e-Apprenticeship: Establishing Viability of Modern Technology in Traditional Practice

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Abstract

In the Province of British Columbia there is growing emphasis on education mediated by computer technologies, or e-Learning technologies. Current Provincial initiatives encourage e-Learning technology utilization from K-12 through postsecondary levels. Under such political pressure it appears inevitable that apprenticeship training in the Province will also be expected to adopt similar e-Learning measures. The intent of this work is to identify the motivation for such changes, examine the educational feasibility of e-Learning as it applies to apprenticeship, and outline some of the non-educational considerations that must be made when undertaking educational reforms of this magnitude. Included in Appendix A is a pilot survey undertaken to establish the views of apprentices regarding the utilization of e-Learning; Appendix B contains the raw data gathered through this survey, which is used throughout to support the ideas presented.

Introduction

It could be argued that apprenticeship is the original educational system. While today the word "apprenticeship" is used to describe a number of different educational ideas, in this paper it is used exclusively to mean the training of skilled trades workers. Originally based upon transfer of skills and knowledge within a family, or in a legally binding agreement whereby the apprentice exchanged labour for food; shelter; clothing; and training with a master artisan, apprenticeship has evolved into a sophisticated mechanism of training in Canada. At this point in time, there is evidence to suggest that the nature of formal postsecondary (as well as the K-12 system) as it exists now in Canada may undergo some metamorphosis as political will is exercised at the federal, provincial, and institutional level to embrace computer mediated methodology (hereafter e-Learning) at an increasing rate (Premier's Technology Council, 2004). The building governmental emphasis on e-Learning is likely to touch all aspects of education, including apprenticeship. Currently across Canada there are pilot programs utilizing e-Learning for apprenticeship; some provinces have multiple full-blown apprenticeship programs online.

The intent of this work is to identify the motivation, methodology, and mechanism of adopting online training in British Columbia. Motivation entails insight into the social, economic and political influences that will affect the change. Methodology describes what is necessary to overcome misalignment between the requisite educational features of apprenticeship training and e-Learning capabilities, and offer solutions that would remove the barriers to implementation. Mechanism examines the overall supporting structure that is necessary if there is to be a successful, serious shift in the delivery of apprenticeship training.

Although the focus is primarily on the Province of British Columbia apprenticeship system, arguments draw from literature across the country and around the globe. The literature used is supplemented with personal interviews with active industry, government and educational faculty, and some of the data collected (Appendix B) in a preliminary survey (Appendix A) of apprentices.   In the sample data collection the apprentices were asked to rate their agreement to statements about personal computer access and use, professional computer use, apprenticeship training, on the job experience, educational experience (apprenticeship training) and willingness to undergo non-traditional training.

Regarding the utility of the survey data, while it is difficult to generalize from a small sample (27) from one trade (Electrician), there are some notable trends that are useful. The results prove interesting: comparing and contrasting the opinions of apprentices to the literature. Throughout this work any comments relating to the survey data will be expressed by illustrating the gist of the survey statement and citing relative agreement or disagreement in the form of the statistic for that statement – usually the mean. For the Likehart response statements, the higher values indicate the higher approval or agreement with the statement.

Motivation

The imperative to move towards e-Learning for apprenticeship is provided by a number of influential factors: the rapid progress of industry; irresolution between demand and availability of skilled labour; the shortage of postsecondary educational seats; the cost of apprenticeship training; and increasing educational and workplace competition.

Changing Workplace

Rapid industrial progress has long been the bane of vocational educators when evaluating their effectiveness in the world. H.R. Zeil (1965) in the preface of the proceedings on apprenticeship in Alberta states:

In the world today, change is exponential; the most dynamic feature of this change is technology, and history provides few clues as to how we can control this modern giant. The reproduction of a steady stream of inventions is rationalized and predictable in the large industrial laboratories and commercial laboratories. We have also shortened the time space – the lag – between discovery and use of our products. It has been pointed out that it took 112 years for photography to move from discovery to commercial use, 56 years for the telephone, 35 years for radio, 15 years for radar, 12 years for television. But it took only 6 years for the atom bomb to become an operational reality, and five years for transistors to find their way from the laboratory to the market. (pp. vii, viii)

If industrial automation and the introduction of electronics qualified as rapid change in the 1960's, consider how much more accelerated the assimilation of computer products and technologies and the Internet affect education in the present day. The nature of business has changed dramatically; continual upgrades and new technologies are utilized in a number of different industries.

From the preceding discussion, the following points can be extrapolated: there is so much history to teach, so much that is yet to be discovered that no individual set of programming will be able to cover all of the material in the past and prepare students adequately for the future. It could even be argued that the

more time spent in formal education, the less time remains to practice on the "current" technology, and the content will become dated before the students have a chance to utilize what they have. Even in 1962 C. P. Neale recognized that advancement of industry had such an impact. His feelings on the issue are clearly articulated: "… because it is my opinion that it is unacceptable for us to train people on a year to year basis when technological changes may be making these people redundant before they ever enter the workforce" (Inglis, Neale, & McEwan, 1962, p. 156). It is in response to this spiral that the notion of lifelong learning has been espoused as the solution to the training conundrum: train for work today, and learn to work tomorrow.

Irresolution of Skilled Workers and Employment Opportunities

The economy is quite dependent on the availability of skilled workers; so much so that in the 1960's the federal government, then unable to interfere with provincial control of education, slated skilled labour under a different government office so that it could exercise some control. Selman (1988) describes it thus: "The manpower training legislation passed by Ottawa in 1960, 1967, 1982 and 1985 provided funds for the expansion and creation of vocational training facilities as well as a portion of operating expenses, on a shared cost basis. Following the decision in 1966 on the part of Ottawa that it would play a more direct role in the design and purchase of programs and the selection and maintenance of the students…" Selman (1988, p. 11). Maintaining a skilled workforce involves delicate balance; more than may be readily apparent. Problems that can occur in this fragile ecosystem include: surplus, shortage, dilution and attrition

Surplus quantities of skilled workers in any given field has a number of effects on the economy. It starts with the individual, who will be either unemployed or underpaid. In either case the result is that the worker has no, or significantly less, income that can be added to the economy. Moreover, those unemployed draw on public funds through employment insurance. Although this discussion surrounds shortages, it is critical to realize that as industries wax and wane there may be some flux of supply and demand of workers. Training large quantities of workers to meet a temporary need will result in a surplus.

Shortages affect industries and society by artificially increasing the costs associated with any industry in which a labour shortage exists. During building booms, for example, building trades become in high demand, drive up the cost, and introduce the following issues: dilution and attrition of apprentices-in-training. Dilution will be discussed presently; attrition of apprentices during training is examined along with the other sources of attrition.

Dilution exists when unskilled or semi-skilled workers are provided opportunities to perform work that would otherwise be done by trained, skilled professionals. This has been a problem in the skilled trades since the 17th century (Snell, 1996), perhaps longer. In Snell's dissertation, the Guilds protested dilution because it was economically disadvantageous; in today's world it is considered a risk to public safety! In some cases proposals for training "specialized" workers, to do individual jobs, is considered necessary to fill immediate shortages. The difficulty here is that it provides a very narrow skill set that is quickly found of little utility after the particular boom that has caused its creation. There is a very real potential to lead to high numbers of skilled unemployed: "It is our view that there is a danger in confining one's self to a particular skill, in training 'for a job' rather than laying a foundation in general knowledge and ability to organize one's work assignments" (Scott, 1965, p. 53).

A suitably adaptable training programme can prevent dilution-causing shortages by providing sufficient skilled tradespeople. The opportunity for workers to receive apprenticeship training during booms may

enable them mobility to different fields after a job, or between jobs. Form builders, for example, might be able to take on a job framing. Electricians may be able to move from house wiring to a more industrial operation such as a sawmill or pulp mill. Additionally, even if some dilution exists, periods of unemployment for skilled workers can be reduced through further training if the infrastructure for upgrading is present.

The number of skilled positions available contrasted to the number of skilled people to fill them is in a constant flux. This is largely due to the unpredictable nature of the economy, industries, and people. As has already been mentioned, economic influences can cause industries to expand and contract, leading to shortages or surpluses in sectors. The actions of individuals are also part of the difficulty in accurately forecasting the *employment weather*. Specifically, in this section, how and why people leave skilled labour positions is of interest.

In the big picture, retirement is likely the biggest threat facing the skilled labour pool at the present time. Baby boomers are preparing to leave work and behind them a huge vacuum exists. According to a recent article in The Globe and Mail, one million job opportunities will exist by 2015, and "…35 percent of the labour force across Canada will retire in the next 20 years, with those retiring outnumbering those entering the workforce in B.C. by 2010" (Morton, 205, p. D3).

