *essai*) is a very particular genre. It is meant to put forward an argument and to develop it to its logical conclusion with as few flourishes, flats and sharps as possible, even at the risk of making the point bluntly and forcefully. As such, this sort of piece is meant to provoke reflection, but also to generate positive and negative reactions from the readership with a view to breaking out of the box of conventional thinking, and to producing innovative avenues that might not have been explored otherwise as fully as they should have.

This genre demands that one walks a fine line between cluttering the text with copious clarifying notes to ensure that the message is precise enough, but running the risk that the general flow of the argument might be lost or diluted; and providing sufficient evidence in support of the argument and reference to the body of works that would appear to bolster the case so as to make the argument credible and not simply a groundless fantasy. The reader must also get some help in proceeding to the next step if he/she so wishes. Consequently, I have avoided footnotes and provided only a short selected bibliography.

The crucial role of the think piece is to generate discomfort, and to initiate an intelligent conversation. It is hoped that this paper will do just that. But if this piece should not generate vibrant discussions and rich multilogues, the interested reader should feel free to continue the conversation with the author whose coordinates are available on his website www.gouvernance.ca

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Preamble

It is difficult to prepare a reflective piece on a domain as vast as “technical skills and trades training” for a commission reviewing the state of the postsecondary education system (PSES), without being selective about the aspects of the question that deserve particular attention. And any such selection is not innocent: it reflects one’s own presumptions on the subject.

For years, I have been bemoaning the reductive turn that higher education in Canada has taken: a turn to content-free methodism, based on a disembodied form of literacy and numeracy, and taking more and more distance from a broader approach that would allow for the full use of the whole range of types of perceptions and knowledge, the improvement of skills, and the personal development of the individual. The emphasis has been more and more on *savoirs*, to the detriment of *savoir-faire* and *savoir-être*.

In the university segment of the PSES, this has become the dominant trend, except in certain professional schools that have maintained a more balanced approach.

This truncated approach to education has sanitized the programs and led to an over-emphasis on certain types of knowledge to the detriment of others. Half a century of such programming has also led the citizenry, at least in North America, to assign a higher status to such an approach, to the point that it has come to be regarded as “nobler” and “superior”. The result has been an under-emphasis on the development of other types of knowledge (like those imparted through technical skills and trades training), and to a general impoverishment of the PSES.

This paper argues that (1) broadening the range of intellectual endeavours to include more emphasis on technical skills and personal development, (2) extending the range of partnerships to include more effectively the contributions of external partners from the public, private and social sectors, and (3) ensuring both a stronger support for the technical skills and trades training sub-sector and a greater degree of genuine collaboration among those various branches, avenues and approaches – will immensely improve the PSES.

This will require a triple revolution: a revolution in the mind of the citizenry so that it will develop a better and higher appreciation of the different types of knowledge generated by an ideal PSES, and of the high quality human capital they all generate; a revolution in the social architecture of the PSES to ensure that it is not allowed to crystallize exclusively along disciplinary lines, because the world is not constructed that way; a revolution in the artillery of incentive reward systems likely to ensure not only that the PSES will develop a full range of programs to make the highest and best use of the full range of citizens’ abilities, but that it will also construct multiple bridges among all of them, and draw fully on the whole complement of potential contributors to this enterprise.

This is an oblique way of dealing with the technical skills and trades training issue, but it appears to me to be the only way to deal with it effectively at this stage. Accepting the present partitioning of the PSES is tantamount to banishing technical skills and trades training to a marginal role. It deserves better. Consequently, one has to attack the PSES “class system” frontally and replace it with another partitioning, based on a better appreciation of the whole range of useful knowledge, of the limitations of the ladder of abstraction, of the centrality of percepts (and not just concepts) and of the required focus on the development of the citizen as “reflective practitioner” (Schön) – someone not only “educated” through the memorizing of disembodied principles, but through the improvement of habits of perception and a better capacity to become an explorer of his environment. This would not prevent academic or other hyper-specializations, but it would not make that the norm. With this new approach, the quasi-apartheid in place would most certainly be challenged, and the high-value and complementary nature of the different types of knowledge would be re-asserted.

Only in this oblique way can “technical skills and trades training” sub-sector re-acquire its lustre.

The new world of information technology has already provided a launching pad for these revolutions. The challenge is to generalize these initiatives.

“To prescribe methods automatically blocks the development of better methods”

Jane Jacobs

Introduction

Education (*stricto sensu*), training, and personal development are capital goods whose “just price” is difficult to gauge at the time of buying. The just price worth paying is the discounted value of the streams of benefits of all sorts, over one’s lifetime, that can be derived from buying or acquiring such capital goods. Since one never knows for sure what one will be confronted with in life, it is difficult to know in advance what one should invest in: skills? basic knowledge? character-building? a mix of them? Should one learn to speak another language, or how to swim, or take another few courses in physics?

Given this framing of the question, the argument has often been made that education, training and personal development should be as general as possible, so as to be of use in the widest possible range of circumstances. On this basis, literacy and numeracy are often presented as fundamental necessities in primary and secondary school.

But, *a contrario*, since specialized and therefore specific knowledge is greatly valued because it is purported to yield extremely high benefits if one invests in the right specialized knowledge base, there has been an equally strong tendency to develop very narrowly-focused in-depth pursuit of certain disciplines, skills or traits. This specialization has begun to erode the secondary school’s “liberal education” curricula, but it has mostly challenged post-secondary education where choices become agonistic.

This dilemma is made all the more acute by the fact that the right mix of education (*stricto sensu*), training, and personal development that goes into the production of successful human development is somewhat ill-defined. In most professions, the three components are extremely important: a surgeon, an architect, an orchestra leader, a mechanic, an engineer, a designer, a lawyer, or a social worker must draw heavily from *all* these sources to be successful.

In many other areas, however, it has been argued that the full complement of these components is not essential. This is a view that, personally, I have some difficulty with. In most successful activities, it is difficult not to find the confluence of knowledge, skills and character – even though many observers are prone to occlude the importance of diagnostic skills in the work of a good mechanic, or manual dexterity in the work of a surgeon, or perceptive skills in the work of an internist, or empathy in the activity of a social worker.

