As a long-standing instructor of technical teachers I am struck by two anomalies in the school system. My efforts to help these teachers make a successful transition into the profession is offset or countered, it occurs to me, by these anomalies. One anomaly is the rather obvious one that technical teachers learn by doing while most other subjects in schools involve learning through rote memorization of information or knowledge. The second anomaly revolves around the schools in which technical teachers practice and the degree to which the public seems to unabashedly embrace institutionalized learning. Schools, like many institutions, are a universal feature of 20th and 21st century life in western society. Seldom, however, are their program priorities analyzed for how well they serve us.

I am also compelled and inspired, in this paper, to write as an individual and a professional teacher educator. Somehow, every time I try to write about the subject of institutional life with a professional set of skills and expectations (encumbrances?) I am unable to crystallize my thoughts. On the other hand, when I document my own experiences and personal feelings a more complete and insightful picture emerges. Here is an example of what I mean. I was auditing a university course recently on the subject of 'professional development in education'. During the first class the instructor explained a number of concepts related to inner wisdom, letting go, and opening up. He asked the class if they understood how it is we become disconnected from ourselves, and others. Several students cited personal preferences, such as meditation that seemed to help give them a centredness. Other methods included outdoor adventures, e.g., canoeing, etc. After listening for some time to these testimonials I spoke up. I suggested that a large number of young people seem to have a fragile self-esteem and that this was explainable in part due to a heavy reliance on institutions for significant aspects of personal and professional development [I am sure the instructor saw the contradiction he was perpetrating and wondered if I was going to expose it]. Perhaps there is an over-reliance on institutional ways, I suggested, citing a difference between social and natural order, in which development as a human being was/is largely a family, community, or personal process rather than an institutional one.

Upon reflection it is possible to see how dependent we have become on our institutions and on our systems, especially in North American society. It is as if we defer our own knowledge and experience in life for that of someone else who has the ability to express it, usually in a book or paper. We presume knowledge derived from science is superior to the personal knowledge we accumulate as human beings. In this process we defer to the 'expert' as Burton Clark (1962) so aptly points out in his book Educating The Expert Society. Clark's book documents how we have come to rely on the expert and how the age of specialization has become a legacy of the 20th century. The examples for this abound, especially in capitalistic economies.

This personal reflection, ideological as it is, sets the stage for a critical analysis of our reliance on knowledge versus experience in our education policy and planning. An analysis of the premises we take for granted in the formal education system becomes possible. The paper starts with a critical stance on commodities such as knowledge and explores the attractions and detractions of institutionalized learning. It would be hard to imagine how formal learning could possibly take place absent of knowledge and information. Language is what makes communication and learning viable in all cultures. But words and concepts have evolved to such a level of sophistication that they both clarify and blur reality. It is often difficult to separate reality from abstraction. Carried to extreme they [words and concepts] become tools of themselves, capable of representing but also misrepresenting ideas [the concept 'knowledge-based economy' articulated in the conference literature is a case in point]. Professional people in most fields function with a set of concepts and language that is accepted and imaginatively used and abused at the same time. The fact that so many important aspects of institutional life depend on universally accepted norms regarding language use is a blessing and curse.

Where does this penchant for reducing things to commodities and concepts come from? Is it from our institutional way of thinking? Many policy makers, e.g., political economists, think of schools as instruments of society. Such people refer to the many components (commodities?) necessary/central to an efficient and progressive school system. Knowledge is a particularly visible example. It enjoys high status, fueled in part by the view that assimilation to one way of thinking is central to a progressive and democratic culture. The term 'knowledge-based economy' is one of many which gives credence to the high status associated with knowledge, both inside and outside education systems.

Socially Constructed Knowledge

The keystone or central element of institutional learning is knowledge. This highly regarded commodity has been elevated to such a high degree over the last one hundred years that it [knowledge] is taken as a universal standard for achievement and success. If you don't have certain knowledge and a command of accepted ways to convey it, you are deficient. The consistent cry by governments urging young people to achieve grade twelve or college education provides evidence of this widespread public acceptance of what schools, colleges, and universities do. The irony is that most knowledge conveyed in formal education institutions is constructed knowledge. It is packaged, you might say, for delivery and consumption the same way as a new product is packaged for the retail market. But, according the McLaren (1998), there is more to it.

> Critical education theorists view knowledge as historically and socially rooted and interest bound. Knowledge acquired in school – or anywhere, for that matter – is never neutral or objective but is ordered and structured in particular ways; its emphases and exclusions partake of a silent logic. Knowledge is a social construction (p. 173).