While the retirement of workers is a key issue, the next consideration is the supply to fill the vacuum left by the retiring workers. Currently government projects such as a DVD called "The Third Option Rocks" are attempting to dissolve decades of undeserved stigma attached to trades jobs (Morton, 2005) and to encourage participation in trades training. Moreover, the Industry Training Authority of British Columbia is encouraging secondary school students to enroll in a school based apprenticeship program called "ACE IT". However, inside these sources of replacement workers lurks a secondary source of attrition that is as dangerous, if not more so, than the attrition due to retirement.

Wallace Immen states some critical statistics on the in-training apprenticeship attrition. He expresses that: "Although more people than ever are registered in apprenticeship training in Canada (and many others turned away due to lack of sponsors), fewer than 10 per cent of those who enroll ever complete their programs, according to a report from Statistics Canada" (Immen, 2004, p.C1).

While there a number of factors that contribute to the incompletion rate, of which the discussion will lead well beyond the scope of this paper, identifying such a high apprenticeship abortion rate is hard on the system as a whole. Turnbull, in his address to the first conference on apprenticeship training in British Columbia, discusses the "quits" and makes the following statement:

> I know that that [lack of continuing employment] accounts for the fact that, as has been previously mentioned, only 70% of them [apprentices] do complete the course. Certainly if you are laid off, you are hunting around when you have to keep eating, and you get a bit discouraged. It also wastes money for both the government and private enterprise who foot the bill for that 30% of them who have fallen by the wayside, and the money it cost for that 30% of them is wasted. (White, Turnbull, & Uphill, 1962, p. 137)

Availability of Education

Commensurate with the perceived need for skilled workforce and the concern of apprentice attrition, a training mechanism capable of dampening the oscillations of expansion and contraction of the workforce size is essential. Whatever model is used, it must be efficiently scalable, because as has been hereto

discussed, the needs of any given industry are fickle and unpredictable: where one year large numbers of workers may be required, this quantity may shrink the following year. This very concern is echoed by R. B. McDonnel as he states: "However it is important to bear in mind that forecasting is fallible and that even under the best conditions, one cannot hope to predict precisely the skills which will be in demand five, ten or twenty years from now. In this view emphasis should be placed on flexibility" (Wales, O'Neal, & McDonnell, 1962, p.43).

A *fixed operation* education model is slow to respond; the end result is either shortage or surplus. Place-based education models are inherently fixed: the building capacities, the parking spaces and the number of training locations. Yet, there is clamor for education such that "Growing numbers of young people in their late teens and early 20's – the demographic echo of the postwar baby boom – are causing post secondary enrolments to swell in Canada" (Industry Canada, Advisory Committee for Online Learning, 2001, p. 24). In order to accommodate an increase in educational demand, place-based educational models require an increase in real estate. When the demand subsides, the facilities become under-utilized. One key argument for e-Learning is that it will allow for variations in enrolments without undue difficulty.

The Cost of Apprenticeship Training

The cost of apprenticeship tuition is, in contrast to other postsecondary tuition, quite affordable: by the guide provided by the British Columbia Institute of Technology approximately $104.00 Canadian per week (BCIT 2006-2007 apprenticeship tuition, 2006) in the 2006 – 2007 school year. Tuition is minor in comparison to the cost of lost wages. Although some apprentices are eligible for Employment Insurance (Industry Training Authority [FAQ Apprentices], n.d.), this is a small compensation considering that traditional, "place-based" education may also require the incurrence of moving fees and housing rental during training.

Brenda Anderson of Northwest Community College provided the following compelling testimony, illustrating these issues at the 15th Standing Committee on Education meeting held in Huston British Columbia in 2001:

> It's interesting because, although a significant portion of people we provide training to are young people, they're not the majority of our clients coming to the college structure. The majority of our clients are people 25-plus who have taken a look at their lives and said: "I need to do some other things to advance where I want to go and what I want to do." At that age they're coming with adult baggage. They have families, mortgages and a whole number of things that accompany them when they're looking at adult education. For them to pack up and go to Prince George, the lower mainland or anywhere else is a real problem. It creates financial hardship, and then you're removing them from their support structures in the environment in which they're familiar. We need to try to support them in different ways. We need to try to take it down to a community level. (Select Standing Committee on Education, 2001, p.624)

Anderson's comments seem to be focused on full time programming, such as a full year of college or university. Apprentices have a greater challenge in relocating because they are not leaving for a full year, but are attending courses with durations on the order of 6 to 10 weeks per annum. The mean survey response in the statement "I live close to the training center or institution at which I take my training" was 2.37; the mode was 1 (Table B2, Question 3), inferring that a number of the apprentices had to move to take training. It is impractical to give up one tenancy and move to another for two to three months, so apprentices are likely to hold two accommodations during school.

The average age of an apprentice according to Paula Dunning (1997) is 26 (p. 80). The demographic data collected as part of the survey concurs: the mean age of the participants was 26.67 years for second year apprentices (Appendix A). At this age, it is reasonable to postulate that apprentices of this age group are likely to have family responsibilities as well inferring that apprentices may not only hold down may two residences but also support their families while attending school. This is an expensive proposition for those who can least afford it. As Dunning (1997) keenly notes, "Apprentices can expect to spend four or five years working under a journeyman before achieving journeyman status. During that time they are paid relatively low apprenticeship wages, which vary according to the trade" (p. 80). Further, since the apprentice has moved away from home (and job), there is no opportunity to work while at school. Survey response to the statement about work during school indicated that 3 of the 27 apprentices surveyed worked while at school (Table B2, Question 17).

To combat the cost of learning, students seek forms of education that allow them to remain employed while seeking out an education that will serve to maintain or promote them in their industry, or move to employment in a more desirable sector. In this spirit the suitability of an online educational system is being investigated to see if it can meet the demands of industry better than place-based training programmes.

Educational and Workplace Competition

Competition in the educational sphere is a multi-dimensional entity. Students compete for entrance to institutions. In turn, Institutions compete for the best students to maintain their position in the educational delivery market. Employers (and communities) compete for the best students from the best institutions. Graduates compete for the best jobs in the most desirable locations.

The demand, created by the aforementioned lack of *educational space* coupled with the students eager to receive certification that will quickly put them in a lucrative job, has opened the door to many forms of alternative education. The scope of competition is now much larger than may be realized, as illustrated by the Industry Canada, Advisory Committee for Online Learning (2001): "If we do nothing, online learning will still come to Canada. But it will increasingly be provided to Canadian learners by foreign institutions and corporations that will be responsive only to global market forces and their own domestic exigencies" (p.37).

In some communities in British Columbia, there is a limited pool of skilled labour to draw from. Under the current system the apprentices attend school during block release at one of the public or private institutions, usually located in larger centers throughout the province. Relocating to school takes the apprentices from their communities for a period of time during which they are not able to contribute to their industries or communities. Additionally, they may be attracted to the larger centers, thereby effectively reducing the skilled workforce in communities that can least afford such losses (L. Stamm, personal communication, 2006). e-Learning has the potential to offset these pitfalls by allowing students to receive their theoretical training in their community while they continue to contribute to the economy and their respective industries.

Certain trades possess a small population of artisans. While Construction and Transportation fields make up the bulk of apprentice training (Alberta Apprenticeship and Industry Training Board [AAITBA], 2003), some trades are very specialized. For example, in the entire Province of Alberta the average number of sawfiler apperentices was 28 from 1997 to 2001 (AAITB, 2003, p.48). Such small numbers make it difficult to provide training. Even if an institution were able to offer the training and recover the costs, the frequency of such courses would be less than a more popular trade. Relocation to a center

further away from home may also be required. In Alberta, a motor vehicle technician has the opportunity to attend training at six institutions, however the aforementioned sawfiler is directed to the British Columbia Institute of Technology in Burnaby (Alberta Apprenticeship and Industry Training, n.d.)! In the 1983 British Columbia legislature Mr. D'arcy (MP Rossland-Trail) intimates that there is a necessity for flexibility in training (in community colleges) saying, "Going back once more to one of the reasons community colleges were established, because there was a recognition that the educational institutions of B.C., including BCIT, were not necessarily always providing training that was useful to the employers…" (British Columbia Legislative Assembly, 1983, p.1405). Brenda Anderson further laments the lack of local training because of its effects on the community: "Our high-end jobs in the skilled technical areas are few, yet the needs are very real. We don't want people taking those skills and leaving the community. For the community to grow and develop we need to do that [provide training] at a local level" (Select Standing Committee on Education, 2001, p. 624).