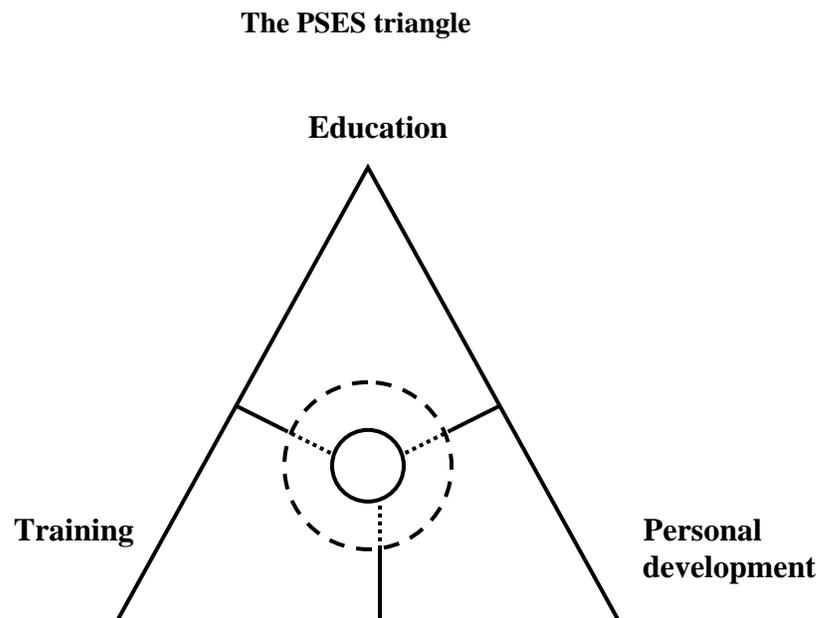
The post-secondary education system (PSES) has a variety of functions in society: to produce ever more literate and numerate, active and responsible citizens, to develop the human capital necessary for the maintenance and enhancement of the country’s competitiveness and living standards, to develop perception, mind and ability, to facilitate the entry into the labour market, to supply an adequate mix of knowledge, skills and personal development to students, etc. Educators, trainers and developers (as crucial producers of PSE) have suggested different strategies and emphasized different approaches to this multiplex task.

Educators have traditionally focused on general principles as a way to teach students how to think critically; trainers have focused on imparting skills and abilities that cannot be transmitted without focusing on schemata that are highly specific to the task at hand; personal developers have taken the view that knowledge and skills can be developed only on the basis of a capacity to grow as a human being within the community to which one is acculturated.

Few institutions have chosen to focus exclusively on one approach over the others. Most have elected different mixes of activities, while emphasizing one dimension or another. But most have not developed as rich a meshing with the other approaches as they should have, nor have drawn as much from the expertise in the external environment as they should have. Even institutions that have privileged co-op education have often managed the internal-external interfaces rather shabbily: not ensuring that what should be acquired through work experience actually is.

To map the PSES, one might imagine a PSES triangle with each of these views at one of the apexes, and most PSES institutions and practices located within this triangle, according to the relative importance they give to each of these three pillars (see Figure 1).

An inquiry into the future of the PSES is a golden opportunity to get an appreciation of the current state of affairs, to question the assumptions on which the present system is built, to speculate on a desirable degree of *metissage* for the PSES, and to explore ways to mobilize all those external and internal partners who have a portion of the information, resources and power (in the private, public and social sectors) and to coordinate their efforts to make the PSES more efficient and more effective. Good governance is based on effective coordination when power, resources and information are widely distributed, and such is the case in the PSES.



Knowledge gaps, apartheid and governance failures

Despite important disagreements about what the best post-secondary education might entail, some fairly standardized version of the system has emerged throughout the country. Although there may be doubts about the effectiveness (doing the right thing) and efficiency (doing it right) of the system in good currency, a bizarre quasi-unanimity and uniformity has emerged across Canada.

A rationale for not raising too many questions about its optimality has evolved through the mutual accolades required by the programs accreditation process. These have ensured some convergence toward the system in good currency, and provided some assurance that it would be properly policed. This forced convergence becomes particularly evident when universities seek permission to grant graduate degrees and must, in the process, satisfy the standards and norms imposed by older and more established institutions.

A few professional schools have strived to maintain a balanced curriculum among the three components, but the link to skills and personal development in universities has become more and more tenuous. This tendency has not only unduly sanitized the academic stream of much valuable contents, but it has often also disconnected the student from other sorts of knowledge and thereby constrained learning considerably.

In community colleges and technical schools, the narrow emphasis on technology per se has considerably weakened the broader ambitions of technical skills and trades training, and students often graduate without all the knowledge, skills, and personal assets that would provide them with the ability to successfully pursue their chosen careers.

Moreover, the tight compartmentalization among the different sets of institutions in general in Canada has prevented the emergence of appropriate *metissages* of these complementary knowledge bases, even when it has become clear that such a mix was desirable in many issue domains. Thus many students (in search of a suitable mix), having completed a degree or diploma at one type of institution are forced to waste valuable time acquiring another degree or diploma from a different type of institution when a mixed program would have been ideally suited for them.

The above diagnosis must be significantly modified when one deals with the British Columbian PSES. This is the place in Canada where the above indictment applies least. In BC, the bifurcation between universities and colleges is certainly large at the governance and structural levels. Universities and colleges are governed by separate acts, and there are no structures that bring the governance bodies, or institutional administrators and leaders together. There is also a third sector, the university colleges. Each of these groups—universities, colleges, and university colleges – fund and maintain separate provincial secretariats for the purpose of political advocacy and government relations.

Notwithstanding the above, there is probably much more integration of courses and programs in BC than elsewhere in Canada. All BC community colleges offer the first two years of university programs, and these first two years are fully transferable to all BC universities. BC's university colleges offer the third and fourth year of a wide variety of degrees, and, in 1995, they were all given independent baccalaureate degree granting authority. In that sense, opportunities for learning skills but also for some *metissage* exist at all BC university colleges and community colleges, given that many are offering not only technical and trades training but substantial academic programming in an integrated and articulated fashion.

Moreover, the British Columbia Council on Admissions and Transfers (<http://www.bccat.bc.ca>) is a world model in establishing course transfer agreements between institutions. All BC PSE institutions, including a number of private sector ones, are included in the Transfer Guide. The Transfer Guide lists thousands of courses offered at BC PSE institutions and defines their degree of transferability (in specific course numbers) to all other BC institutions. These determinations are brought about through annual, discipline by discipline, articulation meetings that bring together representatives from all institutions.

Finally, there is strong government support for private post secondary education providers in British Columbia. The Campbell government has done a great deal to facilitate the development of these providers (flexible legislation and the appointment of a senior bureaucrat within the Ministry of Advanced Education with this portfolio).

Consequently, while the general points made in the next section are still valid, and much more can be done to provide the optimal degree of integration, more progress may have been made in BC than elsewhere, and the argument in BC's case is more about improving a situation that many regard as good than trying to break down barriers among watertight compartments. Yet, much remains to be done in a world where some sense of apartheid still prevails in the mind of the citizen.

(1) Balkanization

a. One of the basic assumptions on which the present PSES is built in Canada in general is the reasonableness of the partitioning of the system into strands of programs and institutions purported to cater to entirely different categories of students, and geared to different "types" of intellectual accomplishments (the academic and the training stream; the secular and the religious institutions).

As we mentioned above, this may be much less the case in BC than in the rest of Canada. What BC has accomplished is a significant loosening of the apartheid on the supply side: the necessary conditions for much mobility and flexibility have been put in place. But it does not suffice to ensure full use of these possibilities, the optimal mix of *savoirs*, *savoir-faire* and *savoir-être* in the programs, and the highest and best use of the extramural knowledge base.

