What lies behind us, and what lies before us, are tiny matters compared to what lies within us.

Ralph Waldo Emerson

University of Alberta

Education and Technology Policy Discourse in Alberta: A critical analysis

by

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Abstract

My research is a critical examination of technology policy discourse between four organizational groups: Alberta Education, the Alberta Teachers' Association (ATA), the College of Alberta School Superintendents (CASS) and the Alberta School Councils' Association (ASCA). I adopt a discursive theoretical position, to examine how education policy promotes a way of thinking about technology by endorsing some values over others and is therefore qualitative. One overarching question and a related sub-question guide my inquiry:

1. What ways of thinking about technology are evident in Alberta's education policy discourse?
- What relationship exists between the ways of thinking about technology in Alberta's education policy discourse and nodal discourses, specifically, the knowledge-based economy and globalization?

The literature base informing my inquiry encompasses three fields of research, the philosophy of technology, education policy and critical organizational discourse. Since my study is based on technology policy in education through an interest in discourse, meaning and power, I employ critical discourse analysis to excavate the common sense notions and assumptions in documents and interview data from the four organizations. Feenberg suggests the various ways of thinking about technology can be summarized into four categories, instrumentalism, determinism, substantivism and critical theory (1999). Feenberg's model (1999) serves as a lens through which to roughly classify the philosophical positions of the organizations.

The findings illustrate technology policy discourse in Alberta is divided along the values axis between the ATA and ASCA taking up substantivist and critical theory positions and Alberta Education moving between instrumentalist or determinist positions. In addition, the data suggests a value-neutral view of technology has dominated the discursive field with significant implications on implementation. Despite the apparent philosophical divide in the ways of thinking about technology in education, the concept of 21st century learning emerged across all four philosophical positions. My findings point to a need for future policy dialogue to adopt a more philosophically inclusive and balanced approach to ensure the potential of technology to support student learning does not go unrealized or continue to narrowly support technical goals.

Keywords: philosophy of technology, policy discourse, 21st century learning

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I was able to complete this study because of the sacrifices, encouragement and contributions of my family, friends and colleagues. The privilege of taking time to study a topic deeply comes at tremendous cost often borne by others. This thesis is not so much a reflection of my understanding, but rather a measure of what one can accomplish given a strong foundation of love, respect and acceptance.

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Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction

Questioning the solution: a vignette

I began my position as an education and technology consultant for my former district by spending time at each school to get a sense of the culture, the professional development needs of the teaching staff and leadership approach of the administrative team. I was immediately struck by the huge disparity between schools in terms of resources. Schools in middle to high socio-economic neighbourhoods tended to have engaged parent councils. In these schools, the parent councils were highly proficient in raising funds for technology by participating in supporting local casino events. There were also differences in the student populations with schools in low socio-economic neighbourhoods having relatively high numbers of special needs and immigrant children. However, across the district each administrative team expressed an interest in acquiring more technology or updating existing systems. I was not surprised by this general consensus but the level of commitment and the sense of urgency to do more, something, anything with technology reflected a certain inadequacy that was disconcerting.

One particular school visit was particularly perplexing. The school has the unfortunate distinction of being one of the lowest on the Fraser Institute rankings, a right-wing think tank report, each year. After the principal took me on a tour of the old (1911) building, we discussed the needs of the students and staff. The teaching assistants outnumber the teachers, the school relies on several social programs, issues with abuse, poverty and basic care are common. The principal concluded his long list of challenges with "and so we're going to get some Smartboards[1] in here". I was taken aback by his response because I couldn't understand the connection between the litany of social issues and the Smartboard solution. "Smartboards?" I asked. "Well, we have to give these kids every advantage. They're already starting out at the bottom. They need technology skills if they're ever going to get a piece of the pie" the principal explained. As I drove back to the office, I tried to understand the principal's rational. Where did this faith in technology come from and why are technology skills the ticket to a better future? Are the teachers and teacher assistants asking for Smartboards? Who is best served by the assumptions inlaid in the skills gap discourse taken up by the principal and supporting the Smartboard solution?

Although my exchange with the principal solidified my interest in further study, my interest in technology and education began as a teacher as I became

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[1] Smartboard refers to a brand of interactive whiteboards.

intrigued by the potential of technology to change teaching and learning in a host of intended and unintended ways. In my Master's research, I discovered teachers ability to use technology effectively was constrained due to factors of which they had little control, such as access to technology. Later, as a district technology consultant, I worked with principals pressured to use their limited funds to install the latest technology, at the expense of larger class sizes, inadequate physical space and an increasing number of children with special needs. During this time and through my work in schools I began to wonder if and how technology policies influenced what I was observing in schools. Next, in my position as an education technology consultant with Alberta Education, I became aware of the multiple ways technology appeared in policy and related documents alongside promises to increase efficiencies and enhance accountability while at the same time transforming classrooms. In all three professional positions, the technology discourse seemed to morph to suit some interests over others. The discussions about technology and education often seemed to be anchored in principles that were not grounded in educational theory and occasionally not in the best interests of teachers and students.

My research interest in the power of language, originally seeded in my interaction with the principal described above, was renewed during my time with Alberta Education. A significant part of the enculturation experience involved learning how to write and talk in ways that best reflected the beliefs and values of

my employer. I became acutely aware of the power of specific words as I worked with my colleagues to craft briefings and key messages. The most effective messages did two things simultaneously, reinforced the position and key messages of Alberta Education and resonated with the intended readers. I became accustom to reading messages through the filters of three main groups: the Alberta Teachers' Association, provincial educational leaders, and the voting public. As colleagues, we would work together to predict if and how each group would respond to a particular message to be prepared to counter. In effect, this process of prediction allowed me to be better prepared for interactions, be it through printed documents or in meetings, with members of other groups. Besides honing my ability to critically assess the discursive field, I was also challenged by my colleagues in a similar process as we as individuals and branches (departments) engaged in extensive dialogue to move initiatives forward. Despite the range in values and beliefs represented within each branch, when we came together in committees, there was a common recognition of our need to work within the discursive frame of our employer – the government of Alberta. This did not, however, dampen the vigorous nature of debate. My image of the stereotypical bureaucrat was shattered days into my employment as I watched a heated and emotional exchange spill out into the hallway after a meeting. The strength of our common culture as employees was most evident when we met with representatives from other organizations. I was astounded to watch the same colleagues who had argued so passionately in the hallway, support each other

eloquently and genuinely in front of a large group of stakeholders. In those times, a common language and a shared understanding bound us.

Being an employee of Alberta Education and perhaps more importantly, a member of a distinctive culture was professionally and personally demanding, rewarding and defining. As a teacher, I had always been aware of my public persona to some extent, but my experience with Alberta Education truly opened my eyes to the highly political nature of public education, first, and second to the power of language. In Alberta Education, as in my former district, a sense-making filter regulates what language is used to create, maintain and reproduce a conception of reality both for employees and for external groups. I have come to see this process as necessary, dynamic, constructive and limiting.

The language we choose, despite its many limitations, is the primary means through which we make sense of our world, perceive reality and imagine alternatives. I define discourse as the language (words) we choose to represent aspects of our physical (material), internal (thoughts) and social (relationships) world. Discourse also represents our projections of preferred futures. Discourse, as part of our social practices, mediates our experiences, allows us to build understanding based on shared knowledge and imagine other possible ways of being or interacting (Fairclough, 2003). The language we choose in relation to education policy and technology is a subset of what is available to us (discourse).

My professional life thus far has caused me to be skeptical and curious about some discourses, specifically those that have become uncontestable. During the last 10 years, one overarching question and a related, sub-question have motivated my professional interests:

1. What ways of thinking about technology are evident in Alberta's education policy discourse?
- What relationship exists between the ways of thinking about technology in Alberta's education policy discourse and nodal discourses, specifically, the knowledge-based economy and globalization?

My study examines technology policy and related documents to identify and analyze the prominent discourses in relation to four philosophical orientations to technology to map differences between organizational groups. For the purposes of this study, I define a prominent discourse as one which emerges consistently between assumptions about technology and reinforces the values and beliefs of an organization.

After extracting the organization's prominent discourses from the data, I look for congruence with two master or nodal discourses: globalization and the knowledge-based economy (KBE). Globalization and the knowledge-based economy are accepted, common sense notions taken up across sectors including the economy, culture, science, politics and health (Jessop, 2004). Both nodal

discourses endorse a positive, deterministic orientation of technology through assumptions about economic progress and innovation[2].

While prominent discourses serve as a background for organizational sense making and ways to respond when engaging other groups, nodal discourses work across sectors and cultures and are virtually impervious to critique. I am interested in examining the relationship between the prominent discourses of organizations in education and the KBE and globalization nodal discourses. Given the potency of the KBE and globalization, an organization is more likely to secure dominance within the technology policy discursive space through a positive correlation with these nodal discourses. Effectively, if a prominent discourse of an organization is based on the same assumptions as for example the KBE, it is more likely to dominate the discursive field.

Purpose of my research

The exchange with the principal, and many others like it with colleagues, parents and educational leaders, caused me to be curious about the thinking behind technology decisions in education. The purpose of my study centers on excavating the common sense notions about technology in education policy discourse in Alberta. I situate my research approach within a critical social theory

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[2] A more detailed definition of nodal discourses and the criteria used to identify prominent discourses are provided in chapter 2.

orientation with a focus on examining how education policy discourse advances and reflects some assumptions about technology in the education system over others. Further, although I recognize the possibility of individuals taking up alternative positions, the prominent discourses in technology policy limit the potential for other perspectives. Given this purpose, my inquiry is guided by one overarching question:

1. What ways of thinking about technology are evident in Alberta's education policy discourse?

I assume language has the potential to shape the way we make sense of our world and how we think about technology in education. I believe some words, or collections of words, serve some interests more than others by creating, maintaining and reproducing selected messages. Further, I suspect education policy discourse has been dominated by some ways of thinking about technology which leads me to ask a second, sub-question:

- What relationship exists between the ways of thinking about technology in Alberta's education policy discourse and nodal discourses, specifically, the knowledge-based economy and globalization?

I believe the way we of think about technology, in education specifically, has been under examined. I use critical discourse analysis to identify, analyze and interpret the discourses prevalent in education policy circles. I discuss why critical discourse analysis best serves the purpose of my study in more detail in chapter 2.

It is my hope the findings will be helpful in guiding discussions about the purpose of technology in education that acknowledges the shared mandate of public education and respects the different orientations to technology in education. My focus on education in Alberta, a province with a bold technology policy agenda, may serve as a case study as the calls for the transformation of education through technology become difficult to ignore.

Alberta context

Alberta is of interest to me for three reasons: 1) it strives to be and is viewed as a leader in education, 2) it has allocated significant resources to supporting a systemic approach to technology in education, and 3) it has been my professional home for over 15 years. In what follows, I will touch on each reason before highlighting some of the history with respect to technology in education during this time.

Alberta Education's vision statement, "to be the best K – 12-education system in the world", is ambitious and sets a competitive tone (2008a, p. 2). Some results, such as national School Achievement Indicators Program (SAIP) and international tests Programme for International Student Assessment (PISA), indicate Alberta is indeed often one of the best education systems (Alberta Education, 2007a; Alberta Education, 2008c). Alberta's reputation for high quality education has created interest from other countries. Since 2004, Alberta has accredited three international schools allowing students in Macao, Hong Kong

and Switzerland to attain Alberta high school diplomas (Alberta Education, 2005b). Also, in July of 2009, Minister Hancock was the only Canadian education minister to receive an invitation to an international roundtable designed to share best practices along with representatives from Australia, China, Hong Kong, Singapore, Sweden, the United Kingdom and the United States. The event was hosted by Singapore's Minister of Education Dr. Ng Eng Hen and Sir Michael Barber co-author of "How the world's best performing school systems came out on top" (Barber & Mourshed, 2007). Given this prominence, Alberta warrants attention.

However Alberta's dropout rate, defined as 20-24-year-olds without a high school diploma and not in school, continues to be an issue. Alberta currently has the second highest dropout rate in Canada according to Statistics Canada. Alberta Education's Business Plan (2008 – 2011) includes a performance standard to raise the 5-year completion rate from 78% to 81%. In July 2007, Alberta Education announced the Technology and High School Success project and provided grants to 24 school jurisdictions to support the use of technology to improve student engagement.

Alberta's unique economic context as a 'have' province and the centralized governance model in education has allowed it to move forward in terms of a systemic approach to technology making it a model for others. "Clearly, in Alberta the existence of a clearly articulated vision and the physical resources makes it possible for that province to move the agenda to a higher

level" (Yabsley, 2004, p. 48). Alberta has been able to amass the political will and resources necessary to address three core areas of technology in education: infrastructure (hardware and software), curriculum and resources and professional learning. Several large-scale provincially funded and supported infrastructure projects, such a SuperNet, LearnAlberta, videoconferencing and the Microsoft license, have provided schools with access to broadband, resources and applications (Alberta Education, 2007b).

In terms of curriculum and resources, Alberta's ICT and Career and Technology Studies curriculum along with the Teaching Quality Standard place an expectation on teachers to apply a variety of technologies to meet the mandated learning outcomes across the curriculum, within specific courses of study in junior and senior high school and generally to meet the students' diverse learning needs. Recently, the Principal Quality Standard was revised to include a technology leadership dimension requiring principals to "recognize(s) the potential of new and emerging technologies, and enable(s) their meaningful integration in support of teaching and learning" (Alberta Education, 2009b, p. 5).

Thirdly, Alberta Education has endeavoured to establish a professional learning community through communication with jurisdictions, stakeholder organizations and post secondary institutions through groups such as Jurisdictional Technology Contacts (JTC) and the Stakeholder Technology Advisory Committee (STAC). Alberta Education has provided technology related research grants and attempted to develop communities of practice by including

expectations for disseminating research findings in grant deliverables, hosting face-to-face professional learning events and supporting online sites for sharing resources and findings.

The existence of activity in these three areas speaks to the ability of Alberta Education to garner enough support and consensus to channel resources despite the many competing priorities such as an increase in English second language and special needs students, the need for schools in growing areas and some resistance from the ATA. Despite these tensions, or perhaps because of them, Alberta Education has been able to advance and resource an ambitious technology agenda. Certainly there have been concessions along the way as some ideas have found traction and become more persuasive than others.

The Evolution of Educational Technology in Alberta (Appendix A) charts the launch of infrastructure and research projects, reports from provincial reviews, and policy documents beginning in the early 80s with the final report from the Minister's Task Force on Computers in Schools in 1983. The task force was struck by then Minister Dave King to make recommendations for long term planning to support the instructional and administrative use of computers in schools. Within this broad mandate, was a pointed directive to assess "the feasibility of establishing an educational courseware development and marketing capability within Alberta" (Romaniuk, 1983, p. ii). The task force committee included 13 members to reflect the "broad base of interests" (Ibid., p. ii), with two individuals from the corporate sector, two representing teachers (through the

Alberta Teachers' Association and the Conference of Alberta School Superintendents), and three from each of Alberta Education, parent or public groups, and higher education.

Throughout the report, the authors stress the issue of computers in schools is a concern for everyone since "the ability to use technology is a prerequisite to long-term economic prosperity for Alberta" (Ibid., p. 2). The report includes 48 specific recommendations ranging from infrastructure and funding to teacher training and curriculum. Significant attention was given though, to the need to exploit the potential of Computer Assisted Instruction (including Computer Assisted Learning and Computer Managed Learning) and the software or courseware required. Given the time, 1983, it is perhaps not surprising the computer was envisioned primarily as a curriculum delivery device capable of increasing efficiencies – more learning through individualized instruction and less time required for administrative tasks. Such promises are mainstays within the technology and education realm. What makes this particular report bold and also, politically reflective of the climate in Alberta is the strong recommendation for Alberta Education to actively engage the software industry.

> We believe that the provincial government should assist in the development of a strong and competitive software industry in Alberta. This industry is labour-intensive, future oriented, its products can be marketed outside the province and easily distributed. Such an industry is consistent with the provincial economic diversification strategy. A thriving software development industry in Alberta, encouraged by the government through incentive and other means, would clearly assist the province in achieving its educational objectives. (Ibid., p. 58)

At the time, the task force clearly believed students, teachers, the education system and the government's economic strategy would benefit from becoming more involved in computer-supported direct instruction and the software or courseware industry. The voice of the task force group pervades the tone of the report through the frequent use of the word, *we*, and specifically addresses how teachers can use computers in the classroom and "enable *us* to deliver instruction more effectively" (Ibid., p. 37). The task force report concludes by estimating the recommendation would cost 10 million dollars over five years to implement.

Alberta Education became actively engaged in technology in 1982 by launching the 'Black Apple'[3] purchase plan and computer purchase grants for schools alongside the introduction of a Computer Literacy curriculum for all grades. Between 1981 and 1983 the number of computers in schools increased from 265 to 3535 (Alberta Education, 2009a, p. 2). In fact, Alberta led all of Canada and all but three American states in the provision of computers to schools (Alberta Education, 1987, p. 3). In 1985, Computer Processing 10, 20 and 30 was introduced to "help students prepare for the information age" (Ibid., p. 3). Between 1985 – 1988 the Small School Action Research project, designed to

[3] Alberta Education purchased 1,000 Bell and Howell OEM computers ("Black Apple") for resale to schools. This provincial initiative spurred the growth of computers in schools and resulted in an increased of 1254 percent: from 265 to 3535 in a two year period (Alberta Education, 2009c).

increase access to programs, utilized telephones and fax machines to send student work to tutors and markers.

In 1987 Alberta Education released Visions 2000: A vision of educational technology in Alberta developed by an internal committee. It predicted the year 2000 would bring "rich and responsive environments for learning where each child may develop confidence and competence in using twenty-first century tools to deal with changing challenges that will call for new attitudes and skills to meet new personal and social realities" (Alberta Education, 1987, p. 4). The report conceived of an efficient, well-managed relationship between humans, materials and machines leading to substantial savings of cost and time, increased individualization and accessibility. "There is no question that technology, intelligently applied, can enhance the quality of learning at fixed or reduced levels of funding, particularly in small or remote schools" (Ibid., p. 4). The report went on to predict the possible uses of portable computers, satellite transmitting and receiving equipment, holography and robotics. It also recommended the curriculum should integrate technology in all courses and provide students with opportunities to learn about, in and through technology. The report did include a cautionary recommendation encouraging the careful analysis of the limitations and impediments of technology to ensure "we create environments that are humane" (Ibid., p. 5). The report concluded "(s)ince the times call for "doing more with less" we are confident that technology can play a vital role in improving the quality of education" (Ibid. p. 6). Clearly, technology was

conceived as an investment that would yield returns through increased efficiencies.

In 1990 the junior high computer studies curriculum replaced the computer literacy curriculum based on two beliefs reflecting the curricular recommendations from the Visions 2000 report: students needed to have a minimum amount of knowledge about computers especially as a productivity tool (learning with and through computers) and students interested in pursuing computers as an area of further study should have the opportunity (learning about computers).

In 1995, the government-appointed MLA Implementation Team on Business Involvement and Technology Integration in Education released the Technology Integration in Education discussion paper which concluded with nine recommendations, five of which were specific to technology infrastructure. The Network Access Grant, of 5 million dollars or $2750 for each learning site, followed the recommendation of the paper to invest in technology to improve teaching, learning and the future employability prospects of students.

In 1996, the Implementation Plan for Technology in Education was released with a focus on five core areas for technology integration in schools: computers, infrastructure, teacher in-service, curriculum and resources and the Internet. The plan led to several key initiatives in each of the core areas over the next five years. To address computers and infrastructure Alberta Education provided enveloped funding for technology to jurisdictions (Technology

Integration Funding), and one-time funding to jurisdictions for the Computer Networks through Innovation. The focus on curriculum and resources lead to the development of the Career and Technology Studies curriculum, the ICT program of studies and the Microsoft provincial licensing agreement. Teacher in-service was motivated by the inclusion of technology-related knowledge and skills to the Teaching Quality Standards and funding was provided to support the launch of Telus Learning Connection and the Galileo Educational Network Association.

In the late 90s, Alberta Education also began creating connections with jurisdictions, post-secondary institutions, and stakeholders through the creation of two groups: the Stakeholder Technology Advisory Committee (STAC) and the Jurisdictional Technology Contacts (JTC). In July, 2001, The SuperNet contract with industry was announced to connect all schools with broadband access to realize the potential of the Internet.

These highlights of technology and education in Alberta demonstrate substantial provincial involvement and leadership. In terms of trends or patterns, it appears Alberta Education initially adopted an infrastructure focus, followed later by the development of curriculum and resources and finally support for professional learning. Also, although research has become more important in terms of informing the direction of technology in education, some of the infrastructure-based projects, including the provision of videoconferencing to all jurisdictions in 2005, were not supported by sufficient research on student learning. Two explanations might shed some light on the gap between research

and some technology projects. First, Alberta Education, by being one of the first to introduce new technologies, was not able to draw upon an established body of research. Second, technology projects seem to be highly influenced by political and economic forces. For example, in the meetings I attended regarding the potential provincial videoconferencing project, the discussion focused on three fairly political goals: to showcase the broadband capability of SuperNet, to improve access to the rural and remote communities and to demonstrate equity. It was thus decided jurisdictions would initially receive two videoconferencing units.

At the time of the launch of the videoconferencing project there was little research on videoconferencing because the technology was relatively new and costly. Alberta Education funded a literature review by Dr. Terry Anderson and Dr. Liam Rourke which concluded since "the bulk of the writing in this area consists of anecdotal reports, project descriptions, and informal case studies…(c)onsequently, we have insufficient information with which to offer definitive conclusions about the use of videoconferencing in a K-12 setting" (2005, p. 3). Alberta, in the absence of a significant body of literature, essentially created their own by providing jurisdictions with funding for infrastructure and reporting. It appears the videoconferencing community of practice grew out of a need to demonstrate utility (Alberta Education, 2006a). Over the years, approximately 13.5 million has been spent on videoconferencing in Alberta (Alberta Education, 2009c).