In summary, the impetus pushing the move to e-Learning is largely in the interest of flexibility in terms of: curricular currency, lifelong learning, retraining skilled workers, response to the economic and market demands, training location and access. Having affirmed that there are satisfactory reasons motivating the e-Learning initiative, the next step is to examine its suitability of methodology.

Methodology

In order to evaluate the educational suitability of online training for apprenticeship, it is necessary to first identify the salient features of the existing system. Next, the capabilities of e-Learning methodologies should be defined. Analysis of the requisite components of apprenticeship training against the abilities of e-Learning technologies will bring to light both potential drawbacks and benefits of e-Learning. Once discrepancies between the needs of apprenticeship and the capacities of e-Learning are clearly visible, it remains to suggest workarounds that will allow e-Learning to be a successful venture for apprenticeship training. It may be that, as suggested by the Advisory Committee of Online Learning, the approach with apprenticeship is a whole new vision: "Then it is necessary to undertake a development effort involving a sweeping deconstruction of the content for traditional courses and its imaginative reconstruction to exploit the unique features of the online medium" (Industry Canada, Advisory Committee for Online Learning, 2001, p. 69).

It is useful to consider the history of apprenticeship for two reasons. First, the historical evolution of apprenticeship can be used to assist in defining the distinguishing features of apprenticeship. Second, through considering the current situation in light of the past, rationale for the current system can be identified and may help avoid creating a system that is rife with the flaws of the past.

Investigating the history of apprenticeship in British Columbia, from the origins of formal apprenticeship to present day revealed that there is little or no literature specifically devoted to the actual educational undertaking of apprenticeship training. Most of the literature focuses exclusively on the economic nature of apprenticeship. The following quote from Brown (1965) offered a sudden insight into why the majority of the papers dealing with apprenticeship issues focused on the economic rather than the educational issues at hand:

> *Technology* is derived from the Greek word meaning *art* or *skill*, and is much older than *science* which is derived from the Latin *sciere*, meaning *to know*. The technologist can exist in any civilization that is trying to discover better or easier ways of doing things, whereas the pure scientist can exist only in a fairly well developed state with a government and religion that do not inhibit free inquiry. (p.1)

From this idea, it seems that the nature of technical work is separate from the more "enlightened education", which would include reading and writing. Consequently the inference is that, since antiquity, apprenticeship has held primarily an oral history and inherited an oral / visual / tactile instructional methodology. Guile and Young (1996) stress in their conclusions that: "We recognize that although the questions of learning and work are not new to the sociological or educational literature, much of the research which has emanated from both these fields has rarely given specific attention to the nature of workplace learning" (p. 186). But scarce historical documentation is not exclusive to apprenticeship. Selman (1988) indicates that all adult education historical research in British Columbia is akin to "…that of an archaeologist who finds a few groups of tiles from a mosaic in ancient Knossos, mounts them in a frame, and then sketches in what the balance of the design might have looked like"(pp. 1, 2). Therefore, a sketch of apprenticeship training history, rather than a comprehensive dissertation, follows.

In its mediaeval European origin apprenticeship training was small-scale; a parent might teach a child or children the skills of the family craft that could be bartered or traded for goods such as food and clothing (Snell, 1996). Apprentices could also be *indentured* to a master of a craft or trade. During his or her tenure, normally around seven years in the 1500's and 1600's (Snell, 1996), or until turning 21 years of age (Washington State Department of Labor and Industries, n.d.), the apprentice would live with the Master or his household and was typically fed and clothed as part or all of his payment (Snell, 1996, Washington State Department of Labor and Industries, n.d.).

Once the agreed apprenticeship time had elapsed, and the apprentice had proved his skills he was considered a "journeyman" and was free either to travel (journey) and ply his trade or to seek out a *settlement,* another village to set up shop where he would not compete with his Master. Alternatively, the arrangement may be made for the apprentice to take over for the Master in the same community (Snell, 1996). Through the training the apprentice would be shown and expected to gradually assimilate the craft and all of the instruction was provided in-situ by the Master.

This tradition, utilizing expert practitioners as trainers, was maintained after formal (regulated, institutionalized) apprenticeship training was instantiated. The source of instructional staff, and even administration, remained journeyman qualified tradespeople, as Selman (1988) states: "A number of the most senior positions in adult education in the province [British Columbia] *are* [italics added] held by persons with no formal training in the field of adult education" (p. 35). This indicates that from its historical roots to as recent as 1988 (at the least) the majority of the adult education in the province was provided leadership informed by tradition rather than "higher education".

Before the initial formalization of apprenticeship training by the Building Trades in 1925, in anticipation of a labour shortage due to retirement (Vancouver Apprenticeship Council, 1928), apprenticeship existed in numerous forms throughout the Province. Apprenticeship agreements were not standardized, and appeared very similar to the original European apprenticeship arrangement as described above. Through the early years, the semi-formalized period, one intent was to avoid the use of apprentices as an inexpensive form of labour but rather develop them into qualified people who would know the satisfaction of contributing to society (Schonning, 1962).

Selman (1988) also posits that the original British Columbia Apprenticeship Act 1935 was used in conjunction with many forms of adult education to relieve the pressure of the depression years, and provide hope for the unemployed. This original act set out a very formal manner the guidelines concerning the apprentice – employer relations, and provided a connection to the Federal Ministry of Labour. The Act also stipulated 11 trades that were qualified for apprenticeship training and provided a contract template (An Act Respecting Training of Apprentices S.B.C. 1935, c.12, Schedule A, Schedule B). In the next few decades the Apprenticeship Act was revised several times, mostly focusing on the

details. During this epoch school training was done either "on the clock" at work or in the off hours. Formalized instruction was available in plants, at night school, at the British Columbia Vocational School, and by correspondence (Selman, 1988, p.12).

Concurrent with Provincial initiatives, the Federal government was busy implementing legislation of its own, including: the Technical Training Act of 1919, the Vocational Training Act of 1930, the 1939 Youth Training Act and so forth. Ultimately the Federal government began funding training and providing Employment Insurance Benefits for apprentices.

In British Columbia during the 1950's a series of vocational schools opened under the moniker "Federal-Provincial Technical Training Institute of British Columbia", which would become British Columbia Vocational Schools (BCVS). By the 1960's these provincial institutions would have new facilities across the Province (J. W. Inglis, n.d.). As time progressed, the BCVS system would fragment and individual institutions would form under separate titles.

Commensurate with the opening of new colleges and (it seems) following the recommendations found in the proceedings of the First Conference on Apprenticeship Training, apprenticeship training took a likeness of its current structure. A man named Dayton, from the Painting and Decorating trade, spoke from the floor during the panel discussion of Montague, Billings, and Taft (1962) saying: "My belief is this – that to be successful – the keys to the basic skills of a trade lie in the establishment of a training centre to simulate as closely as possible actually [sic] working conditions" (Montague et al., 1962, pp. 101, 102).

In addition to quality and proficient work, trades training and apprenticeship did (and still does) place emphasis on mobility and transferability. Although the delivery of training varies across the country, most of the provinces and territories have subscribed to the Canadian Interprovincial Standard, commonly called the Red Seal program. This program was developed around 1955 and currently represents 45 trades, which contain around 80 percent of the apprenticeship workforce (Interprovincial Standards (Red Seal) Program, 2006). During the BCVS epoch, curriculum was created and managed by the Provincial Vocational Curriculum Development Division, housed at the Burnaby campus, to ensure that each institution responsible for apprenticeship training taught to the same outcomes for each level of training (Inglis, n.d.) and, presumably, to ensure that the outcomes satisfied the Interprovincial agreement.

At the present time apprenticeship training is delivered as a blend of approximately 15 to 20 percent institutional training and 80 to 85 percent on the job training (hereafter OJT) (AAITB (2003) Co-Chairs, Apprenticeship Public Consultations (2002)). The inherent workplace-centered nature of the education system is therefore a critical feature of any training mechanism that is to be called "apprenticeship". Considering this, Lloyd Stamm (Director of Operations, Automotive Industry Training Association) made the thoughtful observation: "…what I have been able to surmise is that the apprenticeship style of training/learning depends on experiential learning as opposed to a student staring at an instructor while the instructor talks about the big wide world out there. The apprentice actual [sic] takes part in the big wide world and gains important perspectives in the process" (Stamm, personal communication, June 14, 2006).

The institutional training is delivered primarily in a face-to-face methodology through "block release"; that is to say, students leave the workforce for a specified period of time to attend school. The length (number of weeks) of the block release depends on the program, the trade in question, and the institution at which it is being offered. During this time apprentices may not be paid wages, but may be eligible to receive Employment Insurance benefits.