Another assumption is the conviction underpinning the intelligentsia's celebration of the secular academic stream that this is the *voie royale* approach, leading to superior education while the other colleges are purported to provide inferior if not inconsequential intellectual endeavors (whatever the outcomes might be). Again, while this perception may have been attenuated by some degree of potential *metisage* in BC, the "university" brand name remains quite important.

I have heard it said by members of the "university elite" that TRU (Thompson Rivers University) is not a "real" university because it trains mechanics. This is a measure of the "snob effect" in good currency but also of the uncurious and poor appreciation of types of knowledge other than those privileged by the *inner sanctum*.

According to these assumptions, there is something fundamentally different about these streams: the educational purposes, the nature of the learning processes, the clientele for which the programs are designed, and the basic intellectual abilities of these clientele. This has led to a quasi-apartheid regime that has kept these sub-systems more or less effectively disconnected from one another, and has produced a fractured and dysfunctional post-secondary education system.

This broad consensus stands in contrast to the alternative way that would aim at creating more mixed institutions located at the inner core of the PSES triangle (see figure 1), and better connecting with the world or professionals outside the PSES institutions..

As for the disconnect between the world of the PSES and the real world of practicing professionals and the rich world of work, it has been bridged in part by co-op education, but that provides limited exposure for a minority of students when it should be an integral part of most students' experience.

Over the last while, there has been a higher degree of specialization in PSE institutions (traditional secular universities, religious colleges, community colleges and training schools) and a drift of different institutions toward emphasizing one or the other of these priority approaches. This has meant a certain division of labour among institutions (private, public and social) but has also often meant an impoverishment of the education/training/personal development *mix*, whatever the quality of the segment the institution chose to emphasize. The result has been some erosion in the capacity of the PSES to produce well-rounded "reflective practitioners" (Schön).

b. The professionalization and the unionization of the PSES have somewhat hardened the barriers to cross-fertilization among the different types of institutions and between "insiders" and "outsiders" in much of Canada. Various actors have either been excluded from the process of production in the PSES or have excluded themselves as a result of these barriers.

Given the growing celebration of credentials, the monopoly on the granting of degrees (a privilege bestowed by the provincial governments) and the extraordinarily defensive stance of provincial governments in allowing private institutions the privilege to grant degrees have also had a Malthusian effect on the system. While BC stands as immensely less Malthusian than the rest of the country, and Quest University has made the point that one can break even into the inner sanctum, the BC position stands as the exception rather than the rule. One can only imagine what the Canadian PSES might look like if such barriers to entry did not exist.

Moreover, there has been an ever greater exclusion of practitioners from the teaching function at universities (much less, fortunately, at the community college level, but it is bound to grow with creeping credentialism). This makes it more difficult to provide the right mix. Again, while this is less true in some professional schools and for BC as a region (at least in principle), this has tilted the PSES toward the pure education apex and has excreted from programs much that could be provided only by practitioners.

Consequently, there has been a growing chasm between what is happening at school and what is happening in the workplace.

This has had a dual effect: firms themselves have had to do some of the training needed for the employee to be operative, but the employers have also developed a growing disinterest in truly cooperating with educational institutions, except in crass self-serving ways. When firms run into serious manpower shortages in certain skill categories, they often realize that the sort of training available in the PSES is so inadequate that they need to get into the training business themselves.

In Canada, the contribution of the private sector to the PSES remains a fraction of what it is in the United States and Europe, but it is expected that the inadequacy of the existing PSES is bound to generate much greater interest in the future.

This chasm has been identified and taken advantage of by a growing variety of private and civic institutions that have attempted to fill specific gaps in the PSES: languages, informatics, etc. The growth of this parallel PSES has been somewhat chaotic and its unregulated nature has led to many scams, but the demand is so great for a product different from what the official system offers that citizens are willing to take their chances. While up to now these parallel institutions have tended to specialize on very narrow technical training, there are reasons to believe that they will soon become more ambitious. Again, BC stands as having taken a more liberal stand than most other provinces and as having done a great deal to facilitate the development of these providers.

There have been some creative and successful efforts to somewhat integrate the academic and trades/technical streams in BC. At the very least, one might say that structurally, much has been done in BC to facilitate such integration. How much is effectively done to overcome the high degree of imperviousness that tends to develop among streams and programs must be evaluated.

Let it be said that BC is far ahead on this front than other regions of the country. An illustration of the backwardness of “practices” elsewhere in Canada might be a recent case (in Ottawa) where the same course using the same textbook was given – at a university and a community college – by the same professor (a university professor moonlighting at a community college), but where a student trying to transfer from the community college to the university could not obtain credit in the university program for the course taken at the community college.

This multiplicity of blockages (among institutions, between the institutions and the professional practitioners, etc.) has balkanized the field in Canada and prevented the development of truly integrated programs (except again in certain professional schools and most certainly at the structural level in BC). This has contributed significantly to the perpetuation of the view that this is an either/or option, and not a more-or-less choice, and to the persistence of the cultural devaluation of the non-academic education.

Much of this cultural devaluation is based on a flawed notion of knowledge acquisition and learning but has been exploited by governments to rationalize a funding of community and technical colleges at a much lower level than universities. This in turn has generated hiring practices at the community and technical college level that have been stigmatized as “inferior” by the credentialism scale in good currency. It has become a self-fulfilling prophecy that indeed the non-academic stream could be regarded as inferior.

Unless one revisits the basics of knowledge acquisition and learning, it may be difficult to challenge these presumptions.

(2) Percepts and concepts

This evolution of the PSES would appear to have been derailed by some flawed presumptions about knowledge acquisition. Two of these are the beliefs that (1) superior intellectual achievement is built on content-free principles and methodologies – methodism – acquired through the ladder of abstraction and (2) knowledge flows one-way from underlying disciplines, to applied science, to actual performance.

Both these propositions are false. Knowledge acquisition and learning do not flow solely by climbing the ladder of abstraction, but also emerge from a two-way approach emphasizing knowing-in-action/reflection-in-action, where knowledge emerges from groping with situations, and from surprises leading to on-the-spot experiments and knowledge-creation.

From this flawed view has emerged, as a corollary, a systematic social devaluation of other forms of knowledge acquired through experience, learning-by-doing, and the like, and the sense that such “knowledge” could not be as sophisticated as what came through the ladder of abstraction. From this came natural repugnance at having a bright child follow that route.

Even if these presumptions are ill-founded, they constitute deep-rooted beliefs. So they must be effectively attacked and undermined, because otherwise it will be impossible to effect a social re-valuation of these other types of knowledge.

a. Cognitive science has already begun this debunking work. It casts doubt on the idea that there are any general or transferable cognitive skills. It has shown that critical thinking does not evolve from content-free principles and methodologies, but from procedural and substantive schemata that are highly specific to the task at hand. Developing a human being is ensuring that he or she acquires a fair number of these schemata (Hirsch 1987).