Alberta's vision for technology in education and emphasis on infrastructure are not unique given the context of the time and the jurisdiction of the department. Alberta has been able to advance this agenda relatively quickly largely due to the belief that technology can ensure progress by increasing efficiencies within the system and by fostering a competitive culture that rewards innovation. The notion of efficiency is consistently threaded through technology policy documents, business plans and reports. Funding for technology related projects has been provided through a competitive call for proposals process. Jurisdictions best able to meet the proposals requirements are awarded funding and expected to produce a final report detailing how the funding was used and what was learned about the technology implementation process and the impact on teaching and learning. In this way, the call for proposals process can target research by linking innovation, competition and implementation.

> Alberta Education encourages ongoing innovation and research to explore how new technologies and related practices can help improve teaching and learning. One strategy for supporting this innovation is through competitive Calls for Proposals. Calls for Proposals are innovative, research-based initiatives that let jurisdictions pilot new technologies and practices. School jurisdictions participating in these projects become Alberta Education's research partners in examining new ways of using technology in teaching and learning. (Alberta Education, 2007e)

Since this granting process is used throughout the department of education, some districts, for example the Calgary Board of Education, has dedicated resources to supporting a grant-writing team to improve their chances of securing funding. Alberta Education has consistently led the country in large-scale

technology projects but it is difficult to determine if equity has been further eroded by the call for proposals process. Further, it is difficult to assess if the large-scale technology projects have resulted in change in teaching practice and enhanced learning opportunities. Although jurisdictions have reported on findings associated with grants and Alberta Education has contracted researchers to gather data on some projects (Alberta Education, 2008b; Parsons, 2004), the findings are limited to the students and teachers involved and may not be reflective of the education system. Regardless, Alberta is, in comparisons to other provinces, well equipped technologically and Alberta's students are consistently performing well on provincial and international tests.

Alberta is also of interest to me because I began teaching in a 7 – 12 school in 1990 after being a student in the same district. I have had the opportunity to serve as a teacher, a jurisdictional consultant, and in the technology and curriculum areas of Alberta Education. My teaching career began on the cusp of the Klein revolution (Lisac, 1995), which introduced sweeping restructuring to public education. During the most contentious time, 1993 – 1995, education became front-page news as Alberta Education, the ATA and other stakeholders, such as the Alberta School Boards Association (ASBA) and Alberta Home and School Council (AHSC), struggled to advance their respective agendas in a highly politicized battle.

In January 1994, Alberta Education announced a mix of reforms foreshadowing the upcoming budget. Under the banner of a balanced budget, the

government announced a 12.4% budget cut, 55% reduction in school boards, 50% reduction in kindergarten and introduced charter school legislation (A. Taylor & Neu, 2000, p. 76). The government also removed the ability of municipalities to collect taxes for education and assumed the right to appoint all superintendents. Taken together, the reforms served to both constrict and centralize public education. Reaction was immediate and tensions peaked on October 4, 1997 when the ATA successfully staged the largest march on the legislature attracting more than 20, 000 teachers (Flower & Booi, 1999). Public education was in the spotlight and despite the many competing agendas reform was imminent. Efficiency, accountability and choice were the key words for the restructuring regime, and the backdrop for education policy in the 90s (A. Taylor, 2001).

Alberta led the way nationally on accountability-based reform initiatives by implementing provincial achievements tests in grades 3, 6, and 9 and diploma exams in the early 80s. Taylor found the dominant discourse of the market resonated with business leaders in Alberta and secured "the accomplishment of hegemony or consensual control within the sphere of education" (A. Taylor, 2001) through the creation and implementation of Alberta's Three Year Education Plan in 1994. Alberta Education took up a "results based approach to education (through) a better balance among inputs, processes and results" (McEwen, 1995, p. 28). In the 3-year Business Plans, Alberta Education introduced goals, strategies, actions and performance measures. Evidence of the influence of business rhetoric and the acceptance of related notions within the social and

political context of that time is mirrored in the Alberta Teachers' Association (ATA) Education Week theme for 1990 – 1992, *Education is everybody's business*.

What is most fascinating, and relevant to my study, about this highly divisive time was that virtually all the education partners and stakeholders agreed on one thing, schools needed technology. In his study Jantzie (2002) surveyed three groups: ATA leadership, members of the Computer Council (ATA specialist council) and a stratified sample of teachers in Calgary. All three groups opposed the elements of the reform focused on encouraging competition between schools and the budgetary cuts, but "(a)ll three groups generally supported the adoption of technology" (Jantzie, 2002, p. iv). It is safe to conclude, although these results are from a relatively small sample size, technology remained protected and unquestioned amidst the political upheaval.

Although the ATA has consistently adopted a cautionary stance, their Technology and Education position paper acknowledges the potential of technology to enhance teaching and learning but admonishes teachers to focus on the pedagogical considerations foundational to effective learning. "Teachers must be vigilant in ensuring that technology is used to enhance, not displace, the human dimension and purposes of education. The teaching profession needs to proceed carefully and responsibly in integrating technology into the learning environment" (Alberta Teachers' Association, 1999).

As I write, Alberta Education is dealing with fairly significant budgetary cut backs which may usher in a time of reflection on technology in education. During the last 10 years Alberta could afford to live on the edge of technological innovation. The new economic reality will likely require political and educational leaders to carefully consider and account for the costs and benefits of technology.

Significance of the inquiry

My research, by focusing on Alberta as a unique case, will add to a considerable, oft ignored, body of work critically examining technology in education and society (Bowers, 2000; Burbules & Callister, 2000; Feenberg, 1991; Ferneding, 2003; Franklin, 1999; Moll, 1997; Robertson, 2003). Technology in education, in this view, needs to be examined not as purely instrumental, neutral or natural but rather as a part of the framework for a way of life in our schools (Feenberg, 2003). The increasing prevalence of technology and the commensurate reliance on technology in our education system, accentuates the need for informed policy decisions based on a full complement of perspectives and research. It is my hope the findings will foster a balanced discussion about the role of technology in education in relation to the broad purposes of public education.

My focus on language, in addition to my belief in the integral relationship between language, sense making and values, is a reflection of the increasing importance of language use in post-modern society. During the last 15 years, we

have witnessed the rise of the communications experts in the corporate, academic and government sectors as appropriately worded messages become integral to effectively managing internal operations and external relations.

> …(T)he language element has in certain key respects become more salient, more important than it used to be, and in fact a crucial aspect of the social transformations which are going on – one cannot make sense of them without thinking about language. (Fairclough, 2003, p. 203)

How we write and talk about technology in education is worth examining because it frames, constructs and becomes a part of what it is we want our schools to be like and how we want our students to experience learning. My study is important because the findings have the potential to increase awareness of the ways of thinking about technology endorsed through education policy discourse and the possible implications for public education.

Delimitations

I have chosen to focus on the language used in relation to technology in education policy documents and related documents. The research questions motivating my study required the study to be delimited in terms of focus (policy), data selection (technology related documents), scope (inclusive of four organizational groups) and time period. Policy is often considered innocuous and disconnected from what was really happening in classrooms. I have intentionally elected to study policy and related documents because I have witnessed how policy can influence direction, guide decisions and allocate resources. The

documents selected are not meant to be a complete collection but rather a representative set of related documents. A more detailed rationale for the selection process is included in Chapter 3.

My research interests in discourse, meaning and power could be examined using other focal points but I have chosen to use technology because my experience has led me to be curious about how we talk, write about and use technology in education. Also, although other education policy documents include references to technology, I have specifically selected those which work together to influence discourse provincially, within jurisdictions and more broadly, in the public realm. The selected educational policy documents contribute to, in varying degrees, setting provincial direction, supporting implementation of policy directions within jurisdictions and potentially influencing public discourse.

> Even the most valid aims which can be put in words will, as words, do more harm than good if it is not recognized that they are not aims but rather suggestions to educators about how to observe, how to look ahead and how to choose in liberating and directing the energies of the concrete situations in which they find themselves. (Dewey, Boydston, & Hook, 1985, p. 160)

Education policy does just that, whether we are aware of it or not.

I have further limited the inquiry by attending to the technology and education discourse pertaining to four key organizational groups: government (Alberta Education), teachers (the Alberta Teachers' Association), school jurisdictions (College of Alberta School Superintendents) and parents (The Alberta School Council Association). As explained earlier, I selected these groups

based on my professional experience, most recently with Alberta Education where I became attune to the interests of the ATA, provincial educational leaders, and the voting public. A more detailed rationale is provided in Chapter 3.

In selecting to study the discourses associated with 4 groups, I have excluded other groups including the Alberta School Boards Association (ASBA) and the Association of School Board Officials of Alberta (ASBOA). Both groups, although valuable contributors to public education in Alberta appeared to, based on the strategic planning documents and my professional experiences, have a more tangential interest in technology and education policy. For example, one of the goals in ASBA's strategic plan states: "Boards in Alberta come to a shared understanding of how choice is/might be delivered in Alberta, keeping education of children as a first priority" (Alberta School Boards Association, 2007, p. 3). Although it is likely technology would be implicated in the quest for new delivery mechanisms for the education system, technology is not specifically mentioned in the document. Similarly, ASBOA does not mention technology in even a peripheral way in its strategic plan (Association of School Business Officials of Alberta, 2007). However, ASBOA will likely utilize technology to achieve part of its mandate, to improve efficiency in school business management but this marks only a limited connection with the critical and philosophical focus of my study.

Finally, I have chosen to study the time period 1990 – 2009 since it reflects my professional involvement in education in Alberta. Further, I selectively highlight events to provide a context for my study based on my

interpretation of the historical record available and the relationship to my inquiry. Although I believe Alberta, as a case study, is a rich site for my inquiry, I acknowledge the limitations inherent to my research approach.

Limitations

The study is limited in several ways due to my research interests and orientation and time and space constraints.

To begin, my inquiry is qualitative and set in the critical tradition allowing for 1) selective and purposeful data gathering 2) personal investment of the researcher and a skeptical orientation to inquiry and 3) interpretative analysis of data to determine underlying meaning and patterns. My study is not quantitative and therefore does not set out to prove a hypothesis based on mathematical measurement or neutral observation. For some, my focus on why and how things are, rather that on what, when and where things are may be a limitation.

Also, while I believe the student and teacher voice is important to technology policy in education, my inquiry does not follow technology policy through to implementation in terms of how technology is taken up in classrooms or school jurisdictions therefore I did not interview students or teachers. Although studies utilizing discourse analysis often succeed in demonstrating a relationship between language and action, this aspect is out of the scope of the study. I do however, consider the possible implications of my findings on student decision-making processes in Chapter 5.

Secondly, the documents collected do not represent all the possible documents that could influence the discourse on technology and education in Alberta. Many forces and documents shape technology in education policy. My selection process, described in more detail in chapter 3, necessarily limits consideration of other documents. Also, my historical and social perspective influences the interpretations of the selected policy documents. However, the lens through which I interpret the data is set out in the purpose of my study and the description of the Alberta context.

Another limitation includes the number of interview participants included in my study. Although the creation, editing and implementation of technology policy in Alberta includes many individuals across the system, I chose eight individuals to participate in my study. Time and space constraints contributed to limiting the list of participants but methodological reasons outlined in Chapter 3 provide specific reasons for each selection. In brief, I was interested in interviewing individuals that had a breadth and depth of experience and knowledge in technology and education in Alberta.

Another limitation involves the memory of the participants and the period of time I asked them to recollect. Thus, my study is limited by the accuracy and selectivity of human memory. The interview data must be considered incomplete for this reason. However, since it is likely participants will recall those events and connections which stand out, the data will contribute to my interest in prominent discourses.

Finally, my interview questions limit the information participants are able to provide and my interaction with the participants could influence their response. This limitation is minimized in two ways. First, the semi-structured interviews allow questions to shift based on the position and experience of the participant and the flow of the interview. The questions are open-ended and allow for flexibility in responses. Allowing the discussion to follow the interests of the participant creates an opportunity to tap into the expertise of the participant and uncover issues previously not considered within the scope of the questions.

The intention of the first chapter was to convey my research interest and the structural outline for my study. In what follows, I draw upon three fields of study to flesh out the theoretical foundation.

Chapter 2: Ways of thinking about technology and education policy

The literature base informing my inquiry encompasses three fields of research, the philosophy of technology, education policy and critical organizational discourse. The philosophy of technology provides a theoretical basis for exploring our assumptions about technology and how it changes the way we interact with each other and our world. Education policy literature, specifically from a discursive stance, provides me with theoretical tools to examine the dynamic nature of policy as a site of negotiation between organizational groups. Education policy responds, intentionally or not, to the philosophical questions of technology. This literature base is foundational to exploring the assumptions and supporting beliefs about technology in education policy. The relatively new field of critical organizational discourse relates directly to my interest in drawing meaningful connections between policy discourse and the ways of thinking about technology taken up in organizations.

I begin with a brief introduction to the philosophy of technology before highlighting Feenberg's model (1999) which provides a framework for considering the relationship between technology and the social world based on four broad categories: instrumentalism, determinism, substantivism and critical theory. From here, I move to define education policy as a bridge between the social world and the education system. I contend education policy reflects the way

society conceives of what is lacking, possible and desirable in the education system by identifying problems and offering solutions or by pairing available solutions with appropriate problems. Finally, I introduce critical organizational discourse literature which theorizes the dynamic relationship between groups as each strives to influence how policy issues are framed. I conclude by circling back to my research question and the purpose of my inquiry.

Referring back to the vignette, the principal's rationale for interactive whiteboards reflects a now common assumption linking technology in schools with future employability and broadly, progress. His comments include assumptions based on beliefs about technology. My inquiry focuses on identifying the assumptions and related beliefs about technology in education policy and related documents which may have influenced the principal's views. To accomplish this task, I must first turn to the philosophy of technology.

My study is rooted in exploring what is assumed about technology within the context of education policy. The philosophy of technology is foundational to my inquiry because it examines the nature and social effects of technology. As a field of study, the philosophy of technology questions what we assume to be true about technology and how it shapes who we are, our interactions with others and the world.

Mitcham (1994) follows the growth of the philosophy of technology as a field of study, along two branches: engineering and humanities. From an engineering perspective, and through the works of for example, Ernst Kapp and

Friedrich Dessauer, technological thinking and activity are the basis for understanding human thinking and activity. Engineering philosophy of technology seeks to explain human experiences and ways of being in technological terms. The second branch, the humanities philosophy of technology, including for example, Heidegger and Ellul, attempts to limit the prominence of technological thought and activity and suggests it represents one of the many dimensions of human experience. This humanities approach to exploring the ways of thinking about technology, by raising questions about the assumptions guiding what we believe and value, informs my inquiry.

Considering technology from a philosophical position is a relatively recent tradition. The Enlightenment, and specifically the publication of Encylopédie in 1752, ushered in a new system of beliefs based on science, technology and logic. Modern societies began to demand rational explanations for beliefs based on science and logic challenging the myths and customs common to traditional societies. While science continued to provide more information about the world, technology provided more ways for humans to act on it. So while traditional societies strove to live in harmony with the natural world, modern society sought to understand and conquer it. The prevalence and reliance on technology in all aspects of modern life and a scientific, rational culture has gradually replaced many of the customs and myths associated with traditional cultures.

Science and technology intersect as science supports our need to know and technology drives our desire to control the world. Peters (2006) suggests the

philosophy of technology was late to develop because it "was seen as the handmaiden of science, a kind of applied knowledge that put into practice the pure theory of science" (p. 97). Thus, technology simply grew out of science and was not the subject of critical contemplation until the 20th century.

The humanities philosophy of technology has flourished and generated rich theoretical models for considering how technology shapes our institutions and broadly influences our interactions with each other and our world. In what follows I use Feenberg's model (1999), conceptualizing four philosophical approaches, to provide a brief scan of the field. Although there are limitations to Feenberg's model, as with any attempt to categorize theoretical concepts, it is helpful in establishing basic orientations to technology.

What are the ways of thinking about technology?

The philosophy of technology field provides a historical backdrop and introduced me to multiple models or ways of thinking about technology in education. As I began to explore theoretical models for my study, I was intrigued by Aviram and Tami's (2004) descriptions of the three dominant paradigms prevalent in ICT and education: the Technocrat, the Reformist and the Holistic. However, as I reviewed the data and reflected on my professional experiences, the three categories seemed too limiting. I struggled to identify a conceptual framework in the early stages of my research but in the end, Feenberg's model (1999) emerged quite naturally after the data analysis was complete.

Feenberg suggests the various ways of thinking about technology can be summarized based on questions of control and value. Table 1 below outlines the four positions Feenberg uses to examine the beliefs foundational to our assumptions about technology (1999, p. 9).

Table 1: Feenberg's Table (1999) of Philosophical Positions

Technology is...	**Autonomous**	**Humanly Controlled**
Neutral (complete separation of means and ends)	Determinism (traditional Marxism)	Instrumentalism (liberal faith in progress)
Value-laden (means forms a way of life that includes ends)	Substantivism (means and ends linked in systems)	Critical Theory (choice of alternative means-ends systems)

(Feenberg, 1999, p. 9)

Although the table appears fairly clear, a couple points regarding its application need to be mentioned. In discussing the table, Feenberg (1999) presents the option of considering positive or negative orientation within each quadrant. For example, an optimistic interpretation of determinism would suggest technologies evolve to better meet human needs whereas a less hopeful interpretation would suggest technology is steering humanity to inevitable destruction. In terms of my data analysis, discerning the positive and negative

interpretations within each quadrant is not vital as I take up Feenberg's table (1999) in its most literal interpretation. Here, an instrumentalist position asserts technology is value-free and subject to human control. I am more concerned with the general orientation (e.g. instrumentalist or determinist) of a prominent discourse and less interested in the positive or negative interpretation.

However, because my inquiry is qualitative and therefore relies heavily on my own interpretation of the data, my analysis leaves open the possibility for questioning 1) the selection of a prominent discourse and 2) the accuracy of positioning a prominent discourse within Feenberg's table (1999).

My method attempts to ensure a realistic measure of accuracy but ultimately the quality of my findings depends largely on the transparency of the process and my discernment. So although another researcher, following same line of inquiry and analyzing the same documents, may identify somewhat different prominent discourses or position some prominent discourses in different quadrants on Feenberg's table (1999), I am confident, overall, the findings would be consistent.

Secondly, as Peters notes, Feenberg's model (1999) can force a simplistic interpretation as, for example, "the Heideggerian programme…can run across forms of substantivism (Heidegger) and critical theory (Marcuse and Foucault)" (2006, p. 101). Certainly this is true. However, although some prominent discourses may not align neatly within a particular orientation, they tend towards a position.

Feenberg's model (1999) by delineating the role of human action and the neutrality of technology meshes well with my central concern in discerning the assumptions and beliefs about technology in education policy. My inquiry is centrally concerned with exploring each element along the axis definitively. Feenberg's model (1999) serves as a lens through which to roughly classify the philosophical positions of the organizations present in the data. In what follows, I sketch a description of each broad category in the four quadrants and highlight the central assumptions relating to each. Relevant theorists and examples are highlighted to provide an overview of the field.

Figure 1: Feenberg's Table (1999) of Philosophical Positions - Instrumentalism

Technology is...	**Autonomous**	**Humanly Controlled**
Neutral (complete separation of means and ends)	Determinism (traditional Marxism)	**Instrumentalism** **(liberal faith in progress)**
Value-laden (means forms a way of life that includes ends)	Substantivism (means and ends linked in systems)	Critical Theory (choice of alternative means-ends systems)

Instrumentalism, occupying the top-right quadrant, adopts a user-directed, tool-view approach to technology. Feenberg (2003) refers to instrumentalism as

the "standard modern view" originally taken up by the philosophers and scientists during the 18th Century Enlightenment (p. 6). Here, technology is a neutral instrument designed to solve a problem. The technology improves our ability to complete a task and meet our needs. Instrumentalism takes an empirical approach to the interaction between technology and the world and attempts to quantify the usefulness or impact of a technology. As such, any given technology is thought to have fairly consistent determinate effects regardless of the context. Two assumptions ground this position: 1) technology is non-mediating and 2) humans control ends. "(I)t is normally assumed that the particular technology (mobile phones) operates in a more or less uniform manner in different social settings (Introna, 2007, p. 12). The tool view tends to foreground the capabilities of a technological device while deemphasizing the effect on the social world in which it operates. Feenberg (2003) argues instrumentalism and a liberal faith in progress have dominated Western conceptions of technology until recent years.

For example, the One Laptop Per Child initiative promotes technology, specifically laptops, in a homogenized and neutral way, as the answer to the economic and social problems for all countries. Launched by Nicholas Negroponte, with the support of Seymour Papert and MIT Media Laboratory, the project seeks to provide children in desperately poor countries, such as Nigeria, Rwanda, and Afghanistan, with inexpensive laptops.

> Any nation's most precious natural resource is its children. We believe the emerging world must leverage this resource by tapping into the children's

> innate capacities to learn, share, and create on their own. Our answer to that challenge is the XO laptop. (Negroponte, 2007)

The impetus for the XO laptop project is born from an instrumentalist position as it endorses technology as a means of meeting human needs and specifically supporting resource development for economic ends. Further, the project assumes the laptop will be taken up and used by children in a uniform manner regardless of their social context.

In education, Papert (1980) presents a positive interpretation of instrumentalism by suggesting computer culture opens up new opportunities for students to develop problem-solving skill. Papert believes as students use technology they are exposed to new ways of thinking. As students learn a programming language, for example, they are not simply just creating a program to accomplish a set task but are also becoming more aware of the structural process of building knowledge.

Noble (1995) provides a more pessimistic take on instrumentalism by challenging the promises and neutrality of technology, and pointing to the harmful impacts of technology on society. Noble examines the ways technology has changed work, in industry for example, by de-skilling labor devaluing craft-based knowledge while also driving down wages.

Instrumentalism by accepting human control and assuming technology is value-neutral presents a limited view. So while technologies, for example mobile phones, extend our ability to communicate schools must respond to the other

impacts such as bullying using text-messaging, recording teachers during class and the simple expectation of constant access. Instrumentalism downplays the influence of the social world and the possibility of unintended impacts of technology use.