The training at school typically involves theory delivery and practical exercises designed to reinforce the theory. As mentioned earlier, this training model was implemented to prevent over specialization; to ensure that all apprentices have equal opportunity to be well rounded in their trade knowledge regardless of their workplace. Andrews (n.d.) describes the type of situation that the block release training was designed to compensate for:

> Training, if any consists of very repetitive functions which are more needed in order to ensure the success of the firm than for the improvement of the individual. This was related as the case of the construction sites where an apprentice might be required to pull wires through conduit as a job function running over an extended period of time and in the hair stylist trade where the apprentice might spend considerable time being responsible for sweeping the floors and keeping the shop clean and tidy. While every apprentice should be expected to do some of these types of tasks assignments solely to these for extended periods of time does not provide for adequate training (p. 4).

After a thorough re-working of the apprenticeship system in 2003 (Ministry of Advanced Education, 2003) the Province of British Columbia remains part of the Red Seal program. Consequently the learning objectives for a given trade have remained uniform for all institutions providing apprenticeship training. At the time of this writing the institutions also have maintained the order of training, so that there is flexibility in terms of the apprentice choosing where to attend school; first, second, third and fourth year apprenticeship training should be uniform across the Province.

External to the educational and political field, apprenticeship is a social training milieu. Historically the training was mediated between a Master and his apprentice, along with an agreement of retaining secrets – the tricks of the trade (Vancouver Apprenticeship Council, 1928). Today the same social mediation exists between the co-workers as well as between apprentices and certified trades workers between employers. This is illustrated in the following quote: "Lave & Wagner (1991) stress the idea of situated learning which sensitises us both to the negotiated character of learning as a social practice and how opportunities to participate within workplace cultures influences whether and how we learn" (Guile & Young, 1996). Apprentices participating in the sample survey indicated that they liked attending school [Mean 3.41] (Table B2, Question 2), they learned from other apprentices [Mean 3.19] (Table B2, Question 28) and they continue friendships with classmates [Mean 30] (Table B2, Question 29).

In summary, as it is now understood, the educational face of apprenticeship training includes contextual practice in the workplace; utilizes socially mediated teaching methods; and involves textual, oral / aural and kinesthetic learning methods. Evaluation of apprentices wishing to become journeymen is based on competency through a nationally articulated examination system. Apprenticeship training also embodies flexibility and incorporates economic and industry responsibilities which must be met.

Mechanism

The nature of e-Learning is complex, and defining it even more so. While most people may feel that they understand the term, there are a number of iterations that are captured in this envelope. e-Learning encompasses computer-based training, asynchronous and synchronous online training - which can be either Internet or Intranet based – and it can incorporate mixed delivery training. This paper takes the standpoint of e-Learning as an online, specifically Internet accessible, delivery model. It is clear that in some situations other media and / or mixed delivery may be found to be more desirable. Arguing for a specific method or discussion of individual techniques is beyond the scope of this work. Rather, through the following paragraphs the potential for online learning to meet the needs for apprenticeship training are identified in general terms.

As previously indicated, under the current block release model institutions providing training use a portion of time providing theoretical background and another portion of time practicing the tasks associated with the theory in a workshop. It seems obvious that the virtual world of the Internet is not a suitable replacement for the hands-on training, and as such it falls as the first disconnect between online versus place-based training and will be dealt with in a later section.

The potential for online learning is then situated on the theoretical portion of the curriculum. As discussed earlier, institutional education makes up about 15 percent of the apprenticeship training, so only a fraction of 15 percent of the total training is addressed. At first blush, it hardly seems worth the effort of retooling the educational program, but the as discussed earlier block release has significant implications such as impact on local economies and disruption of the apprentices' lifestyle.

Apprentices are conventionally not thought to be academically minded. A recent newspaper article quotes a high school teacher: "'He's a hands-on learner, so he might have trouble learning from a book but once he's shown it, he's got it,' says teacher…" (Edmonds, 2006, p. 1). If the assumption, correctly or erroneously, is made that textual information is not easy for trade students to use in building their knowledge, how can utilization of a computer-based training system be of value? e-Learning offers self-paced learning, a variety of instructional tools, frequent feedback and testing, and the opportunity to revisit material. Unlike short duration, high intensity training currently offered in the block release format, e-Learning offers an embodiment of the widely accepted educational principle that learners construct knowledge in various ways and at various rates. Moreover, it recognizes and accommodates that not all students encounter difficulty on the same material; sometimes students who are otherwise progressing with great ease become entangled in a subject for any number of reasons.

Delpierre (1991) addresses this topic frankly: "While the ability to 'work at one's own pace' is an undoubted advantage to instructional computing, the realities of the traditional teaching environment seldom allow this to be achieved, as time constraints (such as the academic year or semester) which culminate in examinations of one form or another, impact the 'work at one's own pace' philosophy" (¶ 5). Oettinger (1969) is even more pointed in his remarks: "We ask the schools to group their students because handling a class of 25 to 40 in lockstep, more or less uniformly at one time and in one place, has seemed cheaper and easier than other alternatives" (p. 125). Online learning can assist students by allowing them the time that they require to learn the material.

It is neither sufficient nor advantageous in many circumstances to limit the course material to a written description of the topic at hand. Rather, visual and kinesthetic channels are more active. Consequently, the use of e-Learning technologies in training may offer more opportunities to access student's learning styles. Streaming video clips and photographic images can be combined with text and audio to enrich the learning environment. Apprentices themselves recognize this. Consider the comment written on Page 4 of one survey collected during this investigation:

> As far as online courses are concerned, I'd be opposed. Computer based learning is a good tool in the arena of education proper, but is not the "be all - end all". Different people learn in different ways. Audible, visual, hands on. Often a person learns through metaphoric examples, even through an instructor's inflections, gestures and personal experiences. Often several different perspectives, examples, and opinions are needed with 3 dimensional visual cues for a person to get the gist of the concept. (Appendix B, Comments)

Robin Popow, project leader of the Alternate Apprenticeship Program for Auto Collision at Vancouver Community College, described that the use of multimedia and animations allowed his students to understand concepts more readily. Also, he intimated that these were especially beneficial to English as

Second Language participants because they had the opportunity to revisit the material repeatedly at their leisure (R. Popow, personal communication, June 24, 2006).

Course design can enhance learning through frequent testing and feedback. Questioning is recognized as an effective instructional style in the face-to-face milieu: "Being able to ask probing questions can help participants dig more deeply into a topic or idea, explore various perspectives and make thoughtful judgments about the accuracy and applications of information" (Apps, 1991, p. 67).   The chief disadvantage of using questions in a face-to-face classroom is that not everyone can participate in answering all of the questions. This could be because some learners are passive and shy or others are more active and aggressive, resulting in "…80 percent of volunteered responses come[ing] from 20 percent of the learners" (Renner, 1994, p. 42).

If frequent testing is used in the online environment, there are no wallflowers; everyone participates in the questioning event and benefits from the activity. Opportunities to self-test prior to evaluation were an integral portion of the patternmaking programme designed by Sclof and Pao (1994): "The learner can test himself to see if his interpretive skills are developing well or if he needs more examples and practice in a particular context or for a particular defect. He can test his skills by asking the system to provide him with more cases in a particular area" (p. 527).

Moreover, questioning is an integral component of good e-Learning instructional design. Delpierre (1991) argues that "Essentially, the question episode is where the special educational attributes of the computer are exploited to make a computer-based lesson truly interactive as opposed to what is an 'electronic page turner'" (¶ 3).

Sclof and Pao (1994) designed a prototype online course to train patternmakers on the location of the parting line in a sand mould. They advocated that opportunity to revisit material was of great benefit, intimating "Whenever any piece of information or instruction is presented, the student may choose to have it repeated as many times as he would like" (Sclof & Pao, 1994, p. 525). A future consideration of their prototype was to utilize the computer-based training program in the field, saying "After using the system for training in learning the facts and fundamentals of the patternmaking task, we would like the student to be able to use the system and its multimedia capabilities for guidance during the practice of the art" (Sclof & Pao, 1994, p. 526).

From the immediately preceding discussion it is evident that there is the opportunity to make the theoretical portion of the training program more accessible, applicable, and meaningful to apprentices by offering it in the online medium. Other facets of apprenticeship training, however, are not so well served by an electronic medium.   The following paragraphs identify the key areas which challenge the implementation of an e-Learning medium; each challenge is followed by a potential remedy.   The contentious items include: the workshop portion of formal training, lack of industry acceptance, resistance put forward by students, dissolution of social component of training and potential for academic dishonesty.

What about the practical experience to reinforce the theoretical knowledge? Resolution of the issues surrounding practical experience becomes a complex undertaking. Earlier it was identified that the model of apprenticeship adopted in the 1960's was purpose built to include realistic work-like environments in which students could have the opportunity to experience all aspects of their selected trade, regardless of their work situation, to ensure that they were able to work in any environment in the future.