The development of this basic currency (capacious and vague but fundamental to communicative competence) cannot be ensured by disembodied principles in the manner of the traditional curricula, or through skill-building in the manner one uses to coach an athlete to success. Facts and skills are inseparable, and background knowledge is of great import in the development of critical reason.

Therefore the accumulation of proven knowledge (by memorization of established associations, rules of classification and logical inference, and by students being taught to distrust their personal experience as a guide to knowledge) does not suffice. An effective educational system depends on the perception and experience of the individual, on the training of attention, and higher studies are meant to provide aided modes of apprehension or extraction of information (by means of instruments of metric knowledge; by means of language to make knowing explicit instead of tacit; and by means of pictures to extend perceiving and consolidate the gains of perceiving).

In this Heider/Gibson/Emery “ecological view” of cognition, knowledge is only restricted by our habits of perception, and one may and must educate the student’s perceptual systems. This entails recentering education on the process of searching, on learning to explore, because the weight of evidence is that even literate adults find it difficult to use their own perceptions.

This approach may be summarized as follows:

- the act of picking up information is a ceaseless activity
- what are perceived are places, objects, substances, together with events which are modifications of these things
- information is the specification of the observers’ environment
- the perceptual system is a mode of overt attention: it can explore, investigate, adjust, optimize, extract
- the perceptual system registers persistence and change
- information pick-up can be developed and learned: better extracting, exploring, etc.

This new theory of active perception has educational implications:

- access to information is limited only by habits of perception
- perceptual systems can be improved: this is “an education in *searching* with your own perceptual systems, not an education in how to *research* in the cumulated pile of so-called social knowledge” (Emery 1980:29)
- education is “learning to learn” from our own perceptions.

While the usual PSES insists that it must produce “disciplined intelligence...that is trained in logic and logical analysis”, a much broader approach is suggested by a Heider/Gibson/Emery view that covers a variety of types of “thinking”: logical, practical, lateral, including “*penser avec les mains*” (de Rougemont 1936). And this latter view of the world of knowledge acquisition and learning has an immense importance for the question at hand: it underpins a new educational paradigm emphasizing the import of the training/personal development dimensions (both as complementary elements in the education process, and as a sound basis per se for an alternative learning experience). Table 1 gives a synoptic image of this new world.

b. The motto of Caleb Gattegno used to be that “teaching should be subordinated to learning”. If learning is presumed to be dependent on the ladder of abstraction and the senses are regarded simply a medium through which inputs have to be transformed into mental concepts to be a source of learning, it is easy to see how much of the teaching is going to be perverted toward the sort of activities that characterize the traditional paradigm.

It is only when one accepts that percepts are the direct way in which one extracts information from the environment and learns, that the focus shifts to developing the mechanisms of perception and to nurturing the direct processes through which one learns. All the senses then are means of perception that may be mobilized, and are in the education of the reflective practitioner and in the world of apprenticeship and practical knowledge.

The difficulty with the rehabilitation of practical knowledge and knowledge based on something else than the ladder of abstraction is that it goes against the grain of what has been in good currency since Locke. The emphasis on percepts, and not just concepts, is based on a growing recognition that the perceptual systems have survival value, and that there is no need to force all our knowledge into a mentalistic framework (Noë 2006).

Young children learn how to speak a language through extraction of information from the environment, without any use of the ladder of abstraction. They perceive invariant relations and distinctive features. And Caleb Gattegno has developed a method of language teaching going back to these principles. What we find in both training and personal development is a much greater emphasis on percepts than concepts: in that sense the measure of the IQ as a gauge of intelligence is rather awkward for it measures not intelligence at all but a capacity to deal with abstract similarities. A high IQ does not indicate an ability to behave intelligently outside the narrow world of academic scholarship.

Percepts are tools of exploration: they are the instruments through which serial-genetic concepts (i.e., concepts developed through the serial order generated in nested spatio-temporal events) emerge through becoming aware of invariants. Such learning is central to training and the development of *savoir-faire*. And the perceptual system is capable of acquiring greater capacity to extract information. This is a skill. Percepts are fundamental in developing a different kind of knowledge that we will later call “delta knowledge”, and such knowledge is central to the dispatch of complex tasks that cannot be easily reduced to routines.

There is no reason to believe that the knowledge acquired via the traditional paradigm is “superior” to what is made available via the ecological paradigm. Consequently, there is no reason to dismiss the non-academic stream as “inferior”. On the other hand, this alternative way of learning is not necessarily well managed/governed at present. Indeed, when the technical skills and trades training institutions attempt to emulate the academic schooling, and to get students to master unnatural tasks of abstracting and inferring with symbol systems, rather than making direct use of the percepts, the result is often dismal. It would produce a very poor professional.

Table 1
Two educational paradigms

	Traditional paradigm	Ecological paradigm
The Practice		
Object of learning	Transmission of existing knowledge; abstraction	Perceptions of invariants discovery of serial concepts
Control of learning	Asymmetrical Dependence: teacher- students, competition of learners	Symmetrical dependence of co-learners, cooperation of learners
Coordination of learning	School/classroom calendar, class time- table	Community settings synchronized to and negotiated with community
Learning materials	Textbooks; standardized lab experiments	Reality-centered projects
Learning activity	Paying attention; memorizing	Discrimination; differentiation; searching; creating
Teaching activity	Lecturing demonstrating	Creating and re-creating learning settings
System principle (Abrams 1953)	Pedagogy: “the mirror”	Discovery: “the lamp”
Personal development	Conformity; divorce of means and ends	Tolerance of individuality; learning as living

Source: adapted from F.E. Emery, (1981) op.cit. p.45

A reasonable expectation would be that technical skills and trades training would be done in a manner that draws considerably on the new ecological paradigm, but often the Lockean perspective is so deeply ingrained in the norms of the educational establishment that anyone trying to impose these methods based on percepts on a world permeated by the traditional paradigm would have difficulty not being ostracized. This is all the more difficult in a conventional academic environment where “experiential” approaches are regarded as primitive and anti-intellectual tools.

(3) An alternative perspective: covering all the angles

The production of “reflective practitioners” would entail ensuring a more balanced mix of *savoirs*, *savoir-faire* and *savoir-être* in most PSE institutions. This might mean (in an ideal-typical way) a program allowing students to develop their perception systems in a variety of ways – drawing as much on the development of perception skills and on contextual experience as on stylized “re-searching” of stock knowledge.

It is our view that most of the problems emerge from the fact that there is a fundamental misunderstanding about the essence of post-secondary education. Once it is understood that it is a process that calls for a recognition that in the beginning are (1) the development of *habits of perception* as an effective way to *approach* complexity, then (2) the capacity to *diagnose* what works and does not work, and further (3) the ability to *design* interventions likely to succeed; and that these three operations are analogous in all streams, and require the acquisition of a variety of types of knowledge and skills – (and that this applies equally well in education, training and personal development) – it becomes clear that the present structures and practices in much of the PSES (as it stands) are less than ideal.