Figure 2: Feenberg's Table (1999) of Philosophical Positions - Determinism

Technology is...	**Autonomous**	**Humanly Controlled**
Neutral (complete separation of means and ends)	**Determinism** **(traditional Marxism)**	Instrumentalism (liberal faith in progress)
Value-laden (means forms a way of life that includes ends)	Substantivism (means and ends linked in systems)	Critical Theory (choice of alternative means-ends systems)

In the top-left quadrant, technological determinism also conceives technology as value-neutral but rejects the notion of human control. Technology shapes society based on the natural requirements of progress. Two major assumptions ground this philosophical position: 1) technology develops according to a fixed, direct and inevitable course and 2) society must respond and be organized around technological developments. Darwin (1958) is often associated with technological determinism as he viewed technology as grounded in natural

laws and progress. For Darwin, technological development meets human needs and extends our ability to engage the environment based on improved knowledge of the natural world. Progress, realized through improved efficiency, was the shared guiding principle of nature and technology.

Feenberg includes Marx (1906) in the deterministic camp. While Marx recognized the ways technology established exploitive social structures, he also recognized the potential of technology as powerfully liberating in the hands of the oppressed. Socialism was "not just ending economic injustices and crises, but also democratizing technical systems, bringing them under the control of the workers they enroll. This change would release technology from the grip of capitalist imperatives to a different development" (Feenberg, 1999, p. 224). Although these interpretations of Marx' work offer a fairly optimistic view of determinism, as technological development paves the way for social equity, the more common interpretation is less so.

Technological determinism can also take up a dystopian script where society is powerless and technology propels social changes in keeping with market-based values of competition, efficiency and profit. For example, Marx is more often grouped with anti-technology determinists. Marx believed investment in technology was motivated by a desire to reduce the cost of labour. Thus, technological development, he predicted, would continue to fall under the guiding forces of capitalism. Winner takes up a similar position by demonstrating how technology, by its nature and structure, can be liberating or repressive,

decentralizing or centralizing (1986). Winner contends society is in a state of "technological somnambulism" whereby progress is driven by technology itself rather than careful consideration of the ways in which technologies can structure power relations. Winner argues technology creates new forms of political life, as the artifacts themselves are active political agents and not tools we use without unforeseen implications. “(T)echnologies are not merely aids to human activity, but also powerful forces acting to reshape that activity and its meaning” (1986, p. 6).

Two things are salient for my purposes about determinism: 1) technology is uncontrollable, 2) technological development occurs in a predictable, evolutionary manner ensuring progress. Determinism, in either interpretation, is limited as it denies the possibility of human agency. There is little room to engage technological change if one assumes we are but spectators.

Instrumentalism and determinism present a clear, relatively straightforward way of thinking about technology. That is, technology will advance society either through human will or by realizing its own predetermined end.

Figure 3: Feenberg's Table (1999) of Philosophical Positions - Substantivism

Technology is...	**Autonomous**	**Humanly Controlled**
Neutral (complete separation of means and ends)	Determinism (traditional Marxism)	Instrumentalism (liberal faith in progress)
Value-laden (means forms a way of life that includes ends)	**Substantivism** **(means and ends linked in systems)**	Critical Theory (choice of alternative means-ends systems)

Substantivism is more complicated in that although, like determinism, technology is considered autonomous, it is also value-laden. As such when we choose to use a specific technology for a specific purpose we accept the inherent good or bad qualities or forces, which remain hidden by rationality and efficiency, of that technology. Max Weber's theory of rationalization provides a foundation for substantivism. Weber (1958) describes the plight of modern societies as doomed by the increasing technical control of the social world embodied in the "iron cage" of bureaucracy. For Weber, technology secured rational order thereby enlisting human beings as cogs in the bureaucratic machine or objects similar to raw materials and the natural environment. Weber's theories influenced and inspired many philosophers including Ellul, Habermas and Heidegger.

Heidegger is often considered the most prominent, anti-technology substantivist (Feenberg, 2003). Heidegger erases the division between experiences and technology and suggests an all-encompassing conception of technology as a system and a mode of being. Heidegger warns that defining technology as a means to an end and as human activity blinds us to the essence of technology. In Heidegger's work, technology has a singular trajectory, uncontrollable by humans and value-laden.

> But we are delivered over to it in the worst possible way when we regard it as something neutral; for this conception of it, to which today we particularly like to do homage, makes us utterly blind to the essence of technology. (Heidegger, 1977, p. 4)

In modern societies, technology reveals the world as raw material and objects of control. Heidegger contrasted the dominant Western view of technology as a means to an end with the ancient Greek origin of the term, techne. Techne, refers to the specific process and tools required to craft a thing or perform a service. The techne included the know-how, the purpose, and the process - the essence of the thing (Heidegger, 1977). In modern times, the meaning of techne has shifted as we have asserted control of technology and reduce everything to component parts through systematic, efficient processes. Whereas techne was a craft relationship with the natural world, it has been rationalized through an instrumental view of technology. Modern society is 'enframed' by technology and consequently is reduced by it. "Essentialism holds that there is one and only one 'essence' of technology and it is responsible for the chief problems of modern

civilization" (Feenberg, 1999, p. 3). For Heidegger, technology in our modern times, has become irrevocably detached from the natural world.

Thus, in the technology-saturated society, a fixation on progress and the endless pursuit of efficiency motivates all aspects of human endeavour. Ellul suggests technical values of rationality, artificiality and control supplant the natural order. “Technique has taken over the totality of human activities, not only those of productive activity” (Ellul, 1964, p. 2). Technique is defined as a modern orientation to machine, economics and social systems. For Ellul, the sacred or mysterious necessities of human life are under constant attack by technique. Technique “integrates the machine into society. It constructs the kind of world the machine needs and …clarifies, arranges, and rationalizes…it is efficient and brings efficiency to everything” (Ellul, 1964, p. 5). Technique as a standard, objective method is valued over a creative, subjective one in all aspects of life.

> It has become a general faith, widespread even when it is unvoiced, that technique and technical organization are necessary and sufficient conditions for arriving at truth, if not at the moment, then shortly, to answer the question that life thrust upon us. (Barrett, 1978, p. 8)

Feenberg also suggests the substantivist position is chiefly about a preferred way of life much like that of a religion but where the technology itself, and not the individual, holds values.

> When you choose to use technology you do not simply render your existing way of life more efficient, you choose a different way of life. Technology is thus not simply instrumental to whatever values you hold. It carries with it certain values that have the same exclusive character as religious belief. But technology is even more persuasive than religion

> since it requires no belief to recognize its existence and to follow its commands. Once a society goes down the path of technological development it will be inexorably transformed into a technological society, a specific type of society dedicated to values such as efficiency and power. Traditional values cannot survive the challenge of technology. (Feenberg, 2003)

In this frame, even the problems created by technology are solved with yet more technology. Ellul theorized the nature of technology itself prevents individuals, especially in advanced industrial societies, from critically assessing technology. Thus, society's cult-like dependence on technology becomes a moral force used to "strip off externals, to bring everything to light, and by rational use to transform everything into means" (Ellul, 1964, p. 142). By generating a perpetual sense of need, technology creates dependency and becomes the sole focus of all aspects of human life replacing or eradicating our connection with the natural world.

Substantivism, as shown, tends to spiral downwards and leave society hopelessly enslaved in a technology-bound existence however a positive interpretation is also possible. Those who subscribe to the Radical Instructional Design (RID) theory give over control to technology and place faith in technologists as guides to educational reform. "On the whole, these pro-technology substantivists hold that technology is the key to better schools and better education; it can and will break down traditional barriers to effective and successful school reform" (Blacker, 1994, p. 2). RID theorists see the potential in 'teacher-proof' technologies since traditional teaching subverts learning.

According to this view, teachers and the tradition of mass schooling is set on squashing innovation to preserve the system.

Both interpretations of substantivism are based on two assumptions: 1) technology shapes society more than society shapes it and 2) further that technology holds some inherent values. The positive and negative interpretations of substantivism diverge sharply around whether either aspect, lack of control and inlaid values, will result in improving rather than destroying society.

Figure 4: Feenberg's Table (1999) of Philosophical Positions – Critical Theory

Technology is...	**Autonomous**	**Humanly Controlled**
Neutral (complete separation of means and ends)	Determinism (traditional Marxism)	Instrumentalism (liberal faith in progress)
Value-laden (means forms a way of life that includes ends)	Substantivism (means and ends linked in systems)	**Critical Theory (choice of alternative means-ends systems)**

The critical theory quadrant accepts technological design, development, and use is controllable by humans and reflects the values of the social context. So whereas substantivism tends towards a sense of inevitability, critical theory leaves room for the potential for human agency and choice. Hickman (2006) traces the evolution of the critical theory philosophy of technology through Marcuse and

Foucault concerned with "emancipation from instrumental rationality as an ideology" to Feenberg's interest in "problems of technoscience not separate from, but as part of social life" (p. 72). Marcuse and Foucault offer a more pessimistic interpretation of critical theory and suggest technology is enmeshed in modern society effectively negating the possibility for critique. From this position, the whole system, the values, beliefs and attitudes, must be examined, reoriented or dismantled.

Marcuse, Feenberg's mentor, believes most people, but especially those benefitting most, have been co-opted by the 'the system' fueled by the manipulation and creation of false needs and political interests. "It is (the world) a rational apparatus, combining utmost expedience with utmost convenience, saving time and energy, removing waste, adapting all means to the end, anticipating consequences, sustaining calculability and security" (Marcuse, 1941, p. 419). For Marcuse (1964) technology is a part of our social fabric but has succeeded in rendering our lives in one dimension. As such, technology is now invisible and inevitable. As the glue of the modern industrial economic system, technology is blindly adopted by the masses accepting productivity and consumerism as the primary functions of a progressive society. Those with vested interests, such as private owners and political leaders, must find ways of "mobilizing, organizing, and exploiting the technical, scientific, and mechanical productivity available to industrial civilization" (Marcuse, 1977, p. 108). The human experience is reduced and homogenized within a technocratic frame.

The philosophical theories and criticisms are helpful in calling attention to critical blind spots in the analysis of technology in education but there is a risk of failing to acknowledge and realize the potentialities afforded by technologies. Although much of Marcuse work contains strong substantivist roots, he also leaves open the possibility for radical reform as humans become more aware and take up technology with a fuller understanding (Marcuse, 1972).

Feenberg builds his own philosophy of technology from a critical theory position by assuming "technology is not a thing in the ordinary sense of the term, but an ambivalent process of development suspended between different possibilities" (1991, p. 14). Feenberg's version represents a more optimistic view of critical theory of technology and asserts social constructivism enables technologies to be taken up in different ways and the most beneficial practices sustained. Social construction of technology (SCOT) responds to the deficiencies in determinism and suggests human action shapes technology rather than the reverse (Pinch & Bijker, 1984). Social constructivists further challenge technology cannot be fully understood if one does not study how technology is embedded in its social context. In this way, communities shape the development of technology by choosing technological practices that meet the needs of their local context. Technology is, to some extent, socially constructed.

Feenberg's version of a critical theory of technology also reflects Habermas' notion of a democratic speech community but includes technological design and development to promote the need for a "democratic rationality".

Feenberg argues technological change must begin in the social world. Technological design has historically proven to be political as design choices often reflect the control of privileged actors and not an essential essence of technology. Feenberg (1999) characterizes technology as ambivalent based on the capacity to uphold two contrasting principles:

> 1. Conservation of hierarchy: social hierarchy can generally be preserved and reproduced as new technology is introduced.
>
> 2. Democratic rationalization: new technology can also be used to undermine the existing social hierarchy or to force it to meet needs it has ignored (p. 76).

As one of these two principles is enacted, technology frames a way of life or predisposes us to a particular way of being and interacting. Feenberg sees the critical theory of technology as a political project intersecting the functional and the social dimensions of technology.

Foucault (1980) theories influence Feenberg's position by revealing how social space (e.g. Panopticon prison) become technologies of power. Here, technical domination is a product of social organization, is socially contingent and malleable that is, able to take up different roles in different social systems. Feenberg (1999) notes, however, Foucault's theories do not account for the role of technology specifically but rather focus on the link between the distribution of power and social systems of administration. Foucault's work illuminates the political nature of technology by underscoring how the "masters of technical

systems, corporate and military leaders, physicians and engineers, have far more control over (the organization of society) than all the electoral institutions of our society put together" (Feenberg, 1999, p. 131).

Thus Feenberg, like Sclove, sees technology as a form of legislation (Sclove, 1995). Here, technologies:

> …by coercing physical compliance; prompting subconscious compliance; constituting systems of social relations; establishing opportunities and constraints for action and self realization; promoting the evolution of background conditions; affecting nonusers; shaping communication, psychological development, and culture generally; and constituting much of the world in which our lives unfold. (Sclove, 1995)

In sum, the critical theory philosophy secures any inquiry in technology within the social domain with each theorist opting for a more positive or negative interpretation and a specific disciplinary focus. For the purposes of my study, the three beliefs underlying Feenberg's (2003) critical theory of technology will serve as criteria for this fourth quadrant:

1. Values embodied in technology are socially specific and not narrowly limited to efficiency or control technology.
2. Technologies offer frameworks for ways of life.
3. The design and configuration of technology does not only meet our ends; it also organizes society and subordinates members into a technocratic order.

Feenberg's philosophy does not leave us hopelessly enslaved in a technological system but rather suggests all members of society need to be

engaged in examining the relationship between technology and the social world.

> We need to understand ourselves today in the midst of technology and technical knowledge itself cannot help us. Philosophy of technology belongs to the self-awareness of a society like ours. It teaches us to reflect on what we take for granted, specifically, rational modernity. The importance of this perspective cannot be over-estimated. (Feenberg, 2003)

The above statement calls for a level of intellectual engagement with technology, which, in my experience, has been overshadowed in education policy discourse. By endorsing the possibility of human efficacy, critical theory provides a way for all individuals concerned, not just technical experts and political leaders, to participate more fully in the questions of technology as it relates to the education system, teaching practice, student learning and society. This less compliant position requires educators, as part of their professional responsibilities, to become knowledgeable contributors to a conversation, which has traditionally been dominated by others (e.g. technical experts and political leaders).

However, critical theory also has limitations. Although it provides a foothold for human agency, it may place unrealistic expectations on the active engagement of citizens and overlook the power of technology to force social change. In addition, although critical theory serves as a call to take up technology to enrich democracy and foster better ways of life, it fails to sufficiently acknowledge the limitations imposed by institutions and social structures. With respect to Feenberg's conceptualization of critical theory, some suggest although

it resonates with the contemporary experience, it has limited application with other historical periods.

> While Feenberg's analytic distinctions are useful in clarifying some key aspects and dimensions of contemporary technology, I think that there are some conceptual limitations in his attempt to develop an overarching philosophy of technology that will define its common characteristics over a broad range of historical contexts. (Kellner, 2001, p. 160)

Since my inquiry has a contemporary focus, this limitation is not problematic.

To conclude, the four theories outlined by Feenberg (1999) provide a framework from which to consider the ways of thinking about technology in Alberta's education policy discourse. Examining the assumptions about technology in education policy in relation to the four philosophical positions illuminates what is taken for granted, ignored, and valued in the social world. The philosophy of technology field provides a theoretical backdrop from which to examine the assumptions and beliefs about technology and education in Alberta's education policy discourse and consider the implications for teachers, students, stakeholders and the public. Although applying Feenberg's (1999) table of philosophical orientations has some limitations, such as the risk of over generalizing, it provides a useful way to trace the different ways of thinking about technology evident in the discourse of the four organizational groups: Alberta Education, the Alberta Teachers' Association, Alberta School Councils Association and the College of Alberta School Superintendents (CASS).

What is the relationship between the ways of thinking about technology, education policy and discourse?

Education policy is an artifact of a dynamic, discursive, political process articulating, among other things, the purpose and role of technology in schools. In my study this narrow slice of education policy, specifically that concerning the perspectives of various groups in Alberta on technology, serves as the focal point. Education policy, by endorsing ways of thinking about technology, has the potential to influence perception, shape values and rationalize actions in both constructive and destructive ways. Identifying the prominent discourses in education policy discourse and examining the values upon which they rest can contribute to a more open dialogue regarding the issues and challenges of technology and education.

What is discourse?

Due to my focus, I draw on the field of organizational discourse to examine the interdependent relationship between discourse, meaning and power within and between groups. I define discourse as the language (words) we choose to represent aspects of our physical (material), internal (thoughts) and social (relationships) world. Discourse also represents our projections of preferred futures. Taken together, discourse, as part of our social practices, mediates our

experiences, allows us to build understanding based on shared knowledge and imagine other possible ways of being or interacting (Fairclough, 2003).

What is education policy?

Education policy, for the purposes of my study, is considered a product of a discursive process within the economic and political and realms of the social world. My inquiry focuses on education policy and related documents because they offer ways of thinking about technology in schools. By analyzing the language used in documents and through interviews it is possible to compare and contrast how four key organizational groups in Alberta's education sector make sense of technology in education. I have narrowed my focus to include groups representing: government (Alberta Education), teachers (the ATA), school jurisdictions leaders (CASS School Superintendents) and parents (The Alberta School Council Association).

Ideally, education policy should reflect the cultural norms of the public and provide accountability for the quality of the education system. It is a product of a democratically elected government and implemented, by in large, by public servants for the public good. Realistically, public education policy is politically precarious, as it attempts to balance public interests while also being influenced by the private sector, which exists to maximize individual interests. Whilst mediating the often short-term agendas of political actors, policy also attempts to

settle the often incongruous public visions of the role of education to: conserve and grow, pass on traditions and promote innovation, reaffirm value in what is known and a desire to discover the unknown. "We understand…education policy, to be contradictory in its effects and possibilities: education is stimulatingly a means of improving life chances and enriching life, as well as a process that maintains inequality and sustains conservative social formations" (Ozga & Lingard, 2007, p. 66). Education policy lives in this tension between public and private interests, improving and conserving and remains "whatever its limits, a central way for societies to shape themselves" (Levin, 2001, p. 33).

Policy is part of a discursive process that offers solutions to problems based on a set of values and viewpoints and in doing so, relegates others. By legitimizing particular philosophical positions about technology in education, policy potentially limits the discursive choices and fosters consensus about the direction of educational reform (Selwyn, Gorard, & Williams, 2001; Woodside-Jiron, 2004). Policy, as an authoritative document garners support for specific priorities in the education system and contributes to the consumption, production, distribution and reproduction of ways of thinking and talking about education. Education policy, is about "much more than a specific policy document or text…(r)ather policy is a process and a product" (S. Taylor, 1997, p. 25). Discourse and power underpin both aspects as groups struggle to advance their

philosophical position, secure a dominant position and build consensus within the policy realm. Policy is:

> …a part of a wider system of social relations, framing what is said and thought. Policy texts simultaneously emerge out of, but also produce, particular policy discourses. Groups and individuals position themselves and are positioned by these texts and discourses, and their acceptance, rejection or modification is shaped, in part, by them. (Blackmore & Lauder, 2005, p. 98)

Policy is a site of negotiation as policy-makers ascribe meaning to text, while being influenced by multiple forces (Yeatman, 1990). Policies have the potential to articulate, reinforce and institutionalize the way in which particular notions are understood. Ball notes if policies are about the allocation of values and statements of intentions, "(l)ogically, then, policies cannot be divorced from interests, from conflict, from domination, and from justice" (S. J. Ball, 1990, p. 3). Policies endorse some values and beliefs, and in doing so, distribute power to some individuals and not others. Policy can "articulate, re-articulate or institutionalize the manner in which particular issues might be understood" (S. Taylor, 1997, p. 5) by creating a conception of what is and endorsing what is desirable and possible. Ultimately, education policy initiates change by endorsing a solution or way of thinking about technology but it can also exclude some issues and build resistance between organizational groups.

What influences the ways of thinking about technology in education policy discourse?

Technology in education policy discourse is highly susceptible to the influence of external forces. As Peters notes, "(t)echnology has become the new star ship in the policy fleet for governments around the world" (2006, p. 95). At the macro level, technology can tie education policy discourse to a larger family of economic issues, political agendas and reform initiatives. In the end, technology in education policy discourse sets a frame of decision-making and in doing so distributes power to some individuals and organizations but not others.

Whatever shape it takes, technology in education policy is based on philosophical beliefs. Some see technology as a symbol of progressive, innovative education while others see technology as simply a contemporary classroom tool. However, in the last 10 years technology has become a key impetus for a wide range of reform initiatives, some of which tend towards a deterministic orientation.

> Classrooms without computers indicate a deprived learning context. Creation and acquisition of smart classrooms in schools is a coup and desirable for optimized learning. ICT has moved from technology for communication of information to a curriculum creation and delivery system for teachers and learners—sometimes without the need for teachers. (Kompf, 2005, p. 221)

Some policy-makers view technology as a catalyst for modernizing the classroom and bringing education into the 21st century (Kozma & Shank, 1998). The idea of technology as being a 'fix' within education reform discourse is not

new. As early as 1933 Thomas Edison foresaw motion pictures transforming education and "the education of the future…will be conducted through the medium of the motion picture, a visualized education, where it should be possible to obtain one hundred percent efficiency" (As quoted in, Oppenheimer, 2003, p. 3). From this deterministic perspective, technology is a problem solver for the inefficiency of the education system. "Today the values of technology have so permeated the public mind that all too frequently what is efficient is seen as the right thing to do" (Franklin, 1999, p. 124). The potential of technology as a problem-solver in education, serves as a backdrop for policy-makers worldwide**.**

> Policy-makers and administrators must be assisted to ensure that a programme for promoting ICT use in education results in technologies being used not to extend or replicate the traditional classroom model, in already advantaged areas, but rather to fundamentally change the instructional paradigm, with *ICTs serving as levers for system-wide curricular reform and educational change.* (United Nations Educational, Scientific and Cultural Organization (UNESCO) 2007, p. 7, italics added)

Here, a positive, substantivist orientation places technology in control of systemic reform and educational leaders as guides to eradication of traditional practices. Technology in education policy takes up the momentum generated throughout history between science, economics and politics. "At a symbolic level, new technology has been attractive to politicians for it's connotations of modernity, scientific advance, and the world of business and commerce. …(they) have offered it to the electorate as a talisman" (Somekh, 2000, p. 21).