The initial solution for this quandary, "if not in school, then where?", is that the workshop experience should be managed on the job. It appears, then, that we have come full circle - originally the OJT

experience was judged and found wanting, leading to, essentially, the model now in place. In an interview with a seasoned apprenticeship instructor, Gerard Sheehan, the question surrounding overseeing apprentices was broached. It was a recurring theme that there needed to be an authority that could monitor apprentices closely in the workplace (Sheehan, personal communication, June 15, 2006). Lloyd Stamm also intimated that the employer had to have greater accountability and assume a larger role in training. His suggestion for managing experiential learning: that a logbook be maintained to evidence the types of operations the apprentice has been exposed to. Depending on the trade, including the use of a repair order portfolio - a collection of documents that would detail the work performed by the student – might be a useful tool (L. Stamm, personal communication, June 13, 2006). Agreeably, having greater accountability to a governing body would motivate employers to provide a variety of workplace tasks to apprentices; but this is contingent on the employer having a variety of tasks for the apprentice to do.

Another side of the workplace component shows itself in the range of workplaces that may train apprentices. Although there are national standards regarding competencies that must be demonstrated for journeyman qualification, not all apprentices are employed in a situation where they are able to perform all activities involved in their trade. This has been identified as one of the mitigating factors leading to the current model of trades training encompassing workshop practice. Even with better supervision of apprentices by a governing body and record keeping, apprentices may not get the full gamut of experience from their employers if the scope of work undertaken by the employer is too narrow. "Where some employers do have a genuine interest in training the trend towards participation by the smaller specialized firm has resulted in a situation whereby it is not possible for those firms to supply the full range of experiences and training as specified in the plan of training for that particular trade"(Andrews, n.d., p. 4).

Mike Kidney, Manager of Educational Technology at Nova Scotia Community College (NSCC), was able to shine some light on this difficulty. One solution NSCC created was to offer hands-on tutorials for specific skills as requested by the apprentice taking online training at that institution. An alternate solution, also implemented at NSCC, was that apprentices could negotiate to volunteer with a second employer to acquire experience in another venue. The example Kidney related was an apprentice cook who was working in an institutional kitchen. This apprentice in question made an arrangement with a second establishment, a fine dining restaurant in this case, to volunteer some evenings during the week and thereby flesh out the range of work experience (M. Kidney, personal correspondence, June 12, 2006).

From the survey data it is difficult to really get a good picture of the workplace supervision. Question 25, the statement, which reads "My employer supervises my work carefully" (Table B2), received a mean of 2.92; while Question 26 "At work I am mostly on my own without much supervision" (Table B2), has a mean of 2.73. A 0.09 span is not conclusive. The mode provides a little more distinction: 3 and 2 respectively. Response to the range of work experience provided on the job was quite positive [Mean 3.23] (Table B2, Question 24). Overall, there was no conclusive picture of the workplace supervision, except to say that the apprentices surveyed did feel that they received a broad spectrum of work.

Through rhetoric and speculation one may postulate that, if efforts such as described by Kidney and Stamm above had been implemented, the history of apprentice education may have been quite different. Two key items were missing to make it feasible at that time: a structured apprenticeship system and the administrative workforce. While allowing industry to provide all of the training before proved unsatisfactory, perhaps with increased communication and supervision it might work. Additionally, the administrative work is more prevalent now in the so-called Knowledge Society in which we find ourselves, so the logistical burden of overseeing apprentices may be more acceptable.

One of the most incredible features of apprenticeship and trade qualification programme at present is its uniform, unquestioned acceptance by industry. The credentialing process is recognized by all industries

affected by it. Apprenticeship training in the public institutions of British Columbia has existed more or less in its current state for the past 50 years or more, and is familiar to employers. Introducing a new method of instruction might be seen as something untrustworthy; to be suspicious of. This is no moot point in light of the symbiotic relationship between apprentice, employer, institution and government. Industry tends to drive the apprenticeship program, and must be satisfied with the end results.

When discussing this potential barrier, Lloyd Stamm intimated that there was a pilot Automotive Service Technician course that was run by a lower mainland private training institution. The course was a theory-only night school course, apprenticeship first year. Since the institution was only delivering theory, the employers had to be brought onside. The deal was brokered: the apprentice does not need to take time off work, but does need to have the opportunity to do all of the work outlined in the curriculum while at work. Arrangements were made, apprentices attended night school, and employers provided the opportunity for the apprentices to do the required shop tasks in the field (L. Stamm, personal communication, June 12, 2006).

By Stamm's report, the employers enjoyed the experience of mentoring the apprentices; they felt involved in the training. This early indicator seems to point to the fact that if the employers or supervisors are let in on what the training scheme is, they are more likely to be supportive of it. Moreover, if they enjoy mentoring apprentices and are willing to be involved, this proves that the first concern raised, that of practical workshop experience, can be overcome in the field.

The question percolating now is this: is it the institutions that will mould the learning practice of the current apprentices to accept e-Learning, or will it be the future apprentices who will force institutions to provide e-Learning. Grundy (1987/1995) indicated that curriculum (practice) mirrors society: "To understand the meaning of any set of curriculum practices, they must be seen in both arising out of a set of historical circumstances and as being a reflection of a particular social milieu" (p. 6). In a Newtonian sense, society is pushing against the traditional practices. While a small sample of apprentices may not be open to certain aspects of e-Learning, future apprentices may be more so as our society further embraces technology in education throughout the educational system.

It does not seem that adaptation should be difficult for the apprentices surveyed: all who had Internet connections had high speed and the tenure of the average computer ownership was 7.29 years (Table B1). However, to assume that students are ready to pursue online learning is to be quite presumptuous. Expectations and perceptions of learners is not a technical issue, but one that will need to be addressed in policy. While the Industry Canada, Advisory Committee for Online Learning (2001) states "Many learners, specifically those with extensive experience of the Internet, should enjoy the active, collaborative and self-directed approaches to learning enabled by the online experience" (p. 49), the only way to really get a feeling for what apprentices will accept in the realm of e-Learning is to do further research work and take the responses of apprentices seriously.

Examining the responses of apprentices garnered through the survey (Appendix A), 7 out of 27 survey participants indicated that they studied work-related materials on their own time when not engaged in apprenticeship training (Table B2, Questions 20, 21), and the use of the Internet for technical information was not considered important [Mean 1.88] (Table B2, Question 27). This may be because there is little or no upgrading currently available online, and it may be that the Electrician trade may not have as rapid an increase in new information as other trades. An expanded investigation that included other industries may show variance between trades and provide the ability to more completely generalize the opinions of apprentices.

Apprentices surveyed felt that attending a college provided them a good source of social and professional contacts [Mean 3.69] (Table B1, Question 34). It is the author's opinion that this is a critical part of training. Developing collaborative online communities is uphill work (Palloff & Pratt, 1999), and requires the learners to be familiar with tools utilized in this goal. Mike Kidney expressed that at NSCC they encouraged students to use discussion forums to develop a network of colleagues (M. Kidney, personal correspondence, June 12, 2006). Apprentices responded that they were unfamiliar with discussion forums [Mean 2.35] (Table B2, Question 7). It remains to be seen, but may be that once the students are exposed to these forums they become more comfortable interacting in the online environment.

Academic honesty was one concern that appears to be unfounded. Certainly, during the training course the students may use manuals, texts, or call a friend, but Mike Kidney again clearly articulated the safeguard used in Nova Scotia.

Like most of the provinces in Canada, Nova Scotia has a governing body overseeing apprenticeship to hold the final examinations and provide credentialing. In this way, institutions are at arms length from the final trade qualification examination process. If the apprentice chooses not to learn during the training program, the proof of competence ultimately is evidenced in the final examination marks. For geographically removed students, the same final exam can be proctored through a responsible third party (M. Kidney, personal correspondence, June 12, 2006).

At this junction, it can be seen that the educational matching of apprenticeship and e-Learning techniques has been the focal point of discussion. It can be seen that there are some disconnects between the current practice and features of apprenticeship and e-Learning, but there are also some benefits found in e-Learning technologies that are not presently available in the block release, face-to-face model. With some creativity and considerable effort the educational requirements of apprenticeship can be met realistically by online delivery. Now it remains to investigate factors surrounding e-Learning implementation for success and sustainability.

In summary, the potential for e-Learning to assist apprentices in learning the theoretical material is great. By offering a variety of educational forms such as text, still and video images, animations, and live synchronous lectures, students have a variety of ways to learn the information. Moreover, apprentices can have the opportunity to review and test themselves at any point, cementing their learning. Collaborative learning environments, threaded discussions, chat forums, all can provide ways to discuss the subject at hand, concurrently building socially mediated learning communities and increasing retention.