For the time being, too much emphasis is being put on the academic stream in general (and within it, to the exclusion of diagnosis often, and design almost always) and too much emphasis is being put on the design of interventions in the trade stream (often to the exclusion of the requisite work on perceptions and diagnosis).

A better appreciation of the range of types of knowledge necessary to perform these different tasks would lead one to suggest a number of fundamental transformations: (1) a de-compartmentalization of the different streams of the system; (2) a rebalancing of the types of knowledge in all streams to allow a variety of mixes of these three sets of intellectual tools to coalesce in different programs of research and study; and (3) a restructuring of the PSES into sets of institutions capable of partnering more effectively with different groups of stakeholders.

This will require nothing less than a revolution in the mind of the PSES establishment, as well as in the mind of the citizenry. For generations, they have been encapsulated in a world that has valued “disciplined intelligence” and ignored the contribution of training and personal development to the *outillage mental* of the individual. As a result, arts and music education has been devalued together with “shop”, “gym”, coop work experience, etc. as peripheral (and therefore non-essential) to the main learning programs while in fact they were “essential”.

This quickly led to those students who chose these avenues being regarded as intellectually “inferior” or socially “marginal”, and thereby to be regarded as either unable or unwilling to tackle the challenges of truly “higher” education. It is only with the explosion of the trades in informatics, computer graphics, and the like in the recent past, that the aura of such trades training has begun to regain some lustre.

Sociologically, this has led over time to a variety of pathological phenomena: (1) a higher high-school drop-out rate as “academic” subjects came to dominate the curriculum, and to determine that only “certain” intellectual capabilities were recognized as valuable; (2) a deterioration of specialized skill and trades education as it lost much of its social lustre, a consequent decline in relevance and quality of these skills as little public investment was made in it, and a greater reliance on “learning-by-doing on the spot” in the work milieu (outside the PSES) as a result of the unsatisfactory performance of trades schools; (3) a shortage of skilled personnel.

And when, in the recent past, such technical skills and trades training has acquired some notoriety there has been the danger of these institutions being tempted by higher funding and higher prestige to allow their programs to drift toward a greater academic focus in order to acquire more financial and social gratifications. Indeed, it has not gone unnoticed that a certain number of community colleges doing extraordinarily valuable work have worked hard at acquiring university status.

This would not be worth noting were it not that in order to obtain such status many (not all) have had to lose their “soul” (i.e., to abandon their “philosophy” of education to adopt or mimic the one in good currency in “academic/ institutions). In the best of cases (and again BC has been particularly insightful), such has not been the case, and they have become the sort of laboratory where a new mix of education, skills and personal development has been experimented with.

As for the institutions that have traditionally focused on training and personal development, and who have organically adopted the ecological paradigm, the academic dominium has sometimes perverted their curriculum and programs. They have not dared to extend their experiential approaches to standard domains of studies in academic institutions. As a result, when it comes to extending the training programs to provide students with a complement of subjects likely to enable the graduates to be fully effective in his work environment, and to be able to take on much broader responsibilities as they gain experience, courses grafted on the basic training programs are frequently delivered in such an extraordinarily artificial way that the graft does not take and never becomes an integral part of the intellectual baggage of the reflective practitioner.

Economics and accounting may not be effectively imparted to persons whose “education” has been acquired in the ecological paradigm as they would be in an academic milieu. My own experience with the teaching of economics to business students has revealed that if the learning methods are not modified, the teaching is entirely like water on the back of a duck.

One may draw a few lessons from these reflections:

- a. the PSES in general has been unduly reductive in giving access to varieties of knowledge
- b. in the academic stream, this has meant a truncation of the education process that has often left the graduates ill-prepared to operate effectively except in a narrow field
- c. in the technical skills and trades training, this has frequently meant an unfortunate grafting of artificial branches on experiential programs to give them academic legitimacy
- d. in the process, the hegemony of the traditional paradigm has not been challenged much
- e. the ecological paradigm has had only a partial impact
- f. a mix of the learning through both approaches would provide an improved PSES
- g. it is unlikely to emerge organically unless a variety of prerequisites are put in place, and it is to be noted that BC has been particularly helpful in promoting such *metissage*
- h. a critical review of the PSES should provide an opportunity to re-examine the balance of the system and to ensure that the whole range of types of knowledge and modes of acquisition of knowledge are fully exploited

- i. the existing distortions are ascribable to many causes: public perceptions, interest groups in place, poor understanding of the knowledge acquisition process, etc.
- j. a strategy to refurbish the PSES and to re-establish a full role for technical skills and trades training in its former lustre will require interventions at many levels
- k. there will be great resistance both within and without the technical skills and trades training system
- l. much learning can be derived from the evolution of professional education
- m. a study of the successes and failures of professional education in both the “nobler” and less recognized professions in America and abroad may be quite enlightening
- n. there will be a need for a new vocabulary to deal with these issues
- o. since we do not know how to plan such a change, self-organization and effective experimental learning may be the only way to proceed, and permission to do so must exist
- p. a general debate about learning and the different types of knowledge that have survival values will be necessary
- q. given the crucial importance of “learning to learn” in a knowledge-based socio-economy, and the dysfunctions of the PSES, this opportunity to refurbish it is crucial
- r. the degree of cognitive dissonance and of dynamic conservatism in the system is immense
- s. the sacredness of academic freedom and the credo in good currency that “putting more money into the PSES is the magic cure” will make any quick transformation unlikely
- t. there is a great need for a deeper exploration of the extent to which the PSES is unequally flawed in the different segments of the enterprise
- u. some additional or refurbished external institutions may be necessary for the improvement of the PSES
- v. one must be willing to explore the fringe of this domain of study, as for instance the contributions of some regarded as mavericks when it comes to thinking (de Bono 1979)
- w. much of this discussion is not without some import for the secondary and primary school systems as well
- x. the reframing will require a massive communication strategy
- y. the restructuring must be done with cooperation at the local level
- z. the retooling must be subtle, because there is still a prevalent view that the government has no business in the affairs of the mind, and there is no appreciation of the existing system flaws: the fact that it is nothing but an aggregation of private interests.

Winning conditions for a renaissance

It would be dishonest not to celebrate the signs of a renaissance in some sub-segments of the “technical skills and trades training” sub-system largely in the last decades as a result of the information revolution. Indeed, university graduates have recently been observed taking a second degree at a community college, or taking on studies at private institutions to develop their skills in computer graphics and the like, after a university degree that left them somewhat unemployable. It would be also unfair not to underline that BC has been particularly liberal in developing a PSES that has provided a most extensive process of course transfers and transfers of credit among the different families of institutions (colleges, university colleges and universities).