Within this dynamic relationship, education policy can legitimate and promote particular ideas often with language that suggests it is the only conceivable option given the circumstances. My inquiry adopts this critical social theory orientation by examining how education policy advances and reflects some assumptions about technology over others.

What relationship exists between the ways of thinking about technology in Alberta's education policy discourse and nodal discourses, specifically, the knowledge-based economy and globalization?

Education policy is constructed within a social context rife with struggle, resistance, good intentions and political whims. Although education policy documents appear as formal, carefully considered plans they are products of a political process shaped by the circumstances and priorities of the time. As S. J. Ball (1998) notes, "(m)ost policies are ramshackle, compromise, hit and miss affairs, that are reworked, tinkered with, nuanced and inflected through complex process of influence, text production, dissemination, and ultimately, re-creation in context of practice" (p. 126). In discussions about educational policy, how the issues are framed and by whom is crucial to determining what is valued at a given time. It is therefore impossible to consider education policy and not consider power. "At the core of this naming of what counts and what does not is a power

relationship…influencing principles of selections" (Woodside-Jiron, 2004, p. 201).

The field of critical organizational discourse ties into S. J. Ball's description of education policy and is meaningful to my inquiry for two reasons: first, it helps describe the central role of language within an organization in shaping and institutionalizing a common way of perceiving and responding to the social world and second, it conceptualizes how representatives of an organization engage other groups through their own sense-making processes.

> Organizations exist only in so far as their members create them through discourse. This is not to claim that organizations are 'nothing but' discourse, but rather that discourse is the principle means by which organization members create a coherent social reality that frames their sense of who they are. (Mumby & Clair, 1997, p. 181)

The language used within an organization is the primary way members of a group make sense of their work in relation to others. As such, the language used by a group, by consistently pairing some words and meanings over others, frames how members perceive social reality. "(E)very perception is dependent on the conceptual apparatus which makes it possible and meaningful, as this conceptual apparatus is inscribed in language" (Deetz, 1982, p. 135). This is not to suggest individual perception melds and is lost within the organization, but to acknowledge what is important and relevant to the organization influences how members perceive and interpret discursive events. Prominent discourses,

encapsulating what is important and relevant, serve as discursive frameworks for members of organizations.

What are prominent discourses?

As part of the organizational culture, the language chosen to represent the social world becomes part of "whatever a member must know or believe in order to operate in a manner understandable and acceptable to other members and the means by which this knowledge is produced and transmitted" (Deetz, 1982, p. 128). For the purposes of my study, the core beliefs and knowledge seminal to the organization's conceptual apparatus are called *prominent discourses*. A recent example from my professional experience with Alberta Education to demonstrates how language carries meaning, influences perception and secures cohesion in organizational groups.

High School Completion: an example

Statistics Canada has reported Alberta has one of the highest drop out rates in Canada[4]. Alberta Education named the issue a priority but chose to use the term high school completion instead of the term dropouts, in all policy and related communication documents. Putting aside how the two, drop out rate and high school completion, are statistically different and focusing instead on the

[4] See http://www.statcan.gc.ca/pub/81-004-x/2005004/8984-eng.htm#a

discursive connotations illustrates how the words themselves influence perception. Adopting the term high school completion influences how the issue is perceived in two ways. First, this subtle but strategic labeling reframes the issue in a more positive manner, avoiding negative connotations of the term drop out with quitter or loser. The term high school completion conveys a belief that eventually all students will finish high school. Whereas the drop out rate points to issues with the student who perhaps did not put forth a good effort and chose to drop out, high school completion rates shifts the focus to the education system as a stepping stone to further study or employment.

Additionally, since high school completion measures include the percentage of grade 10 students who finish high school (or equivalent requirements) or enroll in post secondary education or apprenticeship within 5 years it usually presents a better impression of student success than a drop out rate that includes junior high students and does not include students who opt back into the system in some way. The consistent use of the term high school completion in all speaking and writing in meetings, briefings, planning documents and reports reinforced a way of thinking and responding for Alberta Education's members while also attempting to reframe the dropout issue in the public domain. The discursive turn from drop outs to high school completion rates has been taken up by the media as evident in a recent newspaper article reporting "(a)fter years of steady improvement, Alberta's high school completion rate has stalled" (McGinnis, 2009). The article quotes two individuals who use the term dropouts

but retains a focus on high school completion through four references in keeping with the Alberta Education statistics and discourse.

The high school completion example illustrates how, in the dialectical conception of critical organizational discourse, language is not simply a vehicle for communication but essential to articulating "meaning formations which, when habitualized over time, provide the background of common experience that gives organization members a context for their organization behavior" (Mumby, 1988, p. 14). Members are active agents constantly engaged in the production, maintenance and reproduction of a shared sense of organizational reality within an often ambiguous, precarious social environment. Additionally, members also engage in backgrounding or suppressing opposing discourses. In my experience, colleagues would correct each other if they inadvertently referred to drop outs instead of high school completion during meetings or in writings.

In the case of high school completion, Alberta Education played a role in attempting to reframe an issue by replacing references to high school drop out commonly used in the media and other social sectors. What is important to note in this example is that the language used in relation to the high school completion issue and strategy frames members' perceptions by directing attention and energy toward securing the interests of the organization. The problem of dropouts, which is often considered a complex social concern, is reset as a goal of the education system - high school completion.

How do organizations use prominent discourses to secure power?

Critical organizational discourse theorizes how, in cases like high school completion, language creates a shared sense of social reality for a group and examines how some discourses become more pervasive and widely accepted than others. A dialectical approach to critical organizational discourse offers a nuanced, textured view of discourse and power. Here, meaning is contested as groups attempt to dominate the discursive field while meeting resistance. The dialectical approach meshes with my conception of discourse and power for two reasons. First, the dialectical approach acknowledges the natural tensions between the multiple interpretations of organizational members and organizational efforts to impose or fix meaning in certain ways (Giddens, 1979; Hall, 1986). "(T)he dialectical analyses of power and resistance thus suggest possibilities for multiple and contradictory meanings and realties existing in the same discursive space" (Mumby, 2004, p. 242).

Power is exercised, is a discursive space, when one group succeeds in establishing the frame of reference, based on their interests, for other groups (Mumby & Clair, 1997). The ability of one group to secure power is made possible by their ability to use language to fix a particular meaning. Power can move with the changing dynamics of the social world. "While meaning may be temporarily fixed and certain interpretations hold sway, there is constant slippage between discourses and meanings, such that alternative and competing definitions

of the world arise" (Mumby, 1997, p. 364). Within this conception, resistance is integral in pushing discourse towards other possible interpretations and power is transitory. Thus, critical organizational discourse can provide a theoretical basis from which to explore how some beliefs and assumptions in education policy are perpetuated over others and successfully wield power – at least for a time.

For example, in education, groups essentially repurpose the notions like accountability to reflect the values, beliefs and interests of their organization and in doing so shape the meaning of the term and the influence on power relations. Alberta Education, as author of the policy and related documents, is in a dominant position and therefore able to influence the social representations (meaning and value) within the education sector. However, other groups including representatives from CASS, Alberta Schools' Council Association and the ATA exercise power within the discursive space through access to the mass media and other resources within the education sector such as networks of teachers and educational leaders. In the consultation phase, representatives attempt to protect and promote the interests of their members by advancing a particular position grounded in the values and goals of their organization. The language chosen by a group creates cohesion internally between members and presents a consistent message externally. In this way, the language groups use to discuss an issue:

> …'rules in' certain ways of talking about a topic, defining an acceptable and intelligible way to talk, write or conduct oneself, so also by definition, it 'rules out', limits and restricts other ways of talking, of conducting ourselves in relation to the topic or construction knowledge about it. (Hall, 2001, p. 72)

While a member of Alberta Education, I was able to participate in the creation and re-making of policy. Throughout the process, language became central to negotiating power between Alberta Education and the ATA as the meaning of some key words shifted.

Grade level of achievement reporting: an example

A recent example of a highly contested mandated policy initiative, occurring within the contentious accountability discourse space, illustrates the importance of language in relation to meaning and power. Alberta Education introduced the notion of grade level of achievement (GLA) reporting in 2003 with the following description: "GLA reporting involves teachers providing Alberta Education with a whole number that represents their judgment of their students achievement in meeting the Program of Studies outcomes in grades 1 to 9 language arts and mathematics" (Alberta Assessment Consortium, 2006). Throughout the consultation and pilot study phase groups expressed concerns about the new mandate. Some of the debate centered on the requirement of 'a number' to represent the teachers' judgment.

The ATA, CASS and other groups lobbied strongly against GLA throughout the consultation phase in hopes of altering or eliminating the mandate entirely (Alberta Teachers' Association, 2006). The existing policy, mandated in June 2008, provides evidence of a shift in meaning of GLA and the adoption of less specific parameters. GLA evolved to represent the "teacher judgment of the

results from a variety of assessments throughout the school year, expressed as "at, above or below" in relation to the learner outcomes in a subject after a course for a specific grade level has been completed and the student's enrolled grade" (Armstrong, Laird, & Mulgrew, 2008, p. 3). The discursive difference between the two definitions is significant in terms of power and meaning.

In the second iteration teachers are asked to essentially estimate the student's progress using fairly broad categories, at, above or below, whereas in the first iteration teachers were asked to submit a number to Alberta Education. Assigning a number, for example Jane's GLA is 2.5, assumes a linear, measurable notion of learning and second, leaves open the opportunities for comparing and contrasting students, schools and jurisdictions using other data such as provincial achievement test results and socio-economic factors. Although statistical comparison is still possible using the broad categories of at, above or below grade level, the results are less precise as number-to-number comparisons. Power is at work here as the first definition required teachers to provide a GLA number for every student, whereas the final definition of GLA acknowledges the complexities involved in holistic assessment and provides teachers with some flexibility in terms of how they choose to represent student learning (i.e. numerically versus categorically).

In the GLA example, the idea that anything but a number could be used to represent student learning would have been inconceivable when the project was introduced since the rationale for GLA was built around the need to shore up

existing data by collecting data on all students (grades 1 – 9) in the system. However, throughout the consultation phases, GLA morphed as a result of resistance and struggle over the meaning of student learning and the notion of assessment.

The GLA example illustrates how groups negotiate the language in policy in efforts to lobby for influence others and promote a way of thinking. Ultimately, some ideas prevail, are accepted and become policy. Through policy creation and consultation the dominant group seeds the ongoing discussion by framing problems and advocating for solutions while deemphasizing other issues and possibilities. A group may realize success in this iterative, discursive process if they are able to present their interests as commonsensical thus obscuring real differences in beliefs, values or goals of other groups. Throughout the process struggle ensues as groups wanting to create a space for resistance and reinterpretation put forward other meaning formations. The dominant group secures power over subordinate groups when they are able to limit the possibilities for thought and action. In effect, "managing the minds of others is essentially a function of text and talk" (van Dijk, 1993, p. 254). In the GLA example, the subordinate groups were able to expand the discourse that framed the debate thus changing the outcome of the initiative.

In the GLA example, the difference between the first and second iteration of the mandate represents a shift in the meaning and power away from a centralized, quantifiable notion of accountability towards a more general, broad

conception of student progress. The approved mandated version of GLA is more in keeping with the values and organizational interests of the ATA and CASS. The prominent discourses of each opposing organization, in this case focusing on assessment for learning, teacher autonomy and local contextual differences, required a more liberal interpretation of grade level of achievement.

While prominent discourses of an organization serve as a background for sense making and provide a way to respond when engaging other groups, nodal discourses work across sectors and cultures and are virtually impervious to critique.

Why are some ways of thinking about technology more widely accepted than others?

Organizations define themselves and reinforce their values through prominent discourses. In a sense, prominent discourses are identity markings for an organization. Nodal discourses, by comparison, have no affinity with a particular group or sector and function as generic, common sense representations of reality. Fairclough coined the term nodal discourse as dominant discourses which "subsume and articulate a great many other discourses" (2005, p. 5). As hubs of meaning, nodal discourses, demonstrate how beliefs and assumptions "emerge…(and) also produce, particular policy discourses" as words and phrases are paired repeatedly to convey meaning, increase awareness and import

(Blackmore & Lauder, 2005). Nodal discourses, by becoming somewhat of a master narrative, serves to collect similar stories. Hajer found:

> …the key function of story lines is that they suggest unity in the bewildering array of separate discursive component parts of a problem like acid rain. The underlying assumption is that people do not draw on comprehensive discursive systems for their cognition; rather these are evoked through story lines. As such story lines play a key role in the positioning of subjects and structures. Political change may therefore well take place through the emergence of new story lines that re-order understandings. Finding the appropriate story line becomes an important form of agency. (Hajer, M.A. 1995, p. 56)

What is appropriate at any given time with the social world fluctuates but nodal discourses, by braiding together multiple prominent discourses, are highly resilient and durable. The two nodal discourses in the literature most relevant to my study are the knowledge-based economy (KBE) and globalization (Cameron & Palan, 2004; Fairclough, 2006; Jessop, 2004). The KBE and globalization discourses appear often in education policy discourse and overlap within an economic paradigm through a shared association with economic prosperity, technology, information and innovation. The two nodal discourses have become a common sense backdrop for technology policy in education in many countries.

Globalization and the knowledge-based economy: two nodal discourses at work in education policy

Globalization emphasizes the liberalization of markets through the erosion of borders while also including the melding of culture and the erosion of national

identity. As a nodal discourse, globalization is instrumental in "the reform process and the changing role of the social democratic state (as) part of a broader transformation in political architecture" in which "individual and institutional actors and their dispositions and responses are tied to the fate of the national" (S. J. Ball, 2007, p. 28, 33). As nation-states struggle to maintain or improve their economic and social position, citizens are called upon to be active, flexible participants in the borderless market. Steger (2005) suggests globalization, through the discourse he identifies as globalism, is based on 6 assumptions, 3 of which are salient to technology and education policy: 1) globalization is about the liberalization and the integration of markets, 2) globalization is inevitable and irreversible and 3) globalization benefits everyone. These three assumptions have become common backdrops for technology in education policy (Moll,1997; Ozga & Lingard, 2007). Education policy takes up the nodal discourse of globalization, within a primarily economic frame, to rationalize reforms thereby emphasizing these foundational assumptions.

Historically, there has been political endorsement of state controlled public education largely based on the belief that the state, and not the market, could be trusted to act responsibly and equitably in the interest of the common good. The nodal discourse of globalization is generating an acceptance of a market approach to the organization social services and normalizing related notions of choice, accountability and standards. In this way, globalization is seen as "progress and a

rising tide that lifts all boats, …that takes advantage of the historical processes…in order to valorize particular economic prescriptions about how to operate the economy (and) transform education, politics, and culture" (Burbules & Torres, 2000, p. 13). Through the nodal discourse of globalization, public education is thus decontextualized, commodified and considered part of a nation's economic profile.

The KBE nodal discourse, also set within an economic frame, could be considered one aspect of globalization and as such, the nodal discourses are mutually supportive. However, the KBE centers on innovation and the exchange of information as economic drivers for a new post-industrial market model. The literature identifies 3 assumptions as foundational to the KBE discourse: 1) information technologies have a specific, strategic role, 2) knowledge-based society are integral to the globalised economy and 3) "knowledge" is an increasing important, new mode of production (more important than labour and capital) (Krings, 2006).

The assumptions undergirding the KBE and globalization nodal discourses overlap and thus endorse knowledge as a driver of economic growth. In essence, both raise the profile of education to a new level of strategic importance. "This shift from bloody wars to knowledge wars represents the highest stage in evolutionary development as nations put down their weaponry to concentrate on the competition for ideas, skills and knowledge that contribute to economic

advantage" (Brown & Lauder, 2006, p. 26). Further, through association with terms such as the learning society and lifelong learning, the nodal discourses can also be seen as a utopian project promising "a different type of society, which has the capacity to renew the democratic process, combat social exclusion and avoid further degradation of the environment" (Guile, 2003, p. 85). Thus organizations with differing values and beliefs can reframe the nodal discourses as an economic, political, social, environmental or educational issue. In education policy discourse, the KBE and globalization become touchstone discourses and reliable, politically attractive backdrops for policy makers. However, later I will explore how this seemingly logical connection between education and job prospects is not borne out by the economic reality of the job market.

The KBE and Alberta's videoconferencing initiative: an example

In speeches following the spring election in Alberta Premier Stelmach stated, "we have to move to a knowledge-based economy" (Anderson, 2008). Alberta is presumably shifting focus away from the resource-based industries, which has powered our growth for years. Later Stelmach states "education (is) the key to a knowledge-based economy". Three months following Stelmach's comments, Alberta Education announced $55 million dollars to support videoconferencing technology. In the related media release, KBE was referenced in support of the funding decision. "In our knowledge-based economy, technology can improve collaboration, and analytical and problem solving skills that

Alberta's students need to remain competitive in our interconnected world" (Alberta Education, 2008d). KBE is put forward as the only possible future for Alberta's economy in Premier Stelmach's statements and as the current reality in the Alberta Education media release. Thus, by integrating the KBE nodal discourse into the rationale for the videoconferencing technology initiative, Alberta Education increased the likelihood of support and diminishes the possibility for dissent. In addition, a subtle shift in power occurs as KBE takes for granted the idea of education in the service of economic goals and further lends support to a specific technology solution, in this case videoconferencing, in spite of a lack of research base (Anderson & Rourke, 2005).

How do nodal discourses become common sense?

Four factors contribute to securing nodal discourses over other competing discourses (Fairclough, 2006, p. 21). First, social structures are more open to some discourse strategies than others. That is, some discourses resonate better in a particular social context. For example, the increasing prevalence of technology lends support to the KBE nodal discourse as a shift from a manufacturing economy to a service economy appears inevitable (Castells, 2010; Drucker, 1993; Foray & Lundvall, 1996). However, the extent to which this shifts is truly fostering the growth of a knowledge society, in its broadest sense, is less clear. Later, I will refer to Brown and Lauder's work (2006), which fails to find evidence of the connection between education and job prospects.

Second, the scope and reach of the discourse that is, the ability of the nodal discourse to cross boundaries and become integrated throughout sectors contributes to its authority. For example, Jessop shows, in the table below, how the knowledge based economy (KBE) nodal discourse is evident in associated discourses across sectors. This demonstrate the "power of the KBE as an increasingly dominant and hegemonic discourse that can frame broader struggles over political, intellectual and moral leadership on various scales as well as over concrete fields of technical and economic reform" (Jessop, 2004, p. 168). Scope refers to the transposition of the discourse across sectors while reach refers to the ways in which the nodal discourse is integrated with the sector.

Table 2: Jessop's examples of KBE across sectors

Technology	Information and communication technology, information superhighway, smart machines, innovative systems
Education	Lifelong learning, learning society, knowledge factories, advanced educational technologies
Labour	Knowledge workers, intellectual labour, teleworking, human capital,
Economy	Knowledge creation, learning organization, e-commerce, knowledge management, knowledge networks
Culture	Creative industries, cultural commodities, cyberculture, cultural industries

(adapted from Jessop, 2004, p. 169).

While a nodal discourse can work across sectors it is reframed or "recontextualized" as an economic, social, political or environmental issue (Bernstein, 1990). Thus, "organizations may be seen as colonized by external discourses, but they actively appropriate them" (Feenberg, 2005, p. 19). As groups internalize nodal discourses as leverage in support of differing goals, the

potentially assumptions grounding nodal discourses are more susceptible to challenge. I will return to this notion of reframing later.

The third factor contributing to the take up of nodal discourses involves distribution. Prominent social actors, for example politicians or government leaders with access to the primary media channels, invoke the nodal discourse in support for their work in turn legitimating it via the mass media.

For example, Alberta Education regularly posts media releases which are reproduced, with some revisions, by mass media channels. In media releases related to the languages initiative, mandating all students in grades 4 – 9 to learn a second language, Alberta Education consistently referenced globalization[5] as a rationale. In April 2004 Alberta Education announced the launch of the Languages Initiative[6] by stating learning a second language was necessary to "gain a competitive edge in the global economy" (Alberta Education, 2004c).

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[5] The Languages initiative was a government response to a high profile review of public education, Alberta's Commission on Learning (ACOL), released in October 2003. In the final report, ACOL suggested Alberta would benefit economically if all students learned a second language because it would "help(s) our province build an advantage in the world marketplace" (Alberta Learning, 2003, p. 57).

[6] The statements in the media releases were based on Alberta Education's Business Plan which stated the primary purpose of the languages initiative was to ensure "Albertans have the linguistic and cultural skills necessary to compete in the national and global markets and work place" (Alberta Education, 2005c, p. 3).

With a limited number of specialist teachers and few resources the system was ill prepared for such an ambitious mandate. In another media release, then Minister of Education Ron Liepert states "(i)n today's global economy, it is imperative to provide our students with second language options. Research shows us that learning a second language can open doors to career opportunities..." (Alberta Education, 2007h). Taken together, by consistently referencing globalization in media releases regarding the languages initiative, Alberta Education, as a prominent social actor, further legitimizes the nodal discourse, framed as an economic issue, in the main.

Fourth, the discourse must mobilize action or change the behavior of people (Fairclough, 2006, p. 21). It is through this final factor that nodal discourses become actively constructed as they are acted on by large groups of people. Nodal discourses shift "from being just representations and imaginaries to having transformative effects on social reality, being operationalized - enacted as new ways of (inter)acting, inculcated in new ways of being (identities), materialized in new instruments and techniques of production or ways of organizing space" (Fairclough, 2007, p. 54). Again, Alberta's Languages initiative was rationalized through an economic interpretation of the nodal discourse of globalization which led to the development of curriculum and resources to support 8 languages while also justifying the need for a province-wide videoconferencing system.