Moreover, any disadvantage discussed thus far has a solution currently used either in British Columbia or elsewhere in the country. The list of potential barriers is not comprehensive, but with sound judgment and reasoning any impediments should be able to be overcome. It appears that open communication and industry co-operation are the key factors that make the existing programmes successful.

At this point, with the education-specific items addressed, it is necessary to investigate some potential logistical traps that can frustrate the implementation of change in the delivery medium.

Currently, throughout the country, there are a number of programmes that have been successfully implemented online. In many cases, online training is instantiated by forward thinking individuals who put a lot of personal resources (time and effort) into their projects. Other offerings are more comprehensive and supported, such as Nova Scotia Community College, where 15 trades are currently offered via online training.

From the previous discussion it is evident that apprenticeship is a complex programme with many stakeholders, each of whom holds interests that are in alignment as well as competing interests. In his book Change Forces with a Vengeance, Michael Fullan (2003) describes the need to have co-operation between all levels involved in the educational process if real change is to be effective and lasting; grassroots to ensure implementation and increasingly higher levels of administration to ensure funding, saying: "Standards have only minor leverage over system change. It is horizon #1. System transformation is different. It can't be accomplished without making leadership at all levels pivotal" (p. 91).

The emphasis of governmental leadership is documented in Premier's Technology Council (2004). Educators gathering to discuss the implementation of learning technologies in British Columbia institutions identified concerns that they wished addressed through a voting system. Leadership from government was important, evidenced by capturing 30 of 64 available "votes". Much of the leadership required from government circled back to funding structures.

Institutions, too, must provide leadership. While quick to criticize the government, saying, "Government lacks a clearly articulated and well-understood e-learning vision and strategy to build a sustainable e-learning model" (Premier's Technology Council, 2004, p. 3), it should be noted that the administration of institutions also suffer from similar maladies. Successful implementation depends on motivation, planning and support of the training initiatives.

Drastic changes as discussed to this point will result in an upheaval of the established system. Initiating e-Learning programmes for the wrong motivation, such as an institutional cost cutting technique, or to look high tech., will ensure only failure. Kevin Oaks asks: "The focus on cost reduction has been one of the single biggest failings of the e-learning industry as a whole. It's not difficult to show a cost reduction with e-learning, but if it is not effective, what's the point" (Oaks, 2003, pp. 65, 66).

During periods of confusion, it is critical to remain focused on the true purpose of apprenticeship as discovered through the words of Andrews when evaluating the apprenticeship programs in Newfoundland: "The main reason for its being is to train young people; not to provide an immediate and inexpensive source of labour, not to provide a mechanism to get people off of the UI roles, not to enforce labour standards, and not to provide an artificial reason for employment of instructors" (Andrews, n.d., p. 24).

A genuine effort to make online learning a success involves financing for development of curriculum and learning materials. The development of quality educational materials is key to successful, sustained e-Learning as applied to any discipline. There is a substantial cost involved: "The development of online courses and programs can be quite costly because it is not enough to simply put a faculty member's course notes online" (Industry Canada, Advisory Committee for Online Learning, 2001, p. 52). Course development costs for courses that utilized all of the benefits of e-Learning were estimated by Industry Canada, Advisory Committee for Online Learning (2001) on the order of $47000.00 to $1 million USD. Efforts of this magnitude are not something that is done off of the side of one's desk but clearly demands some serious consideration and planning.

It is imperative that administrators recognize the effort that faculty exert to make online education successful. This includes helping resisting faculty ease into their new roles as well as recognizing the amount of work that they are undertaking. Fullan (2003) takes great pains to attempt to articulate that bottom up (instructor driven) transformation of the educational system will not succeed because there is insufficient resources or power to make a meaningful change. Top-down reform is often rejected because change is difficult for people:

Here is the paradox. You need ownership for fundamental change, but you can't get it on a large scale by relying on bottom up strategies. If you base a strategy on investing only in local development, what happens is: (a) not much of the bottom moves, or (b) some of it moves in the wrong way, or (c) some of it moves productively but the good ideas don't get around, nor do they persist for very long. This is another way of saying that "the top" matters – the larger infrastructure really is crucial for system change. Let us also remember that mandated change has a very poor track record, and even if England's literacy and numeracy strategy has been successful it is a rare exception. (pp, 32, 33)

As indicated earlier in this writing, there are a variety of pilot programmes that have been initiated by keen instructors throughout the country. If these programmes are to be successful and sustainable institutional support must be provided, as the above quote mentioned.

For some faculty however, change of this magnitude is difficult to accept. Resistance of new technology is not new: Oettinger (1969) describes a reaction to overhead projectors provided to a new school: "These projectors remained even after the blackboards came, but older teachers who had complained all along that they needed a pilot's license to use these gadgets, promptly abandon their use" (p. 115). For others, it could be speculated that the technology change is not the issue – perhaps the faculty simply like the social, workshop environment in which they currently operate, and are not interested in working at a desk.

While the critics will bemoan the loss of the traditional institutional training of apprentices, it is important to realize that apprenticeship did not originate with any formal educational institution participation. Moreover, the intent is not to eliminate the institutional participation, but merely change the nature of the mechanism by which the training is delivered. Should administration decide that e-Learning is to be part of their institution, crumbling the resistive will of the faculty through might is not a practical technique. Rather, encouraging staff, reminding them that apprenticeship has endured the ages by being flexible and adapting to the social climate, not by holding fast to the status quo and regarding the past with *weltschmerz*. In an elegant testament of the necessary flexibility of trades training made by George Buck, he paraphrases H. R. Zeil, saying: "Those that believed that a given trade was a permanent fixture did not appreciate the precedents of change such as the demise of the sail makers following the advent of steamships"(Buck, 2001, pp. 5, 6). Then, providing assistance to staff during the change is necessary, as described next.

Faculty must be adequately prepared to facilitate online learning if the venture is to be successful. When structured trade schools began offering apprenticeship training, it was realized that traditional apprenticeship did not include formalized conveyance of skills and knowledge from one Master or Mistress to multiple apprentices concurrently; consequently decontextualized training in a scholastic setting required different skills and attitudes than the situational based experience of the workplace. At the inception of trades training, assistance in the form of the Vocational Instruction Program (now Provincial Instructor Diploma Program), offered initially through University of British Columbia and then transferred to Vancouver Vocational Institute (now Vancouver Community College), was provided to ensure quality of instruction (Selman, 1988). Although evolved, that same process is still utilized to prepare trades instructors today.

Just as classroom instructors have to learn instructional techniques and guidelines for managing themselves and the students, it now remains to ensure that online faculty members are supported in their efforts to deliver quality e-Learning. This should include training in the operation of the Learning Management System (LMS or *learnware*), development of skills in leading and moderating online discussions, using chat, whiteboard and other learning software. At Nova Scotia Community College, the online learning faculty are provided in-house training to prepare them for the task. Mike Kidney

indicated that his organization is currently petitioning to have the online facilitator course recognized as part of Nova Scotia's CCEDP (Provincial Instructor Diploma Program equivalent) but are meeting with resistance (M. Kidney, personal communication, June 12, 2006).

Support of e-Learning initiatives includes providing technical support for faculty, as well as for students. Faculty who are early adopters of educational technology are often enthusiastic, and willing to work hard to learn the process of online training, and to provide support to the students. Brennan, Horton, McNickle, Osborne, and Scholten (2003) observed that the perspective of institutions and faculty do not match: "Many professionals involved in online delivery talk about the time they put into development of materials and support of learners as largely unpaid. However, organisations often perceive these inputs as professional development" (p. 14).

Programs offered like those at Nova Scotia Community College, which assist instructors to utilize the LMS, can be rightfully considered professional development. Like any new subject, the learning curve associated with a new delivery technique or medium is necessary. But in order for e-Learning to become a sustainable reality, material development, support and facilitation of the online materials will have to be viewed as distinct, but inter-related, functions. It is not realistic to expect faculty to be able to develop high quality materials, manage web pages, provide technical support for students and teach the course concurrently. Rather, proper support needs to be in place and remuneration provided for all time and efforts expended.

The amount of work involved in online learning must also be realized. Mike Kidney intimated that one problem faced by online facilitators of trades training at Nova Scotia Community College was the perception that sitting at one's desk looking after an online course was not "real work" (M. Kidney, personal communication, June 12, 2006). Yet, Palloff and Pratt (1999) claim that conventional face-to-face lectures would demand 6.5 hours to 7.5 hours of instructor time (based on 2.5 hours per week classroom contact) per week. Conversely, an equivalent online course would require approximately 18 hours per week (p. 50). The difference is in the fact that in an online course reading and responding to the posts requires approximately 3 hours per day.