McLaren believes the world we live in [western society] is constructed symbolically by the mind through social interaction with others. At the practical level but also invisible in the public realm is a call by an increasing number of students for more meaning in the curriculum. Initiatives related to learning that is project-based as opposed to text-based, are gaining momentum. But, what is this polarity about? What is it about a singular reliance on knowledge that is problematic? The problem is articulated by critical pedagogy scholars. Critical pedagogy asks how and why knowledge gets constructed the way it does, and how and why some constructions of reality are legitimized and celebrated by the dominant culture while others clearly are not. Boud (1989) argues that we have overlooked experience and the experience-based learning approach in schools.

> Although experiential or experience-based learning can be regarded as the earliest approach to learning for the human race the significance and potential of it has not been fully recognized until relatively recently. In the formal education system it has tended to be developed and regarded as somehow fundamentally inferior to those organized forms of knowledge which have been constructed as subjects or disciplines. The practical and the applied do not tend to have the same status in educational institutions as the academic and the abstract (p. xi).

Boud would argue that a different set of premises and practices would govern what schools offer young people, if experience as well as knowledge were recognized as equally important.

Technical Teacher Testimonials

The professional development that technical teachers go through provides some evidence of what a different set of premises for school learning would look like. The following journal entries from technical teacher candidates help make the case for Boud's experiential approach. The research method is based on life histories (Jones, 1983) and collaborated stories (Connelly and Clandinin, (1990). In Ontario technical teachers are required by provincial legislation to have five years of work experience in their technical field. As such they are heavily socialized into a workplace culture, one which values experience. Making the transition to a knowledge-based school culture where learning through signs and symbols is dominant creates a tension for them. Many never make a successful adjustment (Hansen, 1996) into the profession. In this case George (a pseudonym) wrote about how learning in school was alien to him but working as a machinist was natural.

> *Years later when I began to work as a machinist apprentice I came to rediscover my true nature of learning. I was able to excel as a machinist, in all areas including math and programming skills which many of my colleagues found difficult. I believe this was because a machinist uses many senses in order to be successful. This is a job that requires a hands-on learner, one who learns through the interaction of the senses. The tactile, aural, visual, and emotional stimuli which one receives generates a sense of*

> *pride and accomplishment in a job well done. This is truly my learning style and the skills and knowledge that I have acquired and will continue to build upon will be retained by me for longer than anything that I have long ago temporarily learned and forgotten in the discursive world of schools. Truly this is the best learning environment for me.*
>
> Technology Teacher Candidate - UWO - 2000

This journal excerpt of a thirty-year-old technology teacher candidate at the University of Western Ontario reveals a problem in our schools and in the way we prepare teachers for their chosen profession. Among many contradictions associated with the pedagogy we perpetuate as teachers and teacher educators, one is particularly invisible. It is that we ask our young to defer their natural tendency for learning in favour of an artificial one. This testimony makes the contradiction more 'explicit' or visible. Eisner's (1998) work on art education as a core subject in schools helps distinguish between knowledge and experience.

> Consciousness of the qualitative world as a source of potential experience and the human sensory system as a means through which those potentialities are explored require no sharp distinction between cognition and perception: On the contrary, I came to believe that perception is a cognitive event and that construal, not discovery, is critical. Put another way, I came to believe that humans do not simply have experience, they have a hand in its creation, and the quality of their creation depends upon the ways they employ their minds (p. 162).

The teacher education socialization research (Zeichner and Gore, 1990) suggests that most general studies teachers adopt some variation of a transmissive model for teaching. Such teachers believe, partly as a result of their training and partly out of conditioning from their own schooling, that learning in schools is about 'knowing' rather than 'experiencing'. They perpetuate a system of teaching into which they were successfully indoctrinated when they were students in high school. These teachers seem to derive their professional self-esteem from 'knowing' in an epistemological way rather than from 'doing' (Kessels and Korthagen, 1996).