These four elements, resonance with social context, scope and reach, distribution and mobilization all contribute to the acceptance of nodal discourses as common sense by a variety of individuals across the social spectrum. As a result, the assumptions upon which the nodal discourses are based can become acceptable representations of reality and serve as a default or starting position for policy-makers.

Reframing nodal discourses

While the KBE and globalization reinforce an economic perspective, the nodal discourse can be reframed as organizational groups internalize them. Through this process of recontextualization, the assumptions grounding nodal discourses can become open to critique. Cameron and Palan (2004) suggest through this discursive processes organizations can "reframe the debate, to change the very nature and boundaries of what is taken to be 'common sense'… and rewrite the foundational narratives" (p. 153).

Organizational groups can challenge the assumptions grounding nodal discourses by pointing to a gap between the rhetoric and the reality. For example, while the KBE nodal discourses hinges on a connection between education, technology and the economic progress, research is showing this connection is difficult to prove. While "high technology is presented as the solution to many economic problems, it has not contributed to raising the standard of living of most

people…(while) the most important category of job creation in the United States in the last decade has been in the realm of personal services" (Burbules & Torres, 2000, p. 7).

While education policy discourse invokes the KBE and globalization nodal discourses to secure a logical connection between technology, higher education, employment opportunities and prosperity, it appears the supply of highly educated and skilled workers is not being matched by the job market.

> The research evidence does not support the idea of a rapid increase in the demand for highly skilled workers although there has been a rapid expansion of tertiary education. Indeed, there are increasing numbers of highly educated people in jobs for which they are overqualified. (Brown & Lauder, 2006, p. 48)

Livingstone (1997, 2004) has also shown the causal connection between formal education and job prospects is being eroded as the proportion of underemployed individuals continues to rise while the economy, especially in the United States, stagnates.

Further, both the KBE and globalization nodal discourses suggest the technology-driven, post-Fordist economy requires an innovative, creative and flexible workforce and clear break from highly structured workplaces (OECD, 2007).

> It is argued that this has given 'knowledge' workers greater control and autonomy over the nature and pace of their work. The rhetoric of the knowledge economy assumes that innovation and creativity are enduring

> features of the new economy but such assumptions are both static and ahistorical. (Brown & Lauder, 2006, p. 29)

Guile (2003) states the level of control enjoyed by a knowledge worker depends on how information and communication technology is employed namely to 'informate' or 'automate' organizational practices. In the latter, technology is layered on top of routine practices reinforcing managerial 'Fordist' structures and reducing worker autonomy. Essentially, technology is used to increase efficiency of traditional practices. In the former, technology "results in a demand for a new type of skill – intellective skill" and fosters knowledge creation, sharing and possibility to develop new skills (Guile, 2003, p. 87). Here technology results in changing work patterns and increases the need for employees to use information innovatively. While the KBE nodal discourse tends to uphold an 'informate' purpose for technology in the workplace and thus the need for individuals to be resilient, creative and collaborative, it is predicted the "vast majority of work, even in knowledge-based economies, would be in 'routine production' and in 'personal services'" (Guile, 2003, p. 90). It seems then, while there is greater emphasis on knowledge production, the service sector is also growing and some elements of the industrial model remain intact. In relation to education policy, these characteristics of the emerging KBE coupled with the statistically weak connection between education levels and employment opportunities points to a need to reexamine fundamental pedagogic questions.

Education policy in many countries has taken up the KBE and globalization nodal discourse, within an economic frame, by perpetuating a conception of learning as something to be accessed and consumed, thereby further strengthening the tie between learning, as qualifications and credentials, and employment (Somekh, 1999; Peters, 2001). Learning is conceived as "both a desired goal to reach by means of the homologous character of curricula, or the tendency to train in homogeneous skills, and an alleged requirement to achieve a healthy capitalist development" (Buenfil-Burgos, 2000, p. 8). Thus, student learning is a national commodity and public education must be held accountable for meeting an international standard of quality. For example, international standards and measures allow countries to be ranked according to various agreed-upon measures of student achievement, much like currencies.

> The new emphasis on measuring and comparing school outcomes across countries and within countries has not occurred spontaneously. Rather, it has been pushed by international organizations such as the International Educational Assessment (IEA), the American National Center of Educational Statistics (NCES), the OECD, and the World Bank. All these organizations share a globalized view of education and efficiency, which includes a highly quantitative view of progress. They also share an explicit understanding that 'better' education can be measured and that better education translates directly into higher economic and social productivity. With more intensive economic competition among nation-states, the urgency of improving productivity is translated by these organizations into spreading the acceptance of inter- and intra-national comparisons on standardized tests of student knowledge. (Carnoy, p. 64)

The OECD's Programme for International Student Assessment (PISA) is one such standard measure of student knowledge with 60 participating countries. The 2006 results placed Alberta second behind Finland. Then Education Minister

Liepert acknowledged the result “ensures that Alberta is recognized as an educational leader worldwide and our students are positioned for great things in a global context" (Alberta Education, 2007a). The PISA results discourse is dominated by government sources through the media. As such, media articles focus on the statistics as a definitive measure of the quality of education of the entire system while ignoring contextual issues, the relevancy of correlations to policy statements or critiquing the test itself. “(T)he statistics…become the commonsense framework of how policymakers discuss the various competing purposes of education as well as the performance of the education system” (Stack, 2006, p. 64). The PISA results are presented as an accurate depiction of reality and become a rationale for future policies or evidence of success of existing ones. The increasing importance of international standards, the interpretation of results among policy-makers through the media demonstrates a simplistic response to the nodal discourses of globalization and the KBE which does not account for the ways in which learning is situated (i.e. cultural), organic (i.e. iterative) and social (i.e. participatory).

While education policy also makes mention of the need for students to be able to apply knowledge in innovative ways and be able to create new knowledge, the emphasis on standards and accountability measures continues to shape and possibly restrict classroom practice.

> But such approaches to learning, where success and failure are intermingled, are counter-intuitive to the way many educational environments are

> currently set up. This is partly because the stakes associated with failure for students and teachers are often too high for failure to be an option. …An irony of Australia's education policies is that they place an emphasis on achievement, yet the fostering of creativity and innovation is stifled where there is a fear of failure. (…)As such, some of the critical conditions required for creativity to flourish are environments where there is trust between teachers and students, and where the consequences for students and teachers of making mistakes are reduced. (Moyle, 2010, p. 12)

Education policy-makers emphasize credential accumulation and higher standards as convenient, simplistic and reassuring prescription to the KBE and globalization nodal discourses. Increasingly though, the assured link between credentials and employment security is being eroded as learning expands to include innovative application of knowledge and not simply the transmission of a static pool of information.

What is learning?

Guile (2006) suggests education policy has responded to the growing emphasis on knowledge in relation to an increasingly networked, postindustrial society based on "impoverished" technical-rational notion of learning grounded in cognitive psychology. However, this narrow conception of learning is proving to be incongruent with today's social and economic challenges which require employers to seek out individuals who are able to respond "*reflexively* to emerging economic, political and social issues in an innovative and creative fashion" (Guile, 2003, p. 94, emphasis added). Thus, while education policy makers have assumed improving access to industrial forms of education and the

accumulation of credentials would assure economic prosperity, the "challenge for education appears to be to develop a more future-oriented perspective about the relationship between education and the economy" (Guile, 2003, p. 98). Within this space, education policies would seek to provide students with a transformative relationship to the world rather than a purely informative one and conceive of learning as both a process of acquisition and participation. The challenge to education policy makers then is to adopt a "much more radical pedagogic agenda" and interrogate the concept of learning relative to the emerging economic, social and political realities of our time (Guile, 2003, p. 99).

In education policy discourse, 21st century learning seems to offer a response to the what is learning question and reflects a move away from learning as transmission by promoting inquiry-based learning and the development of higher order thinking skills (Clifford, Friesen, & Lock, 2004, Kozma & Shank, 1998, Moyle, 2010). While perhaps not a 'radical' change, there is less emphasis on learning products and more of a focus on learning as process. There seems to be at least a theoretical connection between 21st century learning and the generic notion of learning to learn central to the emerging social and economic challenges but also applicable to related discourses such as lifelong learning' and the learning society (Guile, 2001).

> The main characteristic of the knowledge economy is not the rapidly growing knowledge stock but the acceleration of both knowledge creation and knowledge destruction. This is reflected in new skill demands; the fundamental requirements that employees have the capacity to absorb new

> knowledge and to combine different pieces of existing knowledge in a new way. The capability to learn how to learn becomes very important in the knowledge economy where employees have to continuously renew their knowledge. (Schienstock, & Hämäläinen, 2001)

In education, organizational groups can thus take up the nodal discourse of the KBE and globalization but reframe it by emphasizing a connection with 21st century learning. In doing so, organizational groups can use the common sense appeal of the nodal discourses to find influence within the education policy discursive space while also reaffirming their beliefs and values. Thus, through the process of reframing the nodal discourses are rendered open to interpretation and challenge.

Although the assumptions upon which the nodal discourses are based are not theoretically or statistically solid and open to reframing, they remain politically potent. In Alberta, despite continuing strength of natural resources based industry and the increasing proportion of service sector jobs, the KBE and globalization nodal discourses appear to be politically attractive[7]. In education policy, the assumptions upon which the nodal discourses are based provide a rationale for many technology-based initiatives and infrastructure projects. In the following statement traces of the KBE nodal discourse, set within an economic frame, provide support for a $1 million provincial software license agreement.

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[7] As reported in the Provincial and Territorial Economic Accounts Review by Statistics Canada, November 2009.

> “Microsoft is very excited to partner with Alberta Education to help make technology more accessible for students and teachers," said Phil Sorgen, President, Microsoft Canada. "Prioritizing education and learning, and expanding digital inclusion initiatives to enable as many people as possible to participate fully in a knowledge-driven economy, are all critical to Canada's future success. (Alberta Education 2007b)

Here, the KBE is referenced to rationalize the need for all students and teachers to have access to a common platform of Microsoft products. The statement assumes the future economy will be driven by the exchange of knowledge via technology and Microsoft products will be a common platform for production. Future success is defined against economic measures and requires everyone to actively contribute. The reverse of the assumption underpinning these statements suggests students that do not secure access to technology, through Microsoft products, will be excluded from the knowledge-driven economy.

If a prominent discourses of a particular organization is congruent with widely circulated and generally accepted conception of a nodal discourses, the organization is more likely to achieve dominance in the main. In the example above, Alberta Education uses the KBE nodal discourse within a purely economic frame thereby reinforcing the common sense assumptions upon which it is based. While there are indeed tensions inherent in this interpretation of the KBE nodal discourse, as shown by Brown and Lauder, Livingstone & Guile, it is likely the media release would resonate across organizational groups (Fairclough, 2006; Steger, 2005).

However, organizational groups may endorse other interpretations of a nodal discourse, in keeping with their own values and beliefs, in order to leverage aspects of their common sense appeal. For example, the ATA might emphasize democratic participation in relation to the KBE nodal discourse (Alberta Teachers' Association, 2008). Thus the KBE and globalization nodal discourses, while grounded in core, common sense assumptions, are contested, somewhat pliable, highly constructive tools within education policy circles.

I am interested in examining the relationship between the prominent discourses in education policy circles and nodal discourses, specifically the KBE and globalization. As was shown in the examples above, nodal discourses may preclude challenging discourses and possibly assist an organization in securing dominance within the discursive field. Thus, some prominent discourses may become pervasive and accepted through positive alignment with the core assumptions grounding nodal discourses. In contrast, nodal discourse may be challenged through the process of reframing as organizations emphasize an interpretation of the nodal discourse which is more in keeping with their beliefs and values. My analysis of the prominent discourses includes considering the multiple ways nodal discourses can be used to promote a way of thinking about technology.

In sum, Feenberg's table (1999) of philosophical positions or ways of thinking about technology provides a strong theoretical basis for examining the assumptions and related beliefs about technology in education policy documents.

Examining education policy from a discursive position, by drawing upon critical organizational discourse, supports my interest in using discourse as a lens to explore issues of power. The literature foundational to my inquiry demands a methodological approach that draws together language, meaning and power. Fairclough's approach to critical discourse analysis and his theoretical construct of nodal discourses meets the needs of my inquiry by allowing me to first, identify the ways of thinking about technology prevalent in education policy discourse in Alberta and second, to identify and explain why some prominent discourses are more likely to become dominant.

Nodal discourses, provides a theoretical basis to discern which prominent discourses (organizational) are aligned with master discourses (societal) and therefore more likely to occupy a dominant position in the discursive field. Organizations may attempt to reframe nodal discourse and thus emphasize an interpretation more in keeping with the values and beliefs of the organization. This discursive strategy may effectively allow the organization to gain acceptance in the main while also challenging the validity of the core assumptions grounding nodal discourses.

My methodological approach, to which I now turn, allows me to tease out the prominent discourses of organizations, analyze each in relation to Feenberg's (1999) philosophical positions and the KBE and globalization nodal discourses.

Chapter 3: Methodology

My methodological approach is qualitative as I assume social reality can best be understood through social constructions such as language, consciousness and shared meanings. As described in Chapter 2, my study examines one segment of education policy, specifically that concerning technology and education in Alberta. Further, I consider education policy as a product of a discursive process in which various groups put forward different conceptions of the purpose and role of technology in education.

Conceptual frame: research focus, theoretical orientation and method

Education policy can be studied from a variety of approaches. Ball's framework, below, neatly captures the interactivity between policy products and the discursive process as it relates to educational change and power within the social world. Ball adapts Althusser's work (1969) and suggests policy can be studied by exploring the interactions between three dimensions each with a correlating theoretical strategy, level of concern and focus (S. J. Ball, 1990).

Table 3: Theoretical Strategies

Focus of Education Policy	**Level**	**Theoretical Strategy**
Funding of education Education's contribution to productivity and profit	Economic	Structural
Forms of governance of education Patterns of influence Maintenance of social and political order	Political	Realist/Interactionist
Ways of conceiving and discussing policy *Transmission of an effective, dominant culture*	*Ideological*	*Discursive*

(S. J. Ball, 1990, p. 10, italics added)

Thus, my inquiry, from a discursive theoretical position, examines how education policy promotes a way of thinking about technology by endorsing some values over others and is therefore qualitative.

I employ critical discourse analysis (CDA) to guide my data analysis and interpretation. CDA best serves the purpose of my study specifically, excavating the common sense notions and assumptions about technology in education policy discourse in Alberta. Additionally, CDA provides a theoretical frame for examining the relationship between language, meaning and power in technology policy discourse.

I begin by outlining the origins and purpose of CDA to situate it within the larger field of discourse analysis. Next, I describe how CDA is helpful in revealing ways of thinking about technology in connection with Feenberg's table of philosophical positions (1999). Finally, I describe each step in my method and offer a brief example.

Critical discourse analysis (CDA): theory and method

CDA is situated within the hermeneutic tradition and as such there is no clear separation between data collection and analysis. Essentially, the theoretical framework and the methodological approach are shaped by the research question. CDA, by combining critical social theory and linguistic theory, has proved to be a flexible and productive framework to explore a range of inquires from gender and race to management and healthcare (Bergvall & Remlinger, 1996; Boutain, 1999; Reisigl & Wodak, 2000). In education, scholars have utilized CDA to examine language in various contexts including classroom conversations, resources and exchanges between educational leaders and teachers (Chambers, 2007; Mehan,

1996). The one common assumption shared by CDA researchers is that language and power are linked (Rogers, 2004).

Critical theoretical underpinnings

CDA grew out of the work of language philosophers and social theorists such as Bakhtin, Pêcheux and Wittgenstein who sought to explore the relationship between language, meaning and the social world (Bakhtin, 1981; Pecheux & Nagpal, 1982; Wittgenstein, 1953). Bakhtin suggests the discursive tension ever-present in our social environments is integral in negotiating meaning and our conception of self. “In a Bakhtinian sense, with whom, and in what ways and in what contexts we interact will determine what we stand to learn” (A. F. Ball & Freedman, 2004, p. 6). Essentially, as we communicate with others, we develop a set of words and understanding.

Pêcheux (1982) also roots discourse within social processes and dismisses the possibility of fixing meaning to words. For Pêcheux, "a word, expression or proposition does not have a meaning of its own, a meaning attached to its literality” (Pêcheux & Nagpal, 1982, p. 188). Words also point to other words or representations.

Similarly, Wittgenstein (1953) demonstrated the meaning of language is dependent on how words are used and not fixed by the relationship between words and things. The specific definition of words is not as important as the social aspects of shared understanding. Essentially, language makes meaning against the

backdrop of a social situation. How we talk about a thing influences what we believe about it, how we value it and use it. These three scholars established a theoretical basis for critical discourse analysis by questioning and illuminating the relationship between language and meaning within the social world.

Foucault's work has also been foundational to CDA. Foucault is associated with French discourse analysis and post-structuralism, originating with Pêcheux, where discourse frames what is accepted as truth. Foucault (1982) theorizes discourse in part, as a network of rules which institutionalize power, knowledge and truth within a society. Foucault's interest lay in revealing how a dominant discourse comes to the fore and how some speaking practices are more acceptable than others. In this way, Foucault makes the connection between how we act and interact with others and our words, thoughts and perception of reality.

> In thinking of the mechanisms of power, I am thinking rather of its capillary form of existence, the point where power reaches into the very grain of individuals, touches their bodies and inserts itself into their action and attitudes, their discourses, learning processes and every day lives. (Foucault & Gordon, 1980, p. 39)

CDA, however, rejects the sense of determinism reflected in much of Foucault's writing by attempting to create a space for resistance and change. "(I)n the totality of his work and in his major analysis, the dominant impression is one of people being helplessly subjected to immovable systems of power" (Fairclough, 1992, p. 57). For CDA, the possibility of human agency and hope for social change drives the research agenda as the purpose and primary motivation

for the work. CDA does however, draw upon two important elements of Foucault's work, the notion of discourse as actively constructing aspects of society and the acknowledgment of the interdependent or intertextual relationship between discourses both of which are imbued with issues of power.

Although many CDA researchers rely on Foucault's work theoretically, methodologically they tend to put a heavier emphasis on linguistic and semantic aspects of discourse (e.g. grammatical features and meaning). Fairclough (1992) differentiates his approach as textually orientated discourse analysis or TODA. Whereas Foucault's work examined specific bodies of discourse, for example psychiatry or medicine, he did not focus on types of discourse such as conversations. Also, Foucault adopted an abstract approach to discourse while TODA considers spoken and written texts directly.

Defining discourse

I define discourse as the language we choose to represent aspects of our physical (material), internal (thoughts) and social (relationships) world. Discourse also represents our possible worlds or our projections of preferred futures. Taken together, discourse, as part of our social practices, mediates our experiences, allows us to build understanding based on shared knowledge and imagine other possible ways of being or interacting (Fairclough, 2003). Discourse is not simply a reflection of our social world but rather it "constructs and is constructed by contexts. Discourses are always socially, politically, racially, and economically

loaded" (Rogers, 2004, p. 6). The conception of discourse I adopt reflects Fairclough's definition and assumes there are real processes and things in our material, internal and social world and the way we choose to represent it is a function of the language available to us which also means we select some words and phrases over others (2003). CDA, when applied to education policy discourse, reveals why and how some ways of thinking about technology are more prevalent than others.

Analysis: methodological approaches

Questions concerning language, power and society are central to two books considered to be foundational to CDA, *Language and Control* and *Language as Ideology* (Fowler, 1979; Hodge & Kress, 1993). CDA is a domain of linguistics, however unlike some forms of linguistics which adopts a context-free study of grammar, CDA draws connections between the language form and meaning by "follow(ing) the form of grammar" (Hodge & Kress, 1993, p. 7). In this way, CDA shares a common goal with Halliday's systemic functional linguistics (1978) and critical applied linguistics: "to describe, interpret and explain the relationship between the surface or 'hard' structures of language (form – word choice, tense) and the abstracted or 'soft' structures of language (function – what language does and how)" (Rogers, 2004, p. 8).

Scholars approach CDA from various perspectives. The literature in the field since its inception about 25 years ago reflects a wide array of approaches

which is to be expected given the "intentions of the analyst always guide the theory and method of CDA" (Rogers, 2004, p. 3). Regardless of the approach, CDA consistently brings social theory and textual analysis together and "moves beyond describing and interpreting the role of language in the social world, towards explaining why and how language does the work it does" (Rogers, Malancharuvil-Berkes, Mosley, Hui, & Joseph, 2005, p. 369).

Wodak (2007), for example, brings a historical orientation to CDA to examine the issue of racism as a discursive social practice. Wodak employs an interdisciplinary approach in analyzing the changes in discursive practices across genres and over an extended historical time period. For van Dijk, it is necessary to adopt a social cognition perspective to study the relationship between discourse and power. The focus here is placed on "the role of the social representations on the minds of the social actors" (van Dijk, 1993, p. 251).

Fairclough's approach to CDA provides a flexible methodological framework from which to identify, analyze and examine prominent discourses in relation to Feenberg's (1999) four philosophical positions: instrumentalism, determinism, substantivism and critical theory. CDA and Feenberg's table (1999) of philosophical positions work together to allow me to examine the language of education policy in relation to the ways of thinking about technology and to identify and explain why some prominent discourses are more likely to be taken up in the main.

Document analysis: method

CDA is a systematic, yet it is not formulaic. For example, Fairclough's analytic model moves through the local, institutional and societal domains to describe, interpret and explain discursive relations and social practices. "This recursive movement between linguistic and social analysis is what makes CDA a systematic method, rather than a haphazard analysis of discourse and power" (Rogers, 2004, p. 7). Similarly, I move between local (policy documents and interviews), institutional discourses (organizational discourse) and societal domains (nodal discourses).

The method I employ starts with the identification of specific textual features and moves to establishing related connections and classifications. CDA also provides a basis for considering how some prominent discourses, through alignment with nodal discourses, become more salient and therefore dominant than others. In order to look specifically at the local discourse of each organization I examine each document individually. My method follows three steps in support of the overarching research question and sub-question as illustrated below:

1) What ways of thinking about technology are evident in Alberta's education policy discourse?