While a silo system remains as far as the governance structure is concerned, from the point of view of the users there is much more integration than elsewhere in Canada. In fact, some colleges and university colleges have become leaders in their trades and developed much pride and recognition. Moreover, there has been an extraordinary burgeoning of private sector entities that have developed programs to fill the gaps left by public institutions.

In any case, the information revolution has opened the door to a new appreciation of the most valuable intellectual capabilities being developed in alternative institutions. But it will be a long road to getting this stream fully recognized, funded, and well nested within the PSES.

Three major conditions are necessary for this revolution to occur.

The first one is at the epistemological level. One will have to succeed in generating the explicit recognition that all the institutions over the PSES triangle share the same challenges: (1) *habits of perception* as an effective way to *approach* complexity; (2) capacity to *diagnose* what works and does not work; and (3) the ability to *design* interventions likely to succeed. This will require nothing less than conveying a new educational paradigm to the population, and nothing less than a new vocabulary to explain the alternative types of knowledge acquisitions. As indicated above, the notion of learning (and of the way on which knowledge is acquired) will have to be redefined not only in scientific circles but in the general public, if there is to be a challenge to the notion that learning is re-searching the pile of accredited knowledge.

The second is at the structural level: a de-compartmentalization of the different streams of the system, and a rebalancing of types of knowledge in all streams to allow a variety of mixes of these three sets of intellectual tools to coalesce in different programs of research and study. This should entail more competition, and therefore more innovation in designing programs that cover the whole range of the PSES triangle, instead of inhabiting only a small portion of this territory. Such a restructuring can be expected to generate much hostile reaction from academic institutions which have up to now enjoyed some kind of upper hand in the PSES, but also to generate a recombination of the different segments of the “learning enterprise” enabling the private, public and social sectors, the academic, the trades and the human development, theory and practice, to *recompose* a different ensemble of programs of learning, better fit to match the needs of the different types of reflective practitioners.

The third is at the motivational levels : the design of the right incentive reward system to ensure that the most fruitful partnerships emerge, and that the requisite resources flow toward these new alternative institutions. While there may be a need for collibration (put the thumb on the balance to re-equilibrate things a bit) at the beginning, the intent is that competition among these institutions will keep them at the cutting edge of innovation and better serve those institutions that are more innovative.

(1) Delta knowledge – a cultural reframing

Knowledge is an elusive notion. The typical citizen has only the vaguest notion of what it is, and the ways in which it is acquired. More importantly, when the typical citizen is forced to think about knowledge, some clichés dominate his thinking: literacy, numeracy, and the like. He has little appreciation of the depth of his own knowledge: he does not realize or know what he knows. More important perhaps is the fact that he does not realize that much of the knowledge he has that has survival value he has had to acquire on his own, through experience and attention to his circumstances.

When it comes to classifying types of knowledge, the citizen is even more at a loss. Only academics worry about such things. Fritz Machlup has suggested a three-way classification of what he regards as the most important types of knowledge: humanistic knowledge, scientific knowledge, and social-science knowledge. This classification is not only open to criticism, but has been toxic even though it has become the reference in the PSES, because it has implicitly suggested that these were the only types of valuable knowledge.

The experience in the Netherlands – which came to my attention by chance a few years ago – has thrown some light on that toxicity. In the Netherlands (according to my colleague the industrial designer the late Willem Gilles) these types of knowledge are referred to as *alpha*, *beta* and *gamma* respectively, and are the basis for the different faculties in universities. It has led to certain types of knowledge being unheralded, marginalized, and regarded as mundane, unwholesome, unwanted, illusive, irrelevant and useless, etc.. This perspective has been extraordinarily destructive. It has led to many portions of the PSES being “excluded” from the university. For instance, in the Netherlands, work done in management, architecture, agriculture, medicine, etc., is routinely parked outside the university compounds.

When trying to understand in what way the types of knowledge generated and transmitted in these “excluded” sectors were differentiated from those in good currency within the university, it became clear that these sectors all shared a certain dependency on “learning by doing”, on learning on the spot through reflection in action.

Knowledge acquired in this manner is rooted in *savoir-faire*, in some symbiotic relationship between master and apprentice, and produces a sort of practical knowledge that is quite different from the bookish knowledge imparted by the traditional academic stream. In a generic way, we may refer to that knowledge generated by and for “wrighting and wroughting” (Archer 1978) that depends on learning by doing, conversation with the situation that focuses on know-how more than know-that, and is produced according to rules that are largely implicit, overlapping, diverse, variously applied, contextually dependent, subject to exceptions and to critical modifications (Schön 1988) – as “delta knowledge” (Gilles and Paquet 1989).

Very much of the technical skills and trades training (as in management, design, and many other professions) is based on delta knowledge, and yet it is hardly recognized and most certainly not well understood.

Indeed, this whole dimension of the PSES is not even acknowledged. It is at best considered as frills to the core curriculum, and add-ons that may be beneficial to some programs of studies, but cannot be regarded as constituting anything but extras, in the way case studies, work stages and the like are presented in most academic institutions’ publicity. This practicum component is not considered as the core but the periphery.

Yet if one accepts the Heider/Gibson/Emery paradigm, it is clear that, even in the PSES, much depends on the development of perception skills, and therefore diagnostic skills, even though this is mostly occluded. Professional schools used to understand this to be at the core of their mission. Indeed, what they aim at producing is a professional who has the intellectual abilities required when faced with an ailing patient, a distraught child, a disconcerted organization, a stalled truck or a failed state, to come up with a diagnosis and a coping strategy.

Much of it depends on a corpus of specialized knowledge, but most importantly, on a capacity to extract information, understand the difficulties, and to design a way out. And often professionals are able to react instinctively, in a blink, to a pattern of symptoms. Their attention and perception system have been finely honed, and experience proffers the diagnosis (Gladwell 2005).

But as long as this tacit knowledge is not acknowledged and valued, and as long as only certain types of accredited knowledge are recognized as valuable, no transformation is possible. Why would one work hard to acquire skills and character or to invest in developing better ways to impart such knowledge when it is not valued? And there is a surreal capacity of existing institutions to refuse to accept anything of value outside of their own credentialized metrics. So professionals are becoming unwelcome in academic settings; extraordinary surgeons are led into publishing articles on the costs of their surgical operations in order to maintain their publication record and therefore their university accreditation. A retired supreme court judge was prevented from directing graduate students in a Canadian law school because her publications dossier was not substantial enough, even though her colleagues were studying her judgments in other courses!

Michael Polanyi (1966) has shown that such tacit knowing is equally present in science and practice, that it guides scientists to problems promising new discoveries as much as the recognition of mood on a human face. It is also central to the innovation process in industry – which depends on interpretation and “trans-sector conversations” (Lester and Piore 2004). But unless delta knowledge and tacit knowing are recognized, identified, and labeled as components at the core of the education process, they will never acquire the status necessary for resources to flow in that direction.