By comparison technology teachers, at least in Ontario, bring a different framework and set of premises to teaching. They have a perspective on learning that is practical rather than academic. Background experiences in an apprenticeship, in a cooperative education program, or in a business and industry environment often nourish a learning ethic that is quite a contrast to the predominant one found in schools. In a teacher development and curriculum policy/change context the learning preferences and tendencies of these technology teachers are particularly important to understand. The lives of technology teachers and the relation of their experiences as teachers to the culture of the secondary school is unveiled and identified by Layton (1993) as follows: "No subject challenges the historic role of schools as institutions which de-contextualize knowledge quite so strongly as does technology" (p. 15). The problem is how to clarify the difference between an academic versus practical orientation to learning, and to explore how a

practical or experiential framework for learning contributes to the well being of our young and an understanding of 'how people learn'. My own experience suggests that teacher candidates who have either been socialized into a business and industrial culture or who have a tendency for learning through practical means learn through a 'sense of physical location'. The following journal entries from George and Sean offer evidence of this tendency as well as the need for change in school curriculum theory and practice. That need leads to further exploration of the assumptions we, as school-based educators, adopt when we teach in school environments.

Opposing Authority and Achieving Limited Success - George

> *The most important insight which I learned about myself as a learner [in school] was that it did not matter to me what other people thought about my potential, I knew it was unlimited. Unfortunately I also came to oppose authority constantly. Many years passed before I began to respect people in authority. I was not aware of it at the time, but I demonstrated my true nature of learning, and emphasized in myself a return to the initial method of learning that all of us employ. I reconstructed my experiential learning tendencies. Unfortunately, the experience was not a good or constructive one and I became someone who would not trust or respect teachers until they could prove themselves to be a person who treated all others with respect and trust. Still to this day if anyone suggests that I am not capable of a task I catch myself working hard to prove them wrong. In some ways this is good, but I have to pay close attention to my actions so as not to overreact.*
>
> *From my perspective at the time (and I strongly believe this today) it became apparent to me that the most effective learning environment is one where the educator is able to set aside personal prejudice and focus on the needs of each individual. By doing so you can more effectively provide the area of individual attention that each student requires. This applies to all aspects of any work environment in which I have been employed. I certainly did not fully understand my learning tendencies then, but I am beginning to now. I am, by nature, a hands-on experiential learner and my schooling did not allow me to develop my learning style to any significant level from which my full potential could be realized. During my time in school my parents and teachers all emphasized how important it was to learn and do well in school. I did try to adapt my learning tendencies to suit their perceived views on how to study and learn, but I was only able to achieve limited success through these methods. This made school a difficult place for me to be because I did want to please my parents, but I was unable to explain or understand why I could not achieve the grade levels that we all knew I could. I was trying hard to adapt my learning style to what my parents and teachers thought it should be, and I did achieve limited success.*

Cars Saved My Self-Esteem - Sean

Grade eleven did not appeal too much to me, and neither did grade ten, or nine, perhaps even eight. Yet I had been 'successful' in school. Accelerated in elementary school, I passed through it in six instead of seven years. As a consequence, I was usually the youngest person in the class, and often the smallest in stature. So sports did not turn out to be my strong suit - and the older I got, the more that mattered. Achieving high scores on tests did not impress peers, scoring goals and home runs did. Attending school became a chore. In fact, performing poorly almost became something to be proud of; at least is made you more like 'the other guys'. I may have deftly avoided physical sports, altercations, and fights with larger classmates, but my self-esteem was 'takin-a-whoopin'! Soon I discovered cars.

Cars saved my self-esteem. That is, buying cars, fixing them, driving them illegally (no license plates and too young to drive), selling them for a profit, getting dirty, the sound of them, the power of them, the sheer technological triumph of their existence, everything. I loved cars. (If there is one point of clarity I can draw from our technology rationales [a faculty of education assignment], it is the empowerment feature that tech knowledge fosters). And as much as I came to love cars, I came to love the industry that supports them: garages, mechanics, tools, gasoline and oil, Canadian Tire stores, wrecking yards, car lots, and dealerships. And all of these things just happened to be the stuff of work, not of school.

Back at school I walked the halls with a secret. I had two cars at home in the driveway - two! Everything else there seemed irrelevant. Math was 'new' and taking algebra and geometry – "so what" I thought, "I got two cars at home!" In geography we were taking geology or maps, I think, but 'so what – I've got two cars at home…tonight I'll…" The big guys strutted around with their basketballs and letter jackets, "so what," I smirked to myself, "you probably can't even get the hood open on your dad's car! And I've got two cars at home!" My mind rarely left the topic and there was no drink at school to quench my automotive thirst.

What these journal vignettes reveal is that the values and beliefs that differentiate academic studies from practical learning are discernible, but repressed. They [the individual journal excerpts] help the reader understand the dynamics of two distinct learning cultures, and their impact on teacher socialization .