    Method:

Step 1) Identify, analyze and group assumptions into prominent discourses

Step 2) Align prominent organizational discourses with philosophical orientations

- What relationship exists between the ways of thinking about technology in Alberta's education policy discourse and nodal discourses, specifically, the knowledge-based economy and globalization?

Method:

Step 3) Analyze the prominent organizational discourses to ascertain correlations with two nodal discourses.

I move now to explain each step in the method and offer a brief example of the method applied to a media release issued by Alberta Education (2008d).

Step 1: Identify, analyze and group assumptions into prominent discourses

Identify assumptions

I begin by identifying assumptions in the documents and interview data. Assumptions form the common ground necessary for social interaction and can also secure power and domination within the social world as groups attempt to shape the nature and content of assumptions. The documents contained many assumptions only some of which were relevant to my inquiry.

Thus, I began by examining each document to extract assumptions which speak to the first research question: what ways of thinking about technology are evident in Alberta's education policy discourse? By considering the data in relation to this question, I am more able "to decide which dimensions are more important, which relationships are likely to be most meaningful, and, as a consequence, what information should be collected and analyzed" (Miles & Huberman, 1994, p. 28).

I concern my examination specifically with those assumptions relating to key terms as a consistent and relevant way to flag the data. The habitual occurrence of words provides a basis for determining the relevance. Simply, when the key words appear repeatedly in relation to technology they can support assumptions by "encod(ing) commonly accepted ideas" (Stubbs, 1996, p. 5).

For the purpose of my study, key terms associated with technology were selected based on three criteria: 1) literature (Burbules & Callister, 2000; Feenberg, 1991; Ferneding, 2003; Franklin, 1999; Kozma & Shank, 1998; Moyle, 2010; Somekh, 2000, Watson, 2006) 2) repeated occurrence across the data sample and 3) my professional experience. The following keys terms allowed me to identify assumptions pertinent to my inquiry.

- 21st century
- access
- accessible
- accountability
- any time, any place
- assistive
- broaden
- challenges
- choice
- collaboration
- compete
- connect
- contribute
- critical thinking
- delivery

- enhanced
- empower(ing)
- engage(ment)
- equitable
- flexible
- global(ization)
- improve
- information and communication
- innovative
- interconnected
- integration
- knowledge-based economy
- leader
- leading-edge
- opportunities
- responsive
- security
- self reliance/direction
- transform
- videoconferencing
- world-class

After reviewing the documents I selected assumptions that were representative of others to avoid replication. The assumptions appearing in the data summary tables[8] are therefore are *not* a collection of all the assumptions in the documents but rather a representative sample of the assumptions most relevant to my inquiry. For example, the summary tables do not include all the assumptions tying innovation to technology in each document. Rather, the summary tables include assumptions representative of the meaning conveyed by group of assumptions related to innovation and technology. My goal here is to extract the core ideas conveyed through related assumptions and not to create an exhaustive list of all references to innovation and technology.

[8] See Appendix B-E.

Analyze assumptions

After the assumptions were identified, I analyzed each and classified them as one of three types: existential (about what is), propositional (about what can be or will be) and value (about what is good or desirable) (Fairclough, 2003, p. 212). Classifying the assumptions according to these three types made the data more manageable as it became easier to see relationships between assumptions leading to the identification of prominent discourses. Essentially, categorizing the assumptions allowed me to draw connections between assumptions about reality (what is) with those describing what could be (propositional) and should be (value).

Existential assumptions are statements that describe an organization's view of reality. From the perspective of the organization, these statements communicate an acceptable way to perceive the current state of the world. These assumptions appear as statements of fact and use words like is and are to express a certain, objective state of things.

Propositional assumptions include projections about what could be so as to provide a rationale for a current direction or warning of the possible negative implications if a course of action is not adopted. Propositional assumptions include words like should, may or could to predict a possible future scenario or the potential state of things.

Value assumptions communicate ideal notions of a desirable or undesirable state. These assumptions reflect an organizational worldview and often have a timeless quality.

Thus, the prominent discourses often emerged from a blending together of these three types of related assumptions. Once the prominent discourses were identified, the types of assumptions became less important as the analysis progressed. Essentially, the sole purpose of categorizing the assumptions into the three types was to guide the analysis of the data in this first step.

Group assumptions

Each type of assumption, whether describing what is, what might be or what should be, contributes to shaping the prominent discourses circulating within an organization. Placing the assumptions into these three categories, besides providing a structure for interpreting the data, allowed me to better discern meaningful relationships between them. Here, I determine similarities between assumptions based on what is represented (what they are referring to in the social world) and the perspective or point of view they represent (Fairclough, 2003, p. 129). In this interpretive step, I essentially ask, are these assumptions talking about the same thing to draw them together under a prominent discourse. As I worked with the data, this step – connecting and grouping assumptions – resembled a mind mapping process. The labels on the assumptions (e.g.

existential, propositional and value) naturally fell away as the data analysis progressed and the prominent discourses became the focus.

Brief example of method applied

The first prominent discourse in Alberta Education's media release, connecting technology with engaging learning environments, emerged from a collection of seven assumptions (Alberta Education, 2008d). An existential assumption in the title "(s)chools broaden technology use to transform students' learning opportunities" (2[9]) sets the message in the present. Next, another existential assumption reflects a positive conception of the changes that have already occurred as a result of the introduction of technology: "we have seen exciting transformations in curriculum delivery and truly enhanced learning opportunities for students" (22). A third existential assumption effectively communicates a perception of the current reality in some classrooms by directly tying technology to improved student learning as "investments in innovative technologies, Alberta's teachers are empowering today's learners and improving student success in high school" (8). This statement uses present tense to imply technology is already improving high school completion. Second, the word investment is used to describe expenditures on technology will produce a return or benefit.

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[9] Refers to line number in document.

One of the assumptions in Alberta Education's media release builds on the notion of transformation and engagement in classrooms through a generic reference to research: "studies indicate that technology can be used to create a dynamic learning and teaching environment that engages the 21st century learner" (37). This statement is used to convey the expectation of continued improvement in student learning through technology.

Finally, the media release contains an assumption suggesting teaching practices utilizing technology will be highlighted as positive outcomes of the project. The media release notes project evaluation will be based on the identification of "promising practices that use technology to improve student engagement and high school completion" (34). By valuing practice integrating technology use, the assumption suggests the project evaluation process may deter participants from identifying instances demonstrating technology has a neutral or negative impact on student engagement or high school completion.

In sum, the prominent discourse associating technology with engaging learning environments in Alberta Education's media release is supported by seven related assumptions. The existential assumptions provide a conception of current reality that is, change that has already occurred in classrooms due to the introduction of technology. The propositional assumptions imply future change and improvements are expected while a value assumption endorses a change in practice, through the utilization of technology, as promising. The assumptions forge a meaningful connection between technology and transformational changes

resulting in engaging learning environments based on what is occurring (existential), potential change (propositional) and rewarding practices uses technology (value).

Step 2: Align prominent organizational discourses with philosophical orientations.

Next, I analyzed the prominent discourses identified in the first step to determine a best-fit relationship with Feenberg's (1999) four philosophical positions: instrumentalism, determinism, substantivism and critical theory. In this interpretative step, the prominent discourses evident in each document are placed within a philosophical position based on their agreement with the characteristics along the axis of the table. That is, I adopt a fairly literal interpretation of the philosophical positions to guide my judgment in discerning if a prominent discourse tends to suggest technology is humanly controlled or autonomous, neutral or value-laden. As mentioned in the description of each philosophical position (p. 30-47), the criteria grounding each position serve as guides throughout the analysis. For example, a prominent discourse is considered instrumentalist in orientation if it supports 1) technology as non-mediating and 2) humanly controlled.

Brief example of method applied

The prominent discourse linking technology and transformation in Alberta Education's media release puts forward technology as a solution for the problem

of high school drop out effectively overshadowing other solutions. Also, by emphasizing the positive impact of technology, the prominent discourse downplays the role of the teacher. In doing so, the media release serves to highlight the efforts of Alberta Education, namely the provision of funding for technology, while also signaling a need for change instigated by technology.

In the media release, the prominent discourse tying technology to engaging learning environments, although human control is acknowledged to some extent, overall reflects a positive deterministic position. By advocating a technology-driven transformation of classrooms and the change in teaching practice, the related assumptions are in agreement with the two criteria grounding a deterministic position: 1) technology develops according to a fixed, direct and inevitable course and 2) society must respond and be organized around technological developments. Although teachers are characterized as facilitators in the two expert quotations in the media release, a more instrumentalist position, the decision-making process is reduced to a conversion process as teachers take up and apply technology applications (20). Effectively, by establishing a link between the presence of technology and engaged learning environments this positive deterministic prominent discourse endorses an autonomous, value-free view of technology.

After classifying the prominent discourses, I turned to address the sub-question: What relationship exists between the ways of thinking about technology

in Alberta's education policy discourse and nodal discourses, specifically, the knowledge-based economy and globalization?

Step 3: Analyze the prominent organizational discourses to ascertain correlations with two nodal discourses.

In this third step I analyze the prominent discourses to ascertain the relationship, if one exists, with the two nodal discourses most relevant to my study: globalization and the KBE. I am interested in determining if the prominent discourses emerging from the documents tend to align positively with the nodal discourses or respond to and challenge (reframe) nodal discourses by presenting alternative or counter positions. Essentially, I check for a positive or reactionary relationship between the assumptions supporting the prominent discourses and the assumptions supporting the two nodal discourses.

For example, a prominent discourse will be strengthened in the main if it shares common assumptions with a nodal discourse. Conversely, a prominent discourse attempting to present a counter discourse will challenge the assumptions grounding a nodal discourse. If the prominent discourses of an organization align with the nodal discourses the organization will be more likely to achieve dominance within the discursive field. This third step provides a way to gauge if indeed a way of thinking about technology and education is successfully dominating the education policy discourse in Alberta.

Brief example of method applied

The prominent discourse linking technology and engaging learning environments evident in the media release aligns broadly with the KBE nodal discourse because of shared assumptions regarding traditional models. The prominent discourse promoting technology in classrooms is based, like the nodal discourse of the KBE, on assumptions acknowledging information technologies have a specific, strategic role in transforming system (Krings, 2006). Technology ensures inclusion in the KBE and similarly, technology engages students and improves the likelihood of completing high school. In addition, the notion of curriculum delivery enabled by technology, parallels the way in which technology facilitates the exchange of knowledge within the KBE. Taken together, the prominent discourse in the media release, like the KBE nodal discourse, centers on a move away from the industrial model towards a post-industrial model based on technology, an exchange of information and innovation.

Thus, the engaging learning environments prominent discourse rejects the industrial model of schooling and advocates new technology centered ways of teaching and learning. So just as the industrial model no longer reflects the reality of the market, in terms of processes, products and consumer demands, so to the industrial model of public schooling has become irrelevant causing students to disengage and eventually drop out.

As the media release example demonstrates, the method begins by identifying and classifying assumptions about technology enabling the emergence

of prominent discourses. The prominent discourses are then analyzed to determine what ways of thinking about technology (instrumentalism, determinism, substantivism or critical theory) are endorsed to answer the first research question: what ways of thinking about technology are evident in Alberta's education policy discourse? Finally, I look for strong correlation between the prominent discourses of an organization and the two nodal discourses, globalization and the KBE.

Interview analysis: Methods

The interview analysis began, like the policy documents, by first identifying the assumptions depicting a way of thinking about technology. Next, I analyzed the assumptions to determine resonance with Feenberg's (1999) four philosophical positions. As with the analysis of the prominent discourses in the document analysis, I relied closely on the characteristics along the axis of the table to guide my judgment: autonomous, humanly controlled, neutral or value-laden.

For example, an instrumentalist position is reflected in assumptions based on technology as humanly controlled and neutral. From this position, technology is a tool used to meet human needs. Therefore, attending to the core technical components is the best way to ensure humans can make use of technology. The key reason the prominent discourses grouped under instrumentalism and not determinist position is the emphasis on human control. In sum then, to be aligned

with a philosophical position, the participant's comments demonstrate agreement with the characteristics, relating to control and value, along the axis.

The interview analysis included comparing the participants' comments, in relation to each organization, with the assumptions grounding the two nodal discourses. Again, as with the document analysis, here I seek to determine what ways of thinking about technology are most likely to dominate the education policy discursive field.

The interview analysis added another dimension to the education policy discursive field as it shed insight into the fluctuating political tensions, economic realities and philosophical divisions at work in Alberta during the last 20 years. So while the document analysis created a more rigid, flat depiction of education policy discourse in Alberta, the interview data provided evidence of a gradual movement away from extreme positions in each philosophical orientation across organizations.

The interview data is thus presented alongside the document analysis and illustrates how the ways of thinking about technology have evolved over time.

Data sources and collection

One overarching question and a related sub-question motivate my inquiry and serves to guide data collection:

1. What ways of thinking about technology are evident in Alberta's education policy discourse?

- What relationship exists between the ways of thinking about technology in Alberta's education policy discourse and nodal discourses, specifically, the knowledge-based economy and globalization?

Since my study is based on technology policy in education through an interest in discourse, meaning and power, I include documents and interview data from each of the four groups most relevant to technology and education policy broadly representing government, teachers, education leaders and parents.

The core data sample, listed below, is comprised of education and technology documents authored by Alberta Education. In some cases, only a select portion of the document, relevant to the research questions, is included in the data sample. Although the bulk of my data is from Alberta Education, documents from the ATA, CASS, and Alberta Schools' Council Association are included to compare and contrast the discourse between groups. In addition, the interview data from representatives from each group provides a more nuanced interpretation of the data.

Table 4. Data sources: primary and secondary documents

Document	**Date**	**Section/Page Numbers**
Alberta Education: Primary Documents		
ICT Program of Studies	September 2000	Rationale and Philosophy
Learning and Technology Policy Framework	July 2004	Pages 1 – 4, 10 – 24
Business Plan, 2008 – 2011	March 2008	Pages 1 – 11
Alberta Education: Secondary Documents		
Calls for proposal – Implementation of technology mediated learning to improve student engagement and success in high school	September 2007	All
Media Release	April 2008	All
Alberta Teachers' Association: Primary Documents		
Technology and Education	1999, revised 2004, 2007	As relevant
Resolutions	2007 - 2009	As relevant
Alberta Teachers' Association: Secondary Documents		
Changing Landscapes of the Next Alberta: 2008 - 2028	2008	All
Alberta School Councils' Association: Primary Documents		
Resolutions	2006 - 2008	As relevant
College of Alberta School Superintendents: Primary Document		
Moving and Improving: Building System Leadership Capacity	2009	As relevant

Rationale for selection: Organizational groups

While the reasons for including Alberta Education and the ATA in my study may be obvious as both are central players in the education system in Alberta, the reasons to include the College of Superintendents (CASS) and the Alberta School Councils' Association (ASCA) may be less so since neither group has authored formal, technology policy documents. In what follows, I provide a brief history of each group and offer reasons for including both in my study.

College of Alberta School Superintendents

First, CASS is a voluntary association of school superintendents and other certificated central office educational officers (excluded from the local bargaining units of the ATA). CASS uses a distributed leadership model with small central staff (currently 3) and 10 executive staff members. CASS generally supports the educational aims of other educational organizations including, Alberta Education, the Alberta School Boards Association (ASBA) and the ATA but may choose to vary their position on some issues.

CASS began to take shape after the first annual meeting of locally appointed superintendents of Alberta in 1958. Five years later, an independent group called the Alberta Urban School Superintendents' Association formed which evolved over the years to be CASS. The organization has grown despite limited resources to become a voice for superintendents in Alberta on matters of policy, leadership and most recently system improvement. Although CASS is the

primary mechanism through which jurisdiction leaders are able to influence the direction of education in the province, the evolving nature of the organization and limited financial resources seems to have caused the group to be caught up in issues of identify and purpose.

> It (CASS) seems to have been clearly established that it does not want to present any aspects of the role of a union. It continues to search whether it wants or does not want stronger legislative sanction. It struggles with determining a structure or operating mode that may enable it, effectively, to be reactive always when necessary and to be proactive, at least selectively, on those issues it may identify as being crucial to the success of education in Alberta. (Van Tighem, 1983)

Despite some growing pains, CASS, as one of the four major education partners in Alberta, along with the ATA, ASCA and ASBOA has presented a united front on several contentious issues over the years and effectively influenced provincial direction on for example, grade level of achievement reporting, funding for kindergarten and budget cuts to education. Interestingly, CASS is not yet recognized as a professional organization despite lobbying for over five years.

CASS is of interest and import to my study for two reasons. First, CASS is a prominent player in provincial policy discussion. Second, CASS represents senior leaders in jurisdictions responsible for charting the direction of a jurisdiction, allocating resources and accounting for results. Hollingsworth recently studied three districts which consistently demonstrated long-term, highly effective instructional technology leadership resulting in significant benefits to

student learning. Findings underscore the need for senior leaders to be informed, engaged and intentional to ensure technology is integral to district planning and integral to realizing district goals.

> In examining the data throughout the study, it is apparent that Superintendents and Central Office leaders play a critical role in setting a visionary direction for serving student needs through the use of information technology. Not only do the Superintendents in each lead district clearly articulate a vision, they also understand how information technology contributes to realizing the district vision.
>
> While none of these superintendents professed deep technical prowess, each could articulate why technology was important within their educational organization – an element most critical to this leadership role. (Hollingsworth, 2008, p. 72)

My professional experiences have confirmed Hollingsworth's findings and demonstrate superintendents influence technology-related decisions by determining what is valued, who has power and how things happen. Superintendents quite simply, by creating and limiting possibilities and setting priorities, define districts. CASS, as the organization representing superintendents, is strategically valuable to ensuring technology policy serves the interests of public education.

Alberta School Councils' Association (ASCA)

Another prominent group, ASCA, began in 1929 as an affiliate of the Canadian Home and School Federation which included school-based parent groups such as home and school associations and parent advisory council. In 1988 amendments to the Alberta School Act provided for the creation of school

councils while further revisions in 1994 mandated school councils. The revisions to the School Act became foundational to ASCA's role in providing programs, resources and services to promote school council effectiveness. School councils offer parents a formal channel to support student learning by communicating concerns and advocating for change within their local school community. School principals retain the decision-making authority, but it is expected decisions are based on consultation with the school council.

In addition to providing support for over 680 school councils, ASCA representatives bring a parent perspective to several provincial advisory committees for Alberta Education, CASS, ASBA and the Alberta Regional Professional Development Consortia (ARPDC). ASCA is the primary means through which parents can influence provincial programs and policy and provide input on a range of issues from health concerns to transportation, new school designs to high school completion.

ASCA is relevant to my study for two reasons. First, at the provincial level the resolutions passed at ASCA's Annual General Meeting offer another interpretation and response to Alberta's technology policy. I was interested to examine what elements of Alberta's technology policy resonated with ASCA values and position. Given parents represent one segment of the electorate with vested interests in education, I wondered what elements of Alberta's technology policy resonated with or concerned ASCA. Second, based on my experiences with principals, school councils can influence technology decisions at the school level

because the fundraising dollars are often used to purchase technology for the school due to an apparent funding gap.

A recent study points to the funding gap which has caused some schools to become increasingly reliant on external sources of revenue to fund technology purchases. In an effort to determine ICT program costs, Alberta Education studied the Total Cost of Ownership (TCO) of technology in 13 schools. The study, completed in 2001, revealed that the average per-student cost across the 13 schools was $310 per student per year, ranging from a low of $176 per student in a small elementary school (using largely donated equipment) to $678 per student per year in a high school (Redhead, 2001). However, under the provincial funding formula (2000 – 2003), schools boards were provided in 2000-2001 with $42 per student in "Technology Integration Funding" (TIF) to cover this cost, consequently funding to implement the ICT program of studies has been borne by schools.

The TIF did not last long, however, as it was not supported by jurisdiction leaders. "When Alberta Education talks to CASS about enveloped funding, they say just give us the money and we'll make decisions for our local context" (J. Percevault, Personal Communication, August 20, 2009). Between 2001 - 2004 Alberta Education rolled the $42 per student enveloped TIF funding into the base instructional grant funding. As a result, school boards were required to prioritize the funding of technology within the general budget used to operate schools (Alberta Education, 2007d).

In addition, in 1993 school boards experienced a decrease in per pupil funding of 5% while also losing the ability to generate funding through local taxation, thus causing school boards to rely solely on Alberta Education for core funding (A. Taylor, 2001, p. 8). Since teacher salaries account for the majority of funding allocated, the ability of boards to be 'flexible' in allocating government grants is limited. In 2007 the budget increase provided to school boards did not match inflation (Government of Alberta, 2007).

Throughout this time, some school jurisdictions have dedicated resources to securing grants from Alberta Education to support technology purchases. Based on my experiences, this model seems to favor jurisdictions best able to support the creation of a winning grant proposal, provide support for implementation, monitor progress and complete reporting requirements.

Taken altogether, these factors alongside an increasing emphasis and interest in technology, have created a gap in funding and required some school boards to subsidize the provision of technology at the expense of other programs and priorities and/or for schools to engage in external fundraising.

It is important to note school councils may choose to fundraise but are ineligible to apply for a gaming license, required to access revenues from bingos or casinos. Current policy differentiates school councils from the 'external' activities of fundraising societies; for example, the Alberta School Council Resource Manual (ASCM) states:

> School councils and fundraising societies differ, however, in the types of external relationships they establish in the course of their work. For example....(a) fundraising society wishing to raise money through a bingo communicates with Alberta Gaming and Liquor Commission personnel. (Alberta Home and School Councils' Association, 2006, p. 42)

However, it is possible and probable, the same individuals could serve on both the school council and the fundraising society at the school. Regardless of the division between the school council and fundraising society, it follows that parents involved in fundraising efforts may wish to communicate how they would like the funding used through the school council. Therefore given the probability schools are in need of fundraising dollars to purchase technology and because parents, via school councils and fundraising societies, can influence the expenditure of significant funds on technology it is important to consider ASCA's position on technology and education.