Identifying “delta territory” will not be easy, because in our academic world most professional schools are mesmerized by the “scientific” ideals and have come to neglect more and more the learning by doing, and the focus on the perception system. It can be surmised that if any university were to identify a set of fields in the programs as “delta territory” – as fields where learning by doing, reflection in action were the core, and where learning would have to be designed accordingly, the “chosen” would rebel and claim their right to be parked with the rest of the herd.

So a cultural revolution that would center entirely on technical skills and trades training would have little chance of succeeding. What has to be done is a mobilization of the nobler professions so that the type of knowledge on which their training is based is more widely recognized. Otherwise, there is little hope that there will be a re-valuation of the delta territory and recognition of the sort of tacit knowing that is so central in technical skills and trades training – *savoir-faire* – will materialize.

A bundling of professional schools together into a *College of Professional Institutes* would not be an innocent move. It would not only announce that a new covenant is in place, but that a new ethos is in the process of being constructed.

(2) Triangle-wide experiments: some restructuring

It will not suffice, however, to ensure some recognition for the intellectual accomplishments that are anchored in delta knowledge nor to have a call for the recognition of the relative importance of percepts as a direct vehicle to knowledge. While this may please art teachers who have been arguing for generations that art education is not about training artists, but about nurturing some intellectual and perception developments, it is unlikely to mobilize a revolution in the PSES unless one is able to explicitly encourage a full exploration of the different modes of production of knowledge, and to put in place supporting structures that will prepare the ground for triangle-wide experiments (i.e., experimental designs of teaching, research and practices attempting to develop different packages of *savoirs*, *savoir-faire* and *savoir-être*).

In the endeavor, it is expedient to start by recognizing that there are different types of “research” attached to the different streams. Research has quite an aura, and might prove to be an easier road to credibility than a strict concentration on skill or personal development *stricto sensu*.

In fact, one might usefully start with some linkages between our triad (*savoirs*, *savoir-faire*, *savoir-être*) and the Aristotelian triad of *episteme*, *techne*, and *phronesis*: knowledge that is universal, general, non-contextual; knowledge that is practical, instrumental, product-oriented know-how; and knowledge that is experience-based, prudence, practical wisdom, concerning how to exercise ethical and moral judgment in particular and concrete situations. These sorts of Aristotelian credentials can only help. And it would be easy to infer that each of these branches lends itself to different research, and such research is most important in generating new knowledge of each sort.

This approach has the double advantage that it not only establishes the principle of different bases for legitimate and credible knowledge, but also that it is likely to heighten the status of *techne* because it may be shown that it is at the level of *techne* that the integration of these three strands of knowledge can best be effected (Jentoft 2006). Engineers, architects and other professionals would likely concur.

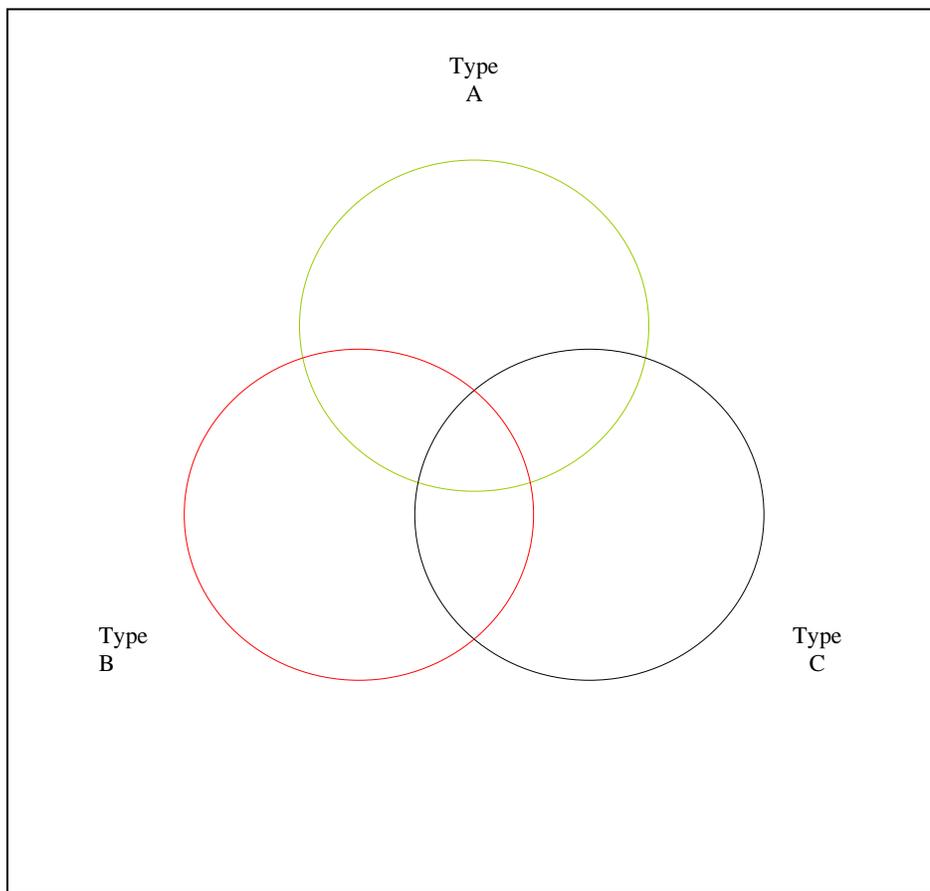
For such a commitment to *techne* to materialize, a wide range of triangle-wide experiments must be conducted that will demonstrate that such is the case. It might be useful to design research institutions that might provide the different foci and the mixes of activities related to these three strands. This would both provide status to all institutions (for research is now a mantra) but would also allow research to be freed from the shackles of academia and its claim to be the only place where meaningful research is conducted.

The Tavistock Institute has proposed an array of institutions one might see as mapping the research domain in the form of Venn diagrams, with three sets of institutions overlapping (Table and figure 2).

The decision to deliberately locate a large number of Type A knowledge creation organizations (focused on client needs, concrete problems, a mix of research and service, and a multidisciplinary approach) in institutions specializing in technical skills and trades training, would provide a sound basis not only for developing new knowledge of a special type (like delta knowledge), but with the necessary platform for the sort of collaborative work that might be done with other organizations (Type B or C) that might be located elsewhere.

Table and Figure 2**Knowledge creation organizations**

	Type of setting		
	User Organizations	University departments	Special institutes
Source of problem	Client needs	Theory & method	General "field" needs
Level of problem	Concrete	Abstract	Generic
Activity mix	Research/service	Research/teaching	Research/ application
Disciplinary	Multiple	Single	Inter-related
	TYPE A	TYPE B	TYPE C



Derived from The Tavistock Institute (1964)

(3) A variety of incentive-rewards: some retooling

It is not sufficient to modify the frame of mind (theory + culture) and structures. One must also tinker with the social technologies and the incentive-reward systems. Culture evolves very slowly, and structures take time to establish themselves. Unless there is a bit of collibration (putting the thumb on the scale to tip it ever so slightly, as I said earlier) the dynamic conservatism of the forces in place may well stymie any change.