George, for example, is particularly strong and articulate in expressing his less than stellar experience as a learner in schools. He had a number of demeaning experiences that, to this day, remain vivid in his memory. One could argue that he is ignoring the fact that many students experience problems or undergo some trauma in school life. In hindsight, many parents and students appreciate the discipline that school life imparts. On the other hand, some who think they are better off for schooling experiences may not have confronted their feelings fully or thought through what really happened. Sociologists are often quite blunt about the latent dysfunctions of the school. Bowles and Gintis (1976) argue, for example, that schools do not reduce or remove class inequities,

they perpetuate them. At the individual student level British sociologist Basil Bernstein (1970) argues that learning in schools serves middle class children (with strong linguistic orientations) well and deprives working class children (with strong non-discursive tendencies). "Thus the working class child may be placed at a considerable disadvantage in relation to the total culture of the school. It is not made for him [sic]: He [sic] may not answer to it." (p. 346). This point is further reinforced by the writings of Margaret Donaldson (1987): "The better you are at tackling problems without having to be sustained by human sense the more likely you are to succeed in our educational system, the more you will be approved of and loaded with prizes." (p. 78).

In Sean's case (a pseudonym), a wisdom is evident. His ability to reflect and to weave the two periods (then and now) into his writing, and his reverence for cars (rather than school), is particularly interesting. This thirty-five year old teacher candidate could tackle the problems that Donaldson refers to, as a school age boy, but he also had a strong sense of himself and his needs, or wants (including the common sense to quit school when his self-esteem required it). How many adults today had thoughts of quitting school but never did? Sean, in a way was true to his beliefs. His tendency was to embrace the technology associated with cars. He could not get enough. Cars, not school, saved his self-esteem.

What these excerpts reveal, beyond personal growth, is that preparing to teach technology is complicated. What these teachers are preparing for and practising to do in the profession is perplexing to them. They have, like many, a set of baggage relating to their own schooling that may or may not be resolved in their own minds. What are my tendencies as a learner? What are my beliefs about learning, studying, experiencing? Have I been honest with myself about why I want to become a technology teacher or is it even possible to know? What does the profession hold for me? In a study at the University of Western Ontario (Hansen, R., Fliesser, C., Froelich, M., & McClain, J. 1992), it was discovered that technology teachers experience a dissonance between value systems. The evidence from that study suggests that the values and beliefs about learning held by technology teachers were/are not recognized as important by school leaders and officials. These teacher candidates felt displaced before even securing their first position in the profession. These young men and women had been socialized into the world of work. Their success and self-esteem had been measured not by book studies and normative grading, but by experience and everyday technical, economic, political, and social reality. The transition to school life for these teachers, consequently, was/is characterized by a subtle and nagging stress, one which they did/do not fully understand, and one about which very little was/is spoken or written.

Implications and Discussion

What makes the study of technology teachers with outside-of-school experience and their reverence for experiential learning pertinent/interesting is the timing - a period in which schools as institutions find themselves deeply entrenched in a constructed and abstracted academic curriculum for all students. The classic model of transmissive teaching, while

receiving some scrutiny of late in the literature, has been a pedagogical staple in Canadian schools for years. So has the traditional school subject mix deemed to be important by school leaders – languages, mathematics, sciences, social studies. The technology curriculum is treated as an option, not a core subject.

Technology teachers, seldom recognized for their practical expertise and culture, continue to be stigmatised by this curriculum formula. The fact that technical specializations have been integrated into broad-based fields of technology, e.g. manufacturing, transportation, design, communications, has not yet changed the status of the subject or the plight of the teachers. Technology teachers from these diverse and demanding curriculum worlds get little fulfilment from a limited range of status levels, satisfaction variables, and career advancement opportunities. Only recently, thanks to Layton and others are these unique teacher attributes/characteristics gaining a modest respectability and prominence in the schools and in the literature.

The school and teacher education curricula seem to be designed on the premise that it is appropriate for our children to postpone or defer their natural tendencies for learning, i.e., to experience through a balance of all the senses, in order to develop their mental or intellectual faculties, in favour of a methodology through which the intellect is trained to separate matters of the mind from the body. The purpose of schooling may best be characterized as learning intellectual self-discipline. Donaldson is particularly blunt about this truth in her book 'Children's Minds'. She uses the term 'disembedded thought' to describe what schools foster through the formal discursive curriculum. In short, schools portray learning as a lofty and irreplaceable exercise in intellectual development. "The paradoxical fact is," according to Donaldson, "that disembedded thinking, although by definition it calls for the ability to stand back from life, yields its greatest riches when it is conjoined with doing."