Rationale for selection: discourses genres

I limit the data set to two discourse genres: policy and related documents (e.g. media releases) and semi-structured interviews. I have intentionally narrowed the data to include only the portions of policy documents containing assumptions and values about technology and education. I am not then, concerned with the learning outcomes in the Information and Communication Technologies program of studies, but I am interested in the rationale and philosophy.

I classify the documents as either primary (foundational) and secondary

(supportive) policy documents. The two types of documents are often intended for different audiences but are mutually reinforcing and therefore illustrative of the way discourse is shaped within each organization. Also, the message of primary policy documents can be disseminated in the main through secondary documents such as media releases commenting upon them. Secondary documents can emphasize and modify aspects of primary documents. In addition, there is an important connection between assumptions in primary and secondary documents as what is stated in one is often intended to be understood against something written in another. Claims made in a secondary document are supported by assumptions in the primary document. In this way, "…assumptions connect one text to other texts, to the 'world of texts'" (Fairclough, 2003, p. 40).

The relationship between primary and secondary documents: an example

Alberta Education's Business Plan (a primary document) and a related call for proposals (secondary document), work together discursively by foregrounding issues and shaping responses. The Business Plan is a high-level planning document which sets out goals and priorities of Alberta Education. The goals and priorities are couched within a description of the Alberta context and emerging global economic and social trends, including the challenges and opportunities presented by technology.

Alberta Education's Business Plan serves as a rationale for channeling resources, usually through a call for proposals process, to jurisdictions or groups

able to put forward a plan fitting the strategic priorities. Once the Business Plan establishes a strategic foundation, the call for proposals are drafted, vetted internally and communicated throughout the system initiating a proposal writing process (in some jurisdictions). In grant proposals, jurisdictional leaders endeavour to show how their project best aligns with the goals of the call for proposals by mirroring the language used to describe the goals of the initiative.

Increasing high school completion rates was identified as a strategic priority in Alberta Education's 2007 Business Plan. In the months that followed, the *Implementation of technology mediated learning to improve student engagement and success in high school* call for proposals was announced as one initiative, within five broad strategies, to address high school completion rates (Alberta Education, 2007g). Twenty-four jurisdictions were successful in securing funding, $300 000 maximum/project, through projects designed to meet the primary goal: "demonstrate innovative uses of technology-rich environments to improve student engagement" (10). The project description below from one of the successful applicants accurately reflects the focus of the call for proposals by stressing student engagement, high school completion and technology-rich environments.

> This project will improve student engagement and course completion by providing students with technology-mediated learning. Technologies will include interactive whiteboards, laptops, student response systems, computer software, digital cameras and camcorders. (Westwinds School Division: http://education.alberta.ca/admin/technology/techsuccess/participants.aspx)

The most frequently used words included in the project titles are *technology-mediated* and *student engagement*. The project descriptions reflect the conception of the technology-rich environments described in the call for proposals. Of the 24 project descriptions, 4 mentioned teachers, while 10 included videoconferencing, 15 included laptops and 17 included whiteboards. Within jurisdictions, the proposal writing process promotes a connection between student engagement, technology and high school completion.

In sum, the central concern of the call for proposals is in determining "how technology can be leveraged to improve the school experience for all students, with particular focus on students who are at-risk, struggling or disengaged with current learning environments" (Alberta Education, 2007g, p. 1). The prominent discourse engaging learning environments, which equates student high school completion with technology-rich classrooms, effectively underscores the value of and need for technology in the classroom. The call for proposals is based on the existential assumption stated in the title: "technology mediated learning…improve(s) student engagement and success in high school" (3). (Wherein technology mediated implies a process of learning through and with technology.) The role of the teacher in the student learning experience and in the learning environment has been disregarded or at least deemphasized. Through the engaging learning environments prominent discourse, technology improves learning and power resides primarily with the technology or in the learning environments and less with teachers.

Another potential and related interpretation is that students are struggling or disengaged because current learning environments are technology-poor. The call for proposals aligns with the strategic priorities of Alberta Education's Business Plan and provides the impetus for a fairly specific technology-based response to a provincial priority, high school completion. Together, the primary and secondary texts in this example work together to create and reinforce a meaningful connection between technology and high school completion within the education system.

The primary and secondary documents selected for my study make up the core data sample, but other documents are introduced to enrich the discussion section. "The corpus should not be seen not as constituted once and for all before one starts the analysis, but as open to ongoing enhancement in response to questions which arise in analysis" (Fairclough, 1992, p. 228). For example, I chose to refer to CASS Connection, the organizations' bi-annual magazine, to better understand CASS' position after the document and interview analysis were complete. Throughout the study, only documents that align with the purpose of the study and findings of the analysis are included in the discussion.

Rationale for selection: documents

I selected three documents from the ATA: 1) Technology and Education (1999, revised 2004, 2007), 2) Annual Representative Assembly technology-

related resolutions (2007 – 2009) and Changing Landscapes of the Next Alberta: 2008 – 2028 (2008) (Secondary Document). Each document has a different potential purpose and target readership. The first, Technology and Education, is a comprehensive position paper intended to serve as a touchstone for members. The second, the resolutions, is a sample of the ongoing dialogue between the ATA and Alberta Education. The third, Changing Landscapes, is a visionary piece intended to facilitate discussion with a wider audience, that is, outside the education community.

I selected 3 primary and 2 secondary documents from Alberta Education: 1) ICT Program of Studies (2000), 2) Learning and Technology Policy Framework (2004), 3) Business Plan (2008 – 2011), and secondary documents 4) Calls for proposal – Implementation of technology mediated learning to improve student engagement and success in high school (2007) and 5) Media Release - Schools broaden technology use to transform students' learning opportunities (2008). As with the selection of the ATA documents, I chose documents with a variety of different purposes and potential audiences. The first three documents provide direction, outline goals and identify objectives primarily for those in the education system. The call for proposals supports implementation and communicates directly to district leaders. The media release is designed by Alberta Education to convey positive messages about the education system, and specifically Alberta Education's initiatives, to the general public. In general, the circle of influence is drawn wider with each document with the ICT program of

studies having the narrowest audience – teachers and the media release having the largest – the public.

ASCA does not have a formal policy position on technology and education but the resolutions, by calling attention to issues and concerns, can shed light on ASCA's position (Alberta School Councils' Association, 2008). In interpreting the resolutions related to technology and education, I assumed alignment with ASCA's mandate, goals and values. For example, ASCA's vision statement seems to be in keeping with a humanistic orientation to purposes of public education centered on the individual development of students as future citizens. "ASCA is committed to the best possible education for Alberta children so they may reach their potential to participate in society in a meaningful and responsible way" (Alberta School Councils' Association, 2009). Since it is expected that ASCA would bring this perspective to discussions related to technology and education policy, the organizational mandate, goals and values have been taken into consideration throughout the analysis.

Rationale for exclusion

I have excluded documents or resources which concern teaching and learning specifically for example, curriculum documents, digital learning objects, online courses and resources. I have also not elected to study the technology related documents produced by jurisdictions, as I am interested in the discourse of organizational groups at the provincial level. I also exclude the technology

discourse associated with the corporate realm, for example marketing products. Documents relating to school councils, minutes from meetings for example, although helpful in establishing a need to include the Alberta School Councils Association in the study, were not included in the data sample. All of these excluded items do indeed carry assumptions about technology and education, but I am limiting my concern to technology education policy, related documents and interviews to ensure the inclusion of data most relevant to the core purpose of my inquiry.

Interview selections

One of the limitations of critical discourse analysis (CDA) some suggest, is that it fails to produce nuanced, well supported findings. Critics assert CDA findings are simply the unsubstantiated interpretations of the researcher without regard for the context (Stubbs, 1997). In an effort to address this limitation, I interviewed eight educational leaders. Each participant brings a unique perspective and all have been involved in education at the provincial level throughout their professional careers. The breadth and depth of career experience of the interview participants generates a rich account of Alberta's unique approach to technology policy in education. The participant's comments breathe life to the policy documents by adding context and personal reactions. The interview data illustrates how education policy discourse shifts over time and is influenced by external forces and internal tensions.

The interviews also assist in determining how, if at all, nodal discourses identified in the primary and secondary documents are taken up by the respective organizations. Although it is impossible to measure the degree of influence of prominent discourses, the interview data demonstrates how some find resonance across the system.

Table 5. Interview participants

Participant	**Former and Current[10] Affiliations**
(anonymous)	District Education Technology, Alberta Education
Pat Redhead	District Education Technology and Alberta Education, retired
John Percevault	District Education Technology
Dr. Maurice Hollingsworth	District Education Technology, Faculty Member at the University of Lethbridge
Jacquie Skytt	Alberta Education, Alberta Teachers' Association
Edna Dach	Alberta Teachers' Association - Education Technology Specialist Council, District Education Technology
Michele Mulder	Alberta School Boards Association, Alberta School Council Association
Dr. Jim Brandon	Superintendent, College of Alberta School Superintendents

[10] Current – at time of interview

Rationale for selection

I selected interview participants based on three criteria: 1) involvement with provincial policy, 2) knowledge and understanding of provincial context relevant to technology and 3) duration of professional experience. All of the participants have participated in the creation, review and/or implementation of provincial policies. I intentionally chose individuals who have contributed actively within the education community during the time period most relevant to my research questions. Besides their direct involvement in education in Alberta during this time, the participants also bring a long-term perspective based on their extensive involvement in education generally over the years.

Rationale for exclusion

I have chosen not to interview teachers, students, parents and administrators primarily because my study focuses on education policy and organizational discourse and therefore needs to include individuals with extensive knowledge and expertise in this area. Also, I am not interested in studying the implementation of policy at the local level, that is, what is actually happening in classrooms with technology.

Questions of validity

Although CDA is a relatively new field, it is built on and informed by, a substantial theoretical foundation of scholarly work in language, meaning and society as shown in earlier in CDA: Critical theoretical underpinnings (p. 92). CDA is interpretative and works within the realm of language and meaning often not easily categorized, weighed and measured. However, much of the criticism leveled at CDA seems to start from a belief and indeed the desire, to attain neutral observations and accurate analysis of an objective reality. In what follows I address the three most common criticisms of CDA: 1) the charge of bias, 2) the dearth of empirical evidence to support findings and 3) the issue of the overtly political agenda.

CDA marries linguistic theory, based on the form and function of language use and critical social theory. Criticisms focus primarily on how researchers move between the two, from identifying and describing to interpreting and explaining the relationship between language and power in society. Some critics, such as Widdowson and Stubbs, have argued CDA is based mainly on personal interpretation and cannot be considered analysis (Stubbs, 1997; Widdowson, 1995). Critics charge CDA researchers read connections into the interpretation of the text. CDA becomes, critics assert, simply a tool for researchers to confirm their suspicions. Critics charge the researchers

commitment, that is the critical stance with respect to existing inequities in society, taints the findings with personal bias.

First, the suggestion CDA researchers privilege their personal interpretation while ignoring other possible interpretations fails to acknowledge how CDA works with the features of the text within social context. CDA is a systematic method which moves from textual analysis, to interpretation and reproduction of text and finally to sociocultural implications. CDA researchers first derive meaning from features of the text by identifying and analyzing the linguistics and semantic aspects of a text. CDA researchers necessarily use their knowledge and understanding of language to make sense of the text. Next, the researcher explains how the text will potentially work within the social world. Here the researcher must attend to the range of possible interpretations within a particular context. CDA resists the mechanical interpretation of texts or fixing a meaning to a feature of the text.

> (T)exts may be open to different interpretations depending on the context and the interpreter, which means that social meanings…of discourse cannot simply be read off from the text without considering patterns and variations in the social distribution, consumption and interpretation of the text. (Fairclough, 1992, p. 28)

CDA researchers, if their findings are to be beneficial to the community, must be attuned to their own interpretative lens, past experiences and knowledge, and sensitive to how discourse is shaped by interactions within the social world.

Another criticism circles around the issue of empirical evidence. Stubbs (1997) charges CDA makes claims regarding a correlation between language use, for example the repetitive pairing of words, and patterns of thinking or the naturalization of ideas but in fact there is little evidence to prove the existence of a relationship.

> There must be non-linguistic evidence of a pattern of beliefs and behaviour. If language and thought are to be related, then one needs data and theory pertinent to both. If we have no independent evidence, but infer beliefs from language use, then the theory is circular. (Stubbs, 1997, p. 106)

First, CDA defines discourse as social action; we use language to act in and on the social world. CDA researchers have illuminated how language influences behavior by manipulating public opinion. For example, Wodak's body of research offers compelling evidence demonstrating a strong correlation between discourse, racism and discriminatory behavior (Reisigl & Wodak, 2001; Wodak, 1989; 1996). Wodak's historical focus demonstrates how discourse can motivate action within a particular context and based on past understandings. Similarly, van Dijk demonstrates how ethnic prejudices were reproduced in the media and circulated and reinforced in everyday talk (van Dijk, 1984; 1991). Both Wodak and van Dijk, although the former adopts a historical approach and the later a socio-cognitive approach, use CDA to prove how language shapes thoughts and influences behavior.

Thirdly, an issue at the heart of most of the criticisms of CDA, the overt political commitment of CDA researchers is problematic for critics. CDA is unapologetic in this regard.

> Practitioners of CDA are indeed generally characterized by explicit political commitments. They are people who see things wrong with their societies, see language as involved in what is wrong, and are committed to making changes through forms of intervention involving language. (Fairclough, 1996, p. 52)

CDA researchers do not see this critical starting point as a deficit or fault, but rather accept it as fundamental to realizing the goal of revealing how language contributes to social inequities and encouraging change.

I come to the analysis of the data with 20 years of experience in various positions in the education system in Alberta. I bring a political commitment to the work as I have observed and been a part of the many conflicting discourses associated with technology and education. I take up CDA to reveal the roots of these discursive differences with the hope of being better able to building bridges between them in the next phase of my career. I move now to a synthesis of my findings including illustrative examples from the document and interview analysis.

Chapter 4: DATA ANALYSIS FINDINGS

In this chapter I include a synthesis of the findings based on a detailed analysis of the documents and interviews[11]. In all, eighteen prominent discourses, or ways of thinking, emerged after the relevant assumptions were identified and grouped. The prominent discourses are distributed fairly evenly between each of Feenberg's four philosophical categories (1999). Throughout the following synthesis, examples of assumptions from the documents and interview data are included to demonstrate alignment with each of the philosophical positions.

This chapter is organized into four main sections. The first section presents a synthesis of the data findings in relation to the overarching research question:

1. What ways of thinking about technology are evident in Alberta's education policy discourse?

This section starts with a brief overview of the findings by highlighting the relationship between the eighteen prominent discourses identified in the data and the four philosophical positions about technology and education. Following the overview, I include a table (p. 140) capturing the complete results of the document analysis findings in relation to Feenberg's philosophical categories

[11] A sample of the primary and secondary documents and analysis are included in the appendix.

(1999). Next, I offer samples of evidence from the data, both the documents and interviews, related to each of the four categories.

The second section identifies the notion of 21st century learning as a discursive overlap in the data. Although the term 21st century learning takes on different meanings based on the philosophical starting point, the data indicated this term is moving education policy discourse away from extreme positions (e.g. negative substantivism or positive determinism). Examples are cited to illustrate how the notion of 21st century learning is resulting in less polarized dialogue and igniting the need to examine what and how students learn alongside assessment practices and accountability systems.

The next section addresses the data gap, specifically a lack of a formal position on technology and education from the College of Alberta School Superintendents. I offer possible explanations for what appears to be a discursive silence in educational leadership in chapter 5. A brief overview of the document CASS provided for this study is included here but I was not able to discern any prominent discourses relevant to technology.

Finally, the last section addresses the sub-question related to my inquiry:

- What relationship exists between the ways of thinking about technology in Alberta's education policy discourse and nodal discourses, specifically, the knowledge-based economy and globalization?

In this section, I describe the relationship between the prominent discourses identified in the data and the two nodal discourses most relevant to my study: globalization and the KBE. I highlight which prominent discourses emerging from the documents tend to align positively and affirm or respond to and challenge (reframe) nodal discourses. An organization is more likely to achieve a discursive advantage in education policy discourse by tying into the nodal discourses.

I conclude the chapter with a few general observations regarding the data analysis findings.

What ways of thinking about technology are evident in Alberta's education policy discourse?

In all, the ten documents reviewed and analyzed yielded a fairly balanced distribution of the eighteen prominent discourses (see p. 140) between the four philosophical positions: substantivism, critical theory, instrumentalism and determinism, outlined in Feenberg's chart (1999). Throughout the following synthesis, I offer examples of the prominent discourses gleaned from the detailed analysis of the documents. To begin, I briefly outline the central tenants of each quadrant in connection to the findings before highlighting illustrative examples emerging from the document and interview data analysis.

Overview of findings

Table 6: Feenberg's Table (1999) of Philosophical Positions

Technology is…	**Autonomous**	**Humanly Controlled**
Neutral (complete separation of means and ends)	Determinism (traditional Marxism)	Instrumentalism (liberal faith in progress)
Value-laden (means form a way of life that includes ends)	Substantivism (means and ends linked in systems)	Critical theory (choice of alternative means-ends systems)

(Feenberg, 1999, p. 9)

The instrumentalism position, emerging primarily from Alberta Education documents, is comprised of prominent discourses that emphasize human control. The prominent discourses in this quadrant were selected based on their agreement with the two assumptions grounding the instrumentalist position: 1) technology is non-mediating and 2) humans control ends. Prominent discourses are judged to be reflecting an instrumentalist position by upholding access to technology, or simply the acquisition of tools, as central and essential to realizing predefined, educational ends. Here, technology is added to classrooms to improve the ability of teachers and students to meet the objectives of the curriculum. Technology is a neutral, delivery device or a device to be used to accomplish predetermined tasks.

Next, the determinism section, again evident primarily in Alberta Education documents but also drawn from ASCA's documents, brings together prominent discourses centering on progress through the natural development of technology. The prominent discourses in this quadrant were selected based on their agreement with two beliefs: 1) technology develops according to a fixed, direct and inevitable course and 2) society must respond and be organized around technological developments. These discourses specifically emphasize the relationship between technology and economic competiveness, innovation, results and future prosperity. Technology is also portrayed as a catalyst for transformative change and necessary for classrooms to be relevant in modern times.

Substantivist prominent discourses reflect agreement with two assumptions: 1) technology shapes society more than society shapes it and 2) technology holds some inherent values. The substantivism quadrant includes prominent discourses emphasizing the negative values associated with technology predisposing individuals to a certain way of being. This group of prominent discourses stressed the uncontrollable nature of technological development and the potential harmful impacts on quality of life. This philosophical approach to technology in society was apparent only in the ATA's documents.

The critical theory position is the only quadrant with prominent discourses emerging from documents from all organizations although primarily and most

stridently from the ATA. The prominent discourses in this quadrant demonstrated alignment with three criteria:

1. Values embodied in technology are socially specific and not narrowly limited to efficiency or control technology.
2. Technologies offer frameworks for ways of life.
3. The design and configuration of technology does not only meet our ends; it also organizes society and subordinates members into a technocratic order.

Here, the value-laden nature of technology grounds the belief that teachers must be key decision-makers regarding the use of technology. These prominent discourses also assume education should ensure students are able to make informed decisions about technology based on knowledge of the benefits and costs. The emphasis on ethical values and the common good recognizes technology frames a way of life and underscores the need for human control.

Although the document analysis demonstrated organizations were strongly linked to some philosophical positions and not others, the analysis did reveal some internal differences. For example, whereas Alberta Education's Business Plan aligned tightly with a deterministic position, the ICT program of studies philosophy and rationale reflected a critical theory orientation. Although this discrepancy is partly due to the difference in the intended audience for each document, the findings point to a contrast in terms of the way of thinking about technology is possible within the organization. Similarly, the interview data

underscored the philosophical differences between organizations but also pointed to some internal tensions and shifts in thinking over the years.

Overall the interview data mirrors and further accentuates the two camps prevalent in the document analysis. In general, instrumentalist and determinist comments were used to describe Alberta Education documents and initiatives while comments reflecting substantivist and critical theory positions were generally associated with ATA and ASCA's documents and initiatives. The interview data complemented and contrasted the document analysis in two ways.

First, the interview data showed, for the most part, participants' perspectives, concerns and priorities were consistent with that of their respective organization but some did recall incidences of contention. These internal organizational rifts were rarely discernable in the document analysis. So while the policy and related documents often appear to speak in a monotone, that is primarily from a consistent position, the participants articulated the less apparent complexities of policy creation and implementation. In effect, the policy documents are static, in that they reflect a particular moment in time (politically, economically and socially) but the participants were able to vividly describe the social context influencing technology policy discourse.

Secondly, all the participants agreed technology policy discourse has shifted during the last 20 years as some of extreme positions, in each philosophical position, have become less prevalent. Participants suggested this evolution is occurring as a result of research in the field and prevalence of

technology in all aspects of society. Many also connected this philosophical move with the notion of 21st century learning.

Alongside the presentation of the document analysis findings following the table below, I include correlative samples from the interview data complementing and contrasting the prominent discourses in each quadrant.