Echoing the concern of faculty workload the report from the Industry Canada, Advisory Committee for Online Learning (2001) states:

> It is very important to keep in mind that, for faculty members, developing online modules, courses and programs, in addition to providing labour intensive coaching most online learners require, can be very time consuming. Faculty members cannot be expected to sustain a commitment to online learning while continuing to carry their traditional teaching, research and engagement responsibilities. If e-Learning is to flourish, it will be important for institutions to release faculty members from their duties so that they will have the time to devote to online learning. However, it is important to keep in mind that providing such release time will commit institutions to very sizeable expenditures they can ill afford – especially at a time of swelling enrolment when faculty members from the baby boom are reaching retirement age. (pp. 51,52)

Although the primary merit of e-Learning as discussed so far is flexibility, it is important to discuss stability of the delivery platform. Uniformity of a platform across the institution needs to be supported by careful and consulted upgrades.

Multiplicity of software results in a number of potential problems that are quite obvious. Purchasing licenses for multiple brands of software drives the cost up, and also diminishes some opportunities to lever economical pricing from a single company. Technical support becomes fragmented and confusing within the institution. Faculty and students can potentially be exposed to multiple learning management systems (hereafter LMS), forcing both groups to learn multiple environments. Therefore, it is necessary to evaluate, at an institutional level, what LMS is most appropriate for that institution.

One of the distinct characteristics of the computer industry is the continual change of software and hardware. As a matter of standard operating procedure, IT departments roll out new versions of software as soon as they are available. However, when examining the nature of educational software, it may be wise to maintain the adage: "if it isn't broken don't fix it". Saettler (1968) relays some of the problems that occurred when sound films were marketed as educational media:

> The advent of sound film in the late twenties introduced a critical period in the instructional film history. Just as educators were becoming convinced of the educational merits of the silent film, the advocates of the sound film realized that they had to fight the old battle all over. The first instructional sound films brought mixed reactions. Some educators repudiated the old silent films; others rejected the new sound films; still others refrained from either open approval or disapproval until they became convinced that the addition of sound was not just another technical novelty. Many hesitated to accept the sound film because they feared their silent equipment would become useless. (pp. 109, 110)

Students also will require support. Login difficulties, connectivity problems, software compatibility (or lack thereof), and isolation all pose potential problems for the online learner (Palloff & Pratt, 1999). Brennan et al. (2003) state in their report: "The main barriers were technology-related issues. Remedies to overcome these were seen to include the provision of a better delivery system and more instruction for users, including classes for beginners to enhance their information technology skills, support throughout the course, and personal tutoring" (p. 53).

Robin Popow, Project Leader of the Alternate Apprenticeship Program, Vancouver Community College, indicated that, as the provider of e-Learning, he is also the chief provider of technical support for the students. While he is able to manage this workload for the courses currently running, Robin indicated that other technical support will be required from the College in order to keep the workload feasible (R.

Popow, personal communication, June 25, 2006). Without proper support, students experiencing difficulties will fall behind, become frustrated, and possibly leave the online programme for a face-to-face method. Palloff and Pratt (1999) indicate that technical support is not only the instructor's responsibility:

> Institutions, like faculty, must engage in good planning in the delivery of online programs and courses and be willing to provide the level of support necessary to make the programs a success. Anything less results in frustration on the part of the students and faculty, as well as loss of confidence in the process of distance learning on the part of both. If institutions and faculty are unable or unwilling to make the commitment necessary to provide quality distance learning, they should not enter this arena. (p. 69)

The transition from traditional classroom and workshop instruction represents a significant change of a well-established training programme. In addition to the considerable educational implications of such a change, there are great implications for any organization seeking to provide broad applications of sustainable e-Learning. Leadership is critical to ensure success, but governmental leadership is not sufficient. Institutional leadership in concert with governmental efforts and faculty initiatives are required for success.

Conclusion and Recommendations

In the light of changing society, greater demands are placed on educational institutions to provide training in an online educational environment. Apprenticeship training could benefit from this method of delivery since there are a number of motivating factors, some of which are: meeting the needs of the apprentice, his community and his employer. Through accessing training by Internet, apprentices are able to maintain their employment, support themselves and their families, and continue being productive for their employers. Overall, this will have a positive national effect as this will hopefully curtail attrition and dilution of the skilled trades; something that is necessary to ensure national, provincial and regional economic well being.

In order to prevent re-hashing problems of old, it is useful to look at the past and determine why the system, as it now exists, came into being. The past can then be used as a guide to avoid the pitfalls that came before. From this investigation, George Selman (1988) is proved correct: the past is not well documented. In the absence of history it will, without care, be repeated and rather than progress apprenticeship training will regress.

In this light, careful evaluation and matching of the current apprenticeship model to the future training model is critical to ensure that any critical features of apprenticeship are retained. To maintain national mobility, the Interprovincial Qualification must be held sacred. This standard ensures not only mobility, but also maintains the current level of competency that British Columbians have come to expect from journeymen in the Province.

Key in the implementation of a new model of training is the involvement of industry. Many of the barriers can be overcome through careful examination of the needs and capabilities of industry. Through negotiated partnerships, employers and educators can work collaboratively to ensure that the apprentices receive the best possible training from each party.

Finally, if a radical change is to be made to apprenticeship training, educational institutions and faculty alike are going to have to reconcile themselves to some earth-shattering upheavals. New technology and

instructional techniques will provide a steep learning curve for faculty, and the different workload will necessitate a change in the current institutional concept funding. The perception of faculty work will also need to change. Support from administration will need to be immediate and ever-present. Increased technical support for instructors and students alike must be provided. None of this is possible without a definite goal and thorough communication and collaboration.

Limitations and Recommendations for Further Study

The opinions of the student are often overlooked in the process of change, even if the change is in their best interest; apprentices of British Columbia are no different in this respect. Throughout the literature review and documentation from the turn of the last century, labour represented apprentices, but apprentices did not have a large voice. Through surveying two classes of Electrician apprentices some opinions have been brought to light. The original intention was to administer this survey to a maximum of 200 apprentices in a variety of trades so that it might provide a useful database from which conclusions could be drawn about suitability between trades and geographical location. The small sample does not allow adequate generalization and therefore the survey should be expanded to provide a bigger picture of how apprentices view their training.

Through this work the author has conceived ideas about how the survey might have been more useful and considered other questions that, in the creation of the survey, were not realized; the work done in this effort is just the tip of the iceberg. To be very concise, further study will need to be done on the opinions of apprentices to determine the best way to get both parties onside before implementation.

Employers should also be queried as to their acceptance of new training models. While there are some recent, successful examples of employer – educator co-operation in flexible learning pilot studies, it remains to be seen if this could be sustained over a large-scale project. Moreover, if the workplace is to provide proctors to monitor the apprentices' performance, work needs to be done to coach and train employers or apprentice supervisors as mentors and evaluators.

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Appendix A

Survey Form

❑ W

CONSENT:

By signing below I acknowledge that I have: read the study document and agree to participate in this study, that I am over 19 years of age, and that I know that I may at any time check the W box above and withdraw my contribution to this effort. I also understand that my name and signature are only collected for confirmation of consent, and that this personal information will remain completely confidential and will not appear on any other documents. Moreover, this survey hard copy will be destroyed no later than January 1, 2007.

Signature   Name   Date

Demographic Information:

This information is collected in the interest of discovering differences between apprenticeship groups and between ages of apprentices.

Age		Trade		Number of years served in this trade	
Do you own a computer?		❑ YES ❑ NO	If yes, how long have you owned a computer?		
Do you have internet service?		❑ YES ❑ NO			
If yes, what is the type of service?		❑ Dial-Up ❑ ADSL ❑ Cable			

SURVEY:

Please answer the survey questions below by shading in the number that best reflects your opinion.