The implications that arise from the absence of a non-discursive curriculum are equally interesting in a curriculum policy/theory context. The fundamental premises about learning, that drive curriculum policy and implementation in schools, are not often discussed in the educational sciences literature. Theories about how children learn, however, abound. One safe observation about the body of research on learning is that it is 'undistinguished'. After forty years of research and hypotheses, there is no consensus on, or definitive understanding of, 'how people learn'. What does exist is a growing and diverse body of evidence that suggests 'the practical project' may be an element in teaching methods courses that deserves more prominence.

Sheridan (2000) argues that schooling legitimizes literacy [the discursive curriculum] at the expense of experience.

> Writing is about seeing and believing in symbols that are substitutions for sensual reality. The page, decorated with permutations of the alphabet, cannot represent smell, taste, touch, and space…. To read is in essence the entry point into an exclusively symbolic reality at the cost of the reality it represents (p. 24).

Eisner takes the relation between literacy and experience one step further.

> First among these [variety of beliefs] is the belief that experience is the bedrock upon which meaning is constructed and that experience in significant degree depends on our ability to get in touch with the qualitative world we inhabit. This qualitative world is immediate before it is mediated, presentational before it is representational, sensuous before it is symbolic (p. 161).

Recent literature (Kessels, and Korthagen, 1996; Layton, 1993), points to a renaissance of sorts in the way educators think about how students become engaged in learning and how school systems interpret reality though the curriculum. Meaningful and authentic learning, in this new view, is thought to be based in experience, the same experience that technology teachers have long cherished as valuable and necessary to learning in the many diverse fields of specialization which make up the world of technology, and technological education.

Research by Harre and Gillett (1994), suggests that real learning requires a sense of physical location to contextualize, precipitate, and reinforce it. They argue that such learning takes place when individuals are stimulated by a broader combination of senses than sight and sound. As Dewey suggests, classrooms should be places where more that 'listening' takes place. The position that learning of a non-discursive nature, i.e., learning through a sense of physical location, stimulates a sense of self, a precursor for/to real learning, is intriguing. Such a position challenges the fundamental assumption that drives school learning. That assumption is that knowledge is the paramount goal and, more important, it can be acquired independent of practical action.

The issue of institutional criticism is captured in Greenfield's (1993) writing. He is particularly articulate in his observations about formal institutions/organizations.

> The basic problem in the study of organizations is understanding human intention and meaning. Part of the complexity in this problem is found in the observation that people can act purposefully and yet bring about consequences that are wholly unintended for themselves and for others (p. 92).

In the case of schools this is particularly true. School goals statements consistently refer to the egalitarian purposes associated with schooling. The evidence suggests, however, that schools are middle class institutions that serve middle class kids well and fail to accommodate the needs of other groups.

The one implication that transcends all others in this analysis centers on the contrived curriculum through which our school students are asked to learn and grow. It is prudent to ask - is the curriculum artificial? Does it perpetuate a theory in which children are seen and treated as commodities? Does our teacher education curriculum misdirect teacher candidates by drilling them in the educational psychology discipline, a discipline that has, for five decades, provided misleading research on learning? The designer curriculum that many westernized countries have adopted over recent years is also open

to question. All such initiatives speak of engaging students more meaningfully in the learning process, but do students become engaged? In teacher education we use a narrow conceptualization of pedagogical options. The focus is on traditions of 'how to teach' with an educational science base. Writing behavioural objectives is one example that shows how curriculum is designed. Yet, the 'objectivist' approach to curriculum development represents, above all else, a search for certainty and technical control of knowledge and behaviour rather than personal growth and meaningful learning.

The position I have taken in this paper is that schools and universities perpetuate a mode of learning that is perceived as being important and best for young people. But, when scrutinized it becomes possible to see a pattern in the design of schools and learning that has flaws. Assimilation into society via academic achievement may do as much harm as it does good for our youth. The critical pedagogy literature, the experiences of technology teachers, and the institutional change research all point to a need for reflection and action, or at a minimum, some lateral thinking. For example, one could ask – can a case be made for reversing or transcending our limited way of thinking about such things as knowledge? What would be wrong with a school curriculum that balanced practical and academic studies for every child? Is industry aware of how it contributes to the confusion between knowledge and experience?

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