It is legitimate for governments to interfere in the affairs of the mind (Tussman 1977), and they do so constantly. If a rebalancing in the PSES production processes is seen as desirable, the incentive-reward systems have to be tinkered with in such a way as to encourage supply, demand and coordination between them.

On the demand side, there is a need for a better information system about the quality and job-worthiness of technical skills and trades training. This must begin with a re-labeling of these activities. This will not be easy because of the “brand name” that universities have carved for themselves, the value of the brand as seen in the United States, and the aura that such name still carries worldwide. Consequently, any change in name is bound not to resonate with those institutions trying to shape their future somewhat differently.

There are already various categories of universities in good currency (undergraduate, comprehensive, research intensive, etc.) so what might be useful is to identify the category of institutions built on the whole range of types of knowledge and an explicit design to promote creativity and innovation as “new generation universities” (NGUs).

Campus 20/20 might be a marvelous opportunity to promote and announce new robust but different standards for these colleges and schools (including a greater sensitivity to the possibility of credits for work experience), and to put in place a robust marketing campaign designed to celebrate this particular strand of the PSES as leading to impressive and lucrative careers. A temporary special type of scholarships-cum-loans directed to the students of the NGUs, well advertised in secondary schools, would probably have some impact on the dropout rates and on the nature of the secondary school programs (i.e., re-introducing a larger place for non-academic subjects and creativity-focused activities).

On the supply side, there will be a need to formally recognize the value of the different forms of knowledge, but also a need to encourage the production of this new knowledge of different sorts. Instead of responding slavishly only to the demands of the traditional university lobbies, it might be worth exploring a bit further the real sources of productivity and innovation, and to fund with some equability the different institutions according to some performance criteria related to their capacity for engendering the “innovative conversations” (Lester and Piore 2004).

The development of Type A research centres in NGUs would do much to bestow higher status to them, to help them recruit a wider range of persons with expertise of different sorts, to incite these institutions to become much bolder in organizing their modes of production and imparting of knowledge, and to establish bridges between these institutions and the other types in the PSES on the basis of this comparative advantage.

On the coordination side, BC has already done much to help the smooth transition of students from one institution to the other, and the new network of research centres would do much to connect the faculty members.

There might be ways in which the experience of the Canadian Institute for Advanced Research might be of use in thinking through ways of generating virtual networks of researchers from these different types of institutions and stimulating joint venturing of institutions in creating mixed programs of studies and research. In this process, it would be a mistake to allow local patriotism and protectionism to prevail.

The use of open source materials provided by the different segments of the PSES might indeed allow an extraordinarily effective transfer of technology and educational materials, and help provide additional “enrichment” through better integration to take advantage of the experience of other institutions. The creation of virtual research organizations making the highest and best use of the personnel in different institutions might indeed be at the basis of a network of elite Type ABC research organizations that would bring together (selectively) not only personnel from different institutions operating at the same level, but also personnel from different institutions operating at different levels. The decision to generously fund such “coordinated initiatives” could produce miracles.

It might even be useful to envisage the creation of new roles for institutions that might be interested in playing an intermediation role in this newly integrated and real-cum-virtual PSES. Such institutions might provide new services.

Two examples might be:

(a) the evaluation of a wide range of competencies that are for the moment very poorly known, properly acknowledged and rigorously assessed (language, particular skills, work experience equivalencies, etc.) with the possibility that such recognized competencies established through rigorous challenge examinations might be properly recorded electronically on the back strip of a portable “education card” not unlike the health card; the technology exists for such an initiative, and proposals to put it in place have been floating about for more than a decade (Authier et Lévy 1992), and yet no institution has stepped forward to take on the responsibility for such an initiative except (I am informed) in Nunavut; this would allow a much finer appreciation of the pool of “knowledges and competencies” available on a level that simply does not exist now; labour market information would be immensely improved; yet, we would appear to be satisfied with much grosser recognition of batches of competencies like degrees when we might get much finer and easily accessible appreciation of the real competency profiles of individuals and communities if such an intermediation role were to evolve.

(b) the development of providers that could offer a whole range of educational packages of accredited courses (either produced locally or acquired from other institutions) that might provide the requisite variety and diversity of programs one would like to see available; these educational packages à la carte provided by intermediaries would be possible without the need to replicate every course or program in the different institutions, and might produce variety and diversity at much lower costs.

Conclusion

For over 50 years, the PSES has congealed in a certain form, and institutions have been explicitly encouraged by financial incentives to focus mainly on a portion of the PSES terrain. Reframing or restructuring of the PSES will obviously generate concern on the part of those who have thrived under this regime, for it can only mean raising questions about the present (maybe) and future (certainly) allocation of resources. Consequently, the legitimacy and importance of the forms of knowledge other than those in good currency in universities are going to be challenged, or at least belittled. Such dynamic conservatism has to be actively countered.

One of the major sources of these problems has been the social architecture of research institutions, which have been disciplinary and well interwoven with university departments (type B). Such architecture has provided a very limiting context for knowledge creation. A more reasonable architecture would harbor different sorts of knowledge creation units.

We have sketched some of the challenges and hinted at ways in which they could be met. But it might not be sufficient. More importantly it might allow less favorably disposed groups to deliberately ignore what has not been put forward squarely and forcefully.

Consequently, and even though it is not in the mandate of the think-piece to put forward recommendations, a number of modest general propositions are mentioned in closing, to complement the various pointed suggestions made in the body of the text.

The first one is the suggestion that the mandate to create, teach and disseminate delta knowledge be integrated formally in the mission of all postsecondary education institutions.

The second one is an effort to trigger a cultural change that would eliminate the old stereotypes plaguing the technical skills and trades training sector, and better inform citizens and business about the sophistication of such training.

The third one is to encourage robustly some experimentation in the PSES with an equally robust evaluation process that will ensure that successful experiments are celebrated and disseminated quickly but unsuccessful ones are quickly brought to a halt.

The fourth one is the creation of missing institutions that prevent an effective governance of the PSES. Such institutions might be the development of an electronic system of competencies profiles around an “education card” that might summarize more comprehensively the full range of competencies of an individual as properly and rigorously assessed, and the development of a network of brokers capable of making the highest and best use of the available range of courses available in the PSES. One might persuade existing institutions to shoulder these new roles or create new institutions that will.

The fifth one is a review of the financing of the different layers of the PSES on the basis of a new and more realistic appreciation of the real costs and benefits of the different activities instead of relying on fanciful historically-based formulas that bear no relationships to real costs and benefits.

These are only a few of the suggestions flowing from our analysis. However they go to the core concerns about the PSES.

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