Question NumbeR		Strongly Disagree \ FALSE \ NO	Somewhat Disagree	Somewhat Agree	Strongly Agree \ TRUE \ YES	Not Applicable
	The theoretical technical training I receive at school is important to my job advancement	①	②	③	④	Ⓝ
	I enjoy going to school to receive my training	①	②	③	④	Ⓝ
	I live close to the training center or institution at which I take my apprenticeship training	①	②	③	④	Ⓝ
	The workshop component of my technical training is important to my job advancement	①	②	③	④	Ⓝ
	The workshop component of my technical training models my workplace	①	②	③	④	Ⓝ
	I use a computer at home for recreational purposes such as surfing the internet, digital photographs, games	①	②	③	④	Ⓝ
	I am familiar with using discussion forums	①	②	③	④	Ⓝ
	I am familiar with using electronic calendars to arrange my time	①	②	③	④	Ⓝ
	I am comfortable with business programs such as MS Word, Excel, PowerPoint	①	②	③	④	Ⓝ

Question NumbeR		Strongly Disagree \ FALSE \ NO	Somewhat Disagree	Somewhat Agree	Strongly Agree \ TRUE \ YES	Not Applicable
	I use a computer in my job on a regular basis	①	②	③	④	Ⓝ
	I am a good student	①	②	③	④	Ⓝ
	On the job training is better than technical training received at school	①	②	③	④	Ⓝ
	I need a structured learning environment with fixed due dates to do well in school	①	②	③	④	Ⓝ
	I would prefer to learn at my own rate and arrange my own time rather than have to schedule school time away from work	①	②	③	④	Ⓝ
	I can afford to take time off of work for my studies without worrying about money	①	②	③	④	Ⓝ
	There is enough time in my program to really learn the material	①	②	③	④	Ⓝ
	I continue to work while I am at school (① for NO ④ for YES)	①			④	Ⓝ
	I have taken correspondence courses in the past (① for NO ④ for YES)	①			④	Ⓝ
	I am a self-directed learner	①	②	③	④	Ⓝ
	I study work related materials when not related to apprenticeship training, including OEM and aftermarket training programs.	①			④	Ⓝ

Question NumbeR		Strongly Disagree \ FALSE \ NO / NO	Somewhat Disagree	Somewhat Agree	Strongly Agree \ TRUE \ YES	Not Applicable
	(① for NO ④ for YES)					
	I read trade journals and magazines on my own time (① for NO ④ for YES)	①			④	Ⓝ
	Trades training received at school current and consistent with my experience in the workplace	①	②	③	④	Ⓝ
	I am interested in trying computer based learning	①	②	③	④	Ⓝ
	My employer gives me a wide range of work to expand my abilities	①	②	③	④	Ⓝ
	My employer supervises my work carefully	①	②	③	④	Ⓝ
	At work I am mostly on my own without much supervision	①	②	③	④	Ⓝ
	I use the internet to help me update my skills and knowledge for work	①	②	③	④	Ⓝ
	I learn a lot from other apprentices while at school	①	②	③	④	Ⓝ
	I stay in touch with the other apprentices I have met while attending trade school	①	②	③	④	Ⓝ
	I often contact the other apprentices I have met at trade school for assistance (such as with technical questions)	①	②	③	④	Ⓝ

Question NumbeR		Strongly Disagree \ FALSE \ NO \ NO	Somewhat Disagree	Somewhat Agree	Strongly Agree \ TRUE \ YES	Not Applicable
	I am often contacted by other apprentices I have met at trade school for assistance (such as with technical questions)	①	②	③	④	Ⓝ
	I have received job opportunities through apprentices I have met at trade school	①	②	③	④	Ⓝ
	The yearly apprenticeship schooling is longer than I need to master the material	①	②	③	④	Ⓝ
	Trade school provides a good source of social and professional contacts for me	①	②	③	④	Ⓝ

Thanks for your time today in filling out this survey and assistance in my investigation.

Brad Hartwig

COMMENTS?

Please make any comments about this survey in the space provided below.

Appendix B

Compiled Survey Data

Table 1

Demographic Data (Page 1)

Question	Mean	Median	Mode	Quantity	Yes	No
Age	26.63	23	22.00			
Number of years served in this trade	2.47	2.00	2.00			
Do you own a computer? (Y)				22		
If yes, how long have you owned a computer?	7.29	6.00	10.00			
No computer				5		
Do you have internet service?					22	5
Dial-up				0		
ADSL				16		
Cable				5		
Multiple				1		
No Internet				5		

Table 2

Summary of Survey Data (Pages 2,3)

Question	Mean	Median	Mode	N/A	Blank	Yes	No
1. The theoretical technical training I receive at school is important to my job advancement	3.85	4.00	4.00	1	0		
2. I enjoy going to school to receive my training	3.41	3.00	4.00	0	0		
3. I live close to the training center or institution at which I take my apprenticeship training	2.37	2.00	1.00	0	0		
4. The workshop component of my technical training is important to my job advancement	3.18	3.00	4.00	1	4		
6. I use a computer at home for recreational purposes such as surfing the internet, digital photographs, games	3.35	4.00	4.00	0	1		
7. I am familiar with using discussion forums	2.35	3.00	3.00	0	1		
8. I am familiar with using electronic calendars to arrange my time	1.81	1.50	1.00	0	1		
9. I am comfortable with business programs such as MS Word, Excel, PowerPoint	2.59	3.00	3.00	0	0		

Question	Mean	Median	Mode	N/A	Blank	Yes	No
10. I use a computer in my job on a regular basis	1.31	1.00	1.00	0	1		
11. I am a good student	3.74	4.00	4.00	0	0		
13. I need a structured learning environment with fixed due dates to do well in school	2.63	3.00	3.00	0	0		
14. I would prefer to learn at my own rate and arrange my own time rather than have to schedule school time away from work	2.31	3.00	3.00	0	1		
15. I can afford to take time off of work for my studies without worrying about money	2.04	2.00	1.00	0	0		
16. There is enough time in my program to really learn the material	3.11	3.00	4.00	0	0		
17. I continue to work while I am at school (① for NO ④ for YES)[a]				0	0	3	24
18. I have taken correspondence courses in the past (① for NO ④ for YES)[a]				1	0	10	16
19. I am a self-directed learner	2.19	2.00	3.00	0	0		
				0	1	7	19

Question	Mean	Median	Mode	N/A	Blank	Yes	No
20. I study work related materials when not related to apprenticeship training, including OEM and aftermarket training programs. (① for NO ④ for YES) [a]							
21. I read trade journals and magazines on my own time (① for NO ④ for YES) [a]				0	0	7	20
23. I am interested in trying computer based learning	2.23	2.00	2.00	0	1		
24. My employer gives me a wide range of work to expand my abilities	3.23	3.00	4.00	0	1		
25. My employer supervises my work carefully	2.92	3.00	3.00	0	1		
26. At work I am mostly on my own without much supervision	2.73	3.00	2.00	1	0		
27. I use the internet to help me update my skills and knowledge for work	1.88	2.00	1.00	0	1		
28. I learn a lot from other apprentices while at school	3.19	3.00	3.00	0	0		
29. I stay in touch with the other apprentices I have met while attending trade school	3.00	3.00	3.00	0	0		

Question	Mean	Median	Mode	N/A	Blank	Yes	No
30. I often contact the other apprentices I have met at trade school for assistance (such as with technical questions)	1.93	2.00	1.00	0	0		
31. I am often contacted by other apprentices I have met at trade school for assistance (such as with technical questions)	1.96	2.00	1.00	0	0		
32. I have received job opportunities through apprentices I have met at trade school	2.67	3.00	3.00	0	0		
33. The yearly apprenticeship schooling is longer than I need to master the material	2.08	2.00	2.00	0	1		
34. Trade school provides a good source of social and professional contacts for me	3.69	4.00	4.00	0	1		

Note: Questions 5, 12 and 22 are not reported to remove the potential for erroneous assessment of the institution at which the survey was carried out. The original intent was that multiple institutions would participate and these values would be generalized.

[a]Data collected were values of 1 and 4 have been converted to numbers of YES and NO responses for simplicity.

Comments

The following comments were collected verbatim from Page 4 of the survey form:

- I believe that correspondence can be done but I think that going to school helps me learn better

- As far as online courses are concerned, I'd be opposed. Computer based learning is a good tool in the arena of education proper, but is not the "be all - end all". Different people learn in different ways. Audible, visual, hands on. Often a person learns through metaphoric examples, even through an instructor's inflections, gestures and personal experiences. Often several different perspectives, examples, and opinions are needed with 3 dimensional visual cues for a person to get the gist of the concept.

- If there were to be online training there would need to be some source of help (instructor) available for help either via e-mail or at a campus for reference and explanations.

- The only forseeable problem I can think of is that a lot of things discussed in class have the personal touch of the teacher added. This is formed from their years of experience. Can this still be incorporated in an online program. At the same time, it would be beneficial for me to take the online program in the upcoming years.

- On-line apprenticeship training should be an option available to apprentices

- In my opinion, in class explanations and lessons are far too valuable to be missed. I highly doubt the input and opinions of an instructor who has worked in the trade and knows about workplaces and theory could or would ever be replaceable on-line. I also believe it would lead to less informed journeymen who skimmed through the course at home on-line and did not absorb the knowledge.

Author Note

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