Table 7: Prominent Discourses mapped to Feenberg's Table (1999) of Philosophical Positions

Technology is…	**Autonomous**	**Humanly Controlled**
Neutral (complete separation of means and ends)	Determinism Change and the new economy (3 documents: AE: L&T policy framework, Business Plan and media release) Engaging learning environments (2 documents: AE: call for proposals and media release) Adequate funding for access (ASCA: resolutions)	Instrumentalism Access (3 documents: AE: Business Plan, call for proposals and L&T policy framework) International standings (AE: Business Plan) Accountability (AE: L&T policy framework)
Value-laden (means form a way of life that includes ends)	Substantivism Identity and the social world (ATA: Changing Landscapes) Access to information versus learning (ATA: Changing Landscapes) The knowledge-based economy (ATA: Technology and Education) Reframing economic competitiveness (ATA: Changing Landscapes)	Critical theory The pedagogical relationship and the common good (ATA: Technology and Education) Distributed learning complementing traditional practice (ATA: resolutions) Teacher control (ATA: resolutions) Change, complexity and uncertainty (ATA: Technology and Education) Critical technology literacy (3 documents: ATA: resolutions, AE: ICT program of studies and L&T policy framework) Educational guidelines and use (ASCA: resolutions) Curriculum and practice-based (2 documents: AE: ICT program of studies and L&T policy framework) Holistic technology planning (ATA: resolutions)

Samples of evidence

Instrumentalism

Figure 1: Feenberg's Table (1999) of Philosophical Positions - Instrumentalism

Technology is...	**Autonomous**	**Humanly Controlled**
Neutral (complete separation of means and ends)	Determinism (traditional Marxism)	**Instrumentalism** **(liberal faith in progress)**
Value-laden (means forms a way of life that includes ends)	Substantivism (means and ends linked in systems)	Critical Theory (choice of alternative means-ends systems)

Prominent discourses located in the instrumentalism quadrant reflect a user-directed, tool-view approach to technology. Here, technology is a neutral instrument designed to solve a problem or complete a task. Instrumentalism adopts an empirical approach to the interaction between technology and the world and attempts to quantify the usefulness or impact of a technology. As such, any given technology is thought to have fairly consistent determinate effects regardless of the context. Support for a delivery model in education policy grew out of fundamental values-based assumptions about the purpose and capabilities of technology, the nature of learning and the role of the teacher. The assumptions identified in the data making up the prominent discourses within the

instrumentalist position demonstrated agreement with two statements: 1) technology is non-mediating and 2) humans control ends.

As evident in the summary table (p. 142), Alberta Education's documents contain three prominent discourses reflecting an instrumentalist position. For example, in the Learning and Technology Policy Framework assumptions tied technology to an accountability prominent discourse through a reference to 'return on investment' (433). This accountability prominent discourse reflects an instrumentalist position by assuming the impact of technology will be measured against predetermined standards. The accountability system in Alberta is based on the identification of "key performance indicators to measure the overall impact of technology on the achievement of learning system objectives and to measure progress" (472). Human control is assumed here as system leaders and teachers will be held to account for results achieved through technology use. The accountability prominent discourse establishes a feedback loop as "decisions are based on learning system/government priorities and the enhancement of learning outcomes, and are evaluated using established performance criteria" (86). The accountability prominent discourse also suggests an interest in gathering data beyond the jurisdiction or school level by using technology to "individualize the tracking and recording of learning progress" (35).

The accountability prominent discourse underscores the need for evaluation of the impact of technology (470). The related assumptions attempt to ensure technology decisions in education are based on data and intended

outcomes (48 and 161). From a positive instrumentalist position, the accountability prominent discourses holds technology as non-mediating and therefore expected to demonstrate consistent results, regardless of the context, and improve achievement for all students.

Alberta Education's Business Plan reinforces this instrumentalist position through another prominent discourse, access. Related assumptions secure the foundation of the access prominent discourse by depicting a divide between the extent and ways in which technology is used by students and teachers. Whereas "(t)echnology is prevalent in all aspects of society and culture and is an integral part of the lives of most children and youth" (150), "(e)ducators face the challenge of integrating technology effectively throughout all areas of curriculum and classroom practices" (156). The related assumptions depict a gap between how students are able to easily use and realize the potential of technology and the ability of teachers (153). These assumptions support positioning the prominent discourse of access within the instrumentalist quadrant by implying two things.

First, the assumptions paint a rather homogenous picture of students in Alberta as enjoying relatively similar degree of access, ability and purpose with respect to technology use. The assumptions imply technology is non-mediating and humanly controlled as students in Alberta are using technology in positive ways, to meet their needs and solve problems. Second, by suggesting most students are already technologically savvy, in ways that teachers are not, it follows increased access to technology will enhance their educational experience

by allowing students to "find information, connect with others and add their own content" (151). The access prominent discourse takes a positive instrumentalist position by promoting access to and use of technology while also endorsing a value-neutral view of technology.

The related assumptions support the access prominent discourse in Alberta Education's Business Plan by articulating a conception of reality in which most students are using technology frequently and comfortably, also lend support to technology as a solution to a series of stresses on the education system. For example, the education system is under pressure to ensure "all students have equitable access to quality learning programs" (63) especially given declining populations in rural areas and increased urbanization make it difficult to retain teachers in rural areas (138). Access to technology is a potential solution providing "(f)lexible and innovative learning opportunities for students – any time, any place" (166). Here again, technology is a value-neutral delivery mechanism for education allowing students to engage in learning and complete programs at their convenience.

The access prominent discourse in Alberta Education's Business Plan also highlights the potential of specific technologies such as "(a)ssistive technology in the classroom to make learning accessible for all students" (160) and "(v)ideo conferencing to open a window to an expanded view of the world and experiences as global citizens, as well as to increase access to programming" (162). These two examples reiterate a direct connection between student learning and technology

and background the role of the teacher, other students, the individual learning needs of students an the influence of the physical space. As a window to the world, technology offers students a neutral, non-mediating way to observe and interact with people from other countries. Teachers or students control how and when the window is opened and closed.

In each case, the access prominent discourse evident in Alberta Education's documents portrays technology neutrally, as a channel to deliver learning opportunities, or positively as enhancing and expanding learning opportunities. The interview data contained examples of an instrumentalist approach to technology. For example, participants suggested the focus on access to technology, having roots in the early 90s, could be the result of the instrumentalist view of technology as a mode of delivery. In this view, humans control the technology and use it to distribute programs, improve efficiencies and maintain standards. Some participants suggested there was concern technology might be seen as a way to 'teacher-proof' the curriculum as jurisdictions moved to offer courses online. In this light, technology provided a measure of quality assurance and technology is assumed to be neutral reflecting an instrumentalist position. At the core, the notion of delivery in education assumes the final product (learning outcome) can be the same regardless of the learning process.

> I think the idea of having standards from grade to grade and consistency in what students are being taught is a good thing you need that, but that is different than saying teachers aren't doing their jobs. It's a trust issue I would say. But it you take it too far, the perfect curriculum is one that can

> be replicated and then digitized and delivered. (J. Skytt, ATA, Personal Communication, August 5, 2009)

The participants' comments suggest this way of thinking about technology, and specifically as a direct conduit for the curriculum, may have caused some teachers to question their role visa vie technology. The quote below suggests the emphasis on technology as humanly controlled, or programmable, influenced the way jurisdictions created positions to support the integration of technology in the classroom.

> …a position came up at central services called computer programmer. My principal said I should apply. But I wasn't a programmer but she said the name was wrong, they mean a consultant. So I got the position, but when I went to teachers they didn't understand my position – the teachers said, "are you going to program me?" So I asked central services to change the name and they did to computer consultant. (E. Dach, Jurisdictional Leader, Personal Communication, June 20, 2009)

The question asked by the teacher in the comment above could be considered a reaction to the prevalence of the instrumentalist position. The teacher seems to be leery of the role of the consultant with regards to professional development as being based on a belief in the neutrality and human control.

In addition to notions of delivery, the focus on standards often accompanied the access prominent discourse in technology policy discourse. The comment below captures the focus of technology policy emphasizing consistent technical and practice standards.

> Looking back on that, I think the decision-makers were trying to establish some standards around what would anchor and direct the system. One became the network access grant, another was SuperNet, another was the

> ICT program of studies – things we are all going to do...common direction, a practice. There are those common "standards" that apply to everyone in the system. (Alberta Education, Senior Manager, Personal Communication, June 26, 2009)

Again, the emphasis on standards, especially in terms of inputs, could be seen as deemphasizing or ignoring the social context in which technology is used. From this perspective, the system would move forward if students and teachers had access to the same technology and followed the same curriculum. The comment below also seems to be based on similar instrumentalist-based assumptions about technology and learning.

> …the key difference between the 20th century and the 21st century is the pervasiveness of technology. So until every kid has access to some kind of device when they need it we're not doing 21st century learning. The key tools of the 21st century are digital, plain and simple. (Senior Manager, Alberta Education, Personal Communication, June 26, 2009)

The emphasis on *all* students further underscores an instrumentalist position by implying all students take up technology and share a common quality of experience. Here, the focus of using technology to provide opportunities for students to access programs is based on the implication that the quality of the educational experience, when compared to a traditional classroom setting and regardless of individual learning needs and social context of each student, remains unchanged.

Although the document analysis demonstrated Alberta Education's documents most strongly adopted an instrumentalist approach, one interview participant noted internal tensions were often at work. The comment below

articulates the philosophical gap present within Alberta Education between those taking an instrumentalist stance and the smaller group taking an opposing position (substantivist or critical theory).

> …it was through computer-assisted instruction. There were people who truly believed you could package learning that way. There was also some belief in some misinformation, politically, that this would save money and that since the most expensive part of education is teachers, if you could somehow package the master teacher whatever it was he/she did then generations of students could benefit and you could save a lot of money…We were philosophically so different, that we could hardly even talk to each other. (P. Redhead, former Alberta Education Senior Manager, Personal Communication, May 20, 2009)

In sum, evidence of instrumentalism was apparent in three prominent discourses emerging from Alberta Education's documents. The key distinguishing factors included a belief in the neutrality of technology and the replicable nature of technology use. The interview data showed how technology could be viewed as a channel for delivery of the curriculum and a tool for students and teachers promising consistently improved results of predetermined outcomes.

Determinism

Figure 2: Feenberg's Table (1999) of Philosophical Positions - Determinism

Technology is...	**Autonomous**	**Humanly Controlled**
Neutral (complete separation of means and ends)	**Determinism** **(traditional Marxism)**	Instrumentalism (liberal faith in progress)
Value-laden (means forms a way of life that includes ends)	Substantivism (means and ends linked in systems)	Critical Theory (choice of alternative means-ends systems)

Prominent discourses in the deterministic quadrant include assumptions holding technology as value-neutral, like instrumentalism, but outside of human control. Technological development is shaped by society-based, natural requirements of progress. In order to be included in the determinism quadrant the assumptions identified in the data demonstrated alignment with two statements: 1) technology develops according to a fixed, direct and inevitable course and 2) society must respond and be organized around technological developments.

As evident in the summary table (p. 142), three prominent discourses demonstrated congruence with a deterministic position from Alberta Education's and ASCA's documents. For example, Alberta Education's Learning and Technology Policy Framework contains a prominent discourse associating

technology with progressive change and the new economy (Alberta Education, 2004). Technology infrastructure in education is conceived, in this view, as integral to achieving efficiencies and accelerated growth of the economy. Here, several assumptions link technological development with enhanced economic growth neutrally and autonomously. "The availability of ICT offers great opportunities to enhance the speed with which knowledge is exchanged and thus contributes to increased competitiveness through innovation" (518). Technology is considered essential to fostering a thriving research community vital to future economic growth. In the new economy or the KBE "(i)nnovation and knowledge creation are essential to the prosperity of all Albertans" (514). This prominent discourse focuses specifically on building a KBE by linking innovative use of technology in education to economic growth (515).

In addition, the change and the new economy prominent discourse also considers education itself as a market exporting Alberta's educational products. Education contributes directly to the growth of the knowledge-based economy as "new technologies, products, processes, services and learning delivery mechanisms enhance the quality of Alberta's learning system and, where appropriate, may be commercialized" (537). There is also a suggestion Alberta's learning sector could become a showcase for technology and education (135). From a deterministic perspective, technology in education will potentially enhance Alberta's global profile. The related assumptions suggest technology and

education will become another avenue for Alberta to demonstrate leadership as a world-class learning system (553).

The change in the new economy prominent discourse was also apparent in Alberta Education's Business Plan and reflected a positive deterministic position based on fairly optimistic observations regarding the changes taking place in modern society.

> The beginning of the 21st century has brought about significant changes to society. These changes…diversity of student population, new and emerging occupations and careers, shifts in family structures, what we now know about how students learn, and increased use of technology – have all impacted teaching and learning. (82)

This list of changes is likely to be interpreted neutrally or positively rather than as cause for concern. The Business Plan does however, list some social issues, including poverty, substance abuse, personal safety and security issues but does not draw a direct connection to the increasing prevalence of technology. Overall, in noting the factors influencing education, the Business Plan adopts a positive tone with respect to economic, social and technological changes. Another assumption states the challenge to education: "(t)he public anticipates that students will be well prepared for the future in an increasingly global environment" (118). The related assumptions indicate the imperatives of the new economy and technological development require public education to equip and ready students to participate in the global economy (94 and 178). Here, students

are required to be responsive to technological developments in order to be productive, contributing members of the global economy.

Although Alberta Education's Business Plan acknowledges the need to address social issues, the focus is clearly on acknowledging and responding to the recent changes in society and not pushing back against them (221). To this end the "education system continues to expand its capacity to remain adaptable, innovative and responsive to the needs of Alberta students for today and tomorrow" (217). The values promoted by Alberta Education including, flexibility and responsiveness, mirror rather than question technological development in modern society. Thus the role of public education becomes integral to a definition of progress as envisioned within a largely economic frame reinforcing a positive deterministic way of thinking about technology and society.

The interview data also contained evidence of a deterministic orientation to technology in education and strengthened the prominent discourse of change and the new economy found in Alberta Education's documents. The comment below succinctly captures the linkage between a lack of technology in a school with exclusion and missed opportunities through the deterministic connection between technology, education and future opportunities.

> The idea too that you're going to be left behind if you don't do this with technology was there too. Parents really bought into it, because they wanted their son or daughter to be able to do this or that with technology so they would be able to get a good job in the future. (P. Redhead, Former Alberta Education Senior Manager, Personal Communication, May 20, 2009)

Redhead went on to explain how some principals saw technology as means of attracting new students. In some cases, decisions regarding the placement of technology in schools were influenced by public perception and less by pedagogical considerations.

> One of the tensions with computers is do you put them in labs or in classrooms – what is the best way to integrate? I had more than one principal tell me the computers had to be grouped together in a lab because it was important for the parents to visually see the computers that way. It was very political on their part and it had nothing to do with pedagogy. If you only had one or two computers at the back of the classroom the parents were never satisfied with that. (P. Redhead, Former Alberta Education Senior Manager, Personal Communication, May 20, 2009)

Participants also suggested technology policy is viewed as essential to building the reputation of Alberta's education system as leaders both in the education sector and in the new knowledge-based economy. As one former superintendent notes, Alberta's strong sense of pride in the education system has become a backdrop for the policy decisions for years. Technology in education, as securing a competitive advantage and further prosperity, finds roots in Alberta's ethos.

> But the drive to be world class – I think there's been a sense of smugness in Alberta for a long time. The idea that we are good, that we have good curriculum and that we do world-class things is there. The idea of standards in our curriculum did not come from the United States. We've always been proud of the outcomes in the programs and the resources that we have. When we started to have more testing and compare ourselves to others we always did quite well so I think there's been a certain amount of pride in the system in Alberta throughout the time I've been around. (J. Brandon, CASS, Personal Communication, October 27, 2009)

Alberta's sense of hubris may have propelled the adoption of a bold technology agenda in education in the mid 90s (e.g. SuperNet, Provincial Microsoft License and LearnAlberta.ca). In this view, technology was no longer considered simply a tool but also a symbol of progress and an indicator of international competitiveness in the new knowledge economy. Participants suggested Alberta wanted to be perceived as being responsive to technological developments through their education policy.

Many of the participants also discussed how much of the education technology policy discourse in Alberta focused on technology infrastructure through connections with deterministic notions of progress. Educational leaders, participants noted, took an interest in acquiring and exploiting technology as an administrative tool to realize efficiencies and improve data management capabilities. A former superintendent described the common sense determinist connection between technology and improved efficiencies.

> When I go back to the late 80s early 90s, the discourse of efficiency, administrative efficiency was there. A lot of effort put into systems at the high school level that can track and sort, management information and that thread continues and frustrates many people in the system today. Of course now the province is coming forward with PASI (Provincial Approach to Student Information), which again is about efficiency. So there has been that thrust. In the system (district) I'm from that was certainly the case and it was what most people were comfortable with because they could see the potential of technology to help in that way. (J. Brandon, CASS, Personal Communication, October 27, 2009)

Participants suggested technology was initially envisioned as beneficial to education in much the same way it was in industry or business. As technology

developed, some became interested in the potential use of technology in schools. "It was about inputs really and just getting the stuff in there and then something good would happen. That was the assumption then…it was different then but I don't think anyone believes that now" (J. Skytt, ATA). The enthusiasm around technology spawned large-scale provincial initiatives over the years such as Alberta's Black Apple program[12]. As one former lead teacher recalled, it was assumed technically savvy teachers could find a beneficial use for technology in classrooms.

> I began my career in technology when I was teaching at an elementary school and my principal brought a Black Apple down to my room and said the Ministry gave us one of these and I think you should have it. I said, what am I supposed to do with it? She said, I don't know, but you'll figure it out. (E. Dach, District Technology Director, Personal Communication, June 20, 2009)

The principal's response endorses a deterministic orientation by assuming the computer was a natural, next-step for the classroom and teachers would respond and organize their practice. While the focus on acquiring technology seemed to compel teachers to find ways to use it, participants also suggested the economic and political climate might have contributed to fostering a defensive culture in schools as technology also appeared a potential threat to teacher autonomy. As one participant noted, alongside the deterministic equating of technology and progress, there was a lack of clarity with respect to how

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[12] See Chapter 1, p. 14.

technology would improve the education system. “What’s the problem we’re solving? No one talked about that and no one knows” (J. Skytt, ATA, Personal Communication, August 5, 2009).

Although the vision for technology in education in the early 90s may have been fuzzy in terms of expected outcomes, technology was seen to have the potential to modernize education. The statement below describes how, from a deterministic position, some believed technology could completely transform education. The idea that technological development is inevitable and synonymous with progress and new ways of imagining the education system is a common mantra not unique to this period in history (Alberta Education 1987, 2010) or to Alberta (Culp, Honey, & Mandinach, E., 2005).

> There was talk about how does technology influence public education as a driver for education, as a delivery vehicle and when you take the vision to the extreme, by people like Alan November, students would be working at their home and interacting with the teacher and we wouldn’t need schools anymore. At the same time we had a school district with a proposal called the third wave or fifth wave where they were going to buy the community arena and all the teachers would work out of there to deliver online education. So at one end you have people saying we could do things in a whole different way and we wouldn’t need school buses and we wouldn’t need schools, and shouldn’t we change education because it hasn’t changed in hundreds of year. (J. Skytt, ATA, Personal Communication, August 5, 2009)

Here, technological developments seem to be driving change and causing schools to respond and organize based on the potential of technology. The comment below suggests education policy discourse in Alberta, for much of the 90s, lacked consideration of the social context and was cast as a simple solution

and a change agent for the education system during a highly politicized time of budget cuts.

> (It was) what I would call the dark days and the "deKlein" of education where the system had been driven by what some people, like Fullan, would call uninformed prescription. Basically politicians and others were trying to make dramatic changes to a system that they didn't fully understand. It was a difficult time. (J. Brandon, CASS, Personal Communication, October 27, 2009)

Technology was often viewed as an integral part of the prescription for change based on assumptions associating technology with progress and improved accountability. However, participants suggested the focus on infrastructure, access and efficiency, through associations with deterministic notions of progress, coupled with an increased sensitivity towards reform efforts might have hampered implementation efforts at the local level.

Taken together, the prominent discourses in Alberta Education's documents and the observations gleaned from the interviews, specifically regarding developments in the 90s, offer clear examples of a deterministic approach to technology and education. As with instrumentalism, technology is considered to be neutral but also hard-wired to ensure progress and a competitive advantage. In both the instrumentalist and the deterministic prominent discourses the impact of technology was consistently portrayed positively.

Substantivism

Figure 3: Feenberg's Table (1999) of Philosophical Positions - Substantivism

Technology is...	**Autonomous**	**Humanly Controlled**
Neutral (complete separation of means and ends)	Determinism (traditional Marxism)	Instrumentalism (liberal faith in progress)
Value-laden (means forms a way of life that includes ends)	**Substantivism** **(means and ends linked in systems)**	Critical Theory (choice of alternative means-ends systems)

From a substantivist position, technology is considered autonomous and value-laden. The related assumptions demonstrated congruence with substantivism based on two assertions: 1) technology shapes society more than society shapes it and 2) further that technology holds some inherent values. The positive and negative interpretations of substantivism diverge sharply around whether either aspect, lack of control and inlaid values, will result in improving rather than destroying society. The prominent discourses evident in this quadrant are drawn exclusively from the ATA documents and adopt a negative interpretation.

For example, the ATA's Changing Landscapes document contained a prominent discourse associating technology with identity and the social world with an emphasis on the erosion of community (Alberta Teachers' Association, 2008). The prominent discourse is anchored by a fairly neutral assumption, "(t)echnology amplifies both the negative and positive consequences of our decisions in the midst of globalization" (201), but several related statements serve to highlight the negative consequences. The collection of assumptions focus on the loss of human control tend to shift this prominent discourse from what might have been a critical theory orientation towards a substantivist position.

Various headlines featured in the ATA's Changing Landscapes document include assumptions, supporting the identity and the social world prominent discourse, accentuating a negative position by suggesting technology is aiding in the erosion of a democratic community (389). Technology is portrayed as shaping society by contributing to or causing a variety of social and environmental problems. These headlines, while acknowledging the connective capability of the Internet and social networking sites, use a questioning tone and negative connotations to convey a sense of apprehension or at least skepticism about the quality of communication online. For example, the term swarm intelligence is used in reference to social networking sites and compared to the collective, decentralized behavior of ant colonies (504). Even if the reader is not familiar with this field of research, the word swarm itself denotes primitive thought processes bound by natural laws and instinct rather than rational thought. Linking

the notion of swarm with the 'wiki world' suggests intelligence and the quality of what is considered worthy to our collective knowledge is no longer fixed and empirical but relative, superficial and constantly in flux.

The second headline, "the Daily Me", highlights how technology enables the personalization of information and like-minded interactions and suggests open political discourse is no longer possible (387). In addition to discrediting the potential of technology to foster democratic engagement, the prominent discourse focusing on the erosion of community moves into social aspects by highlighting quality of life issues. One assumption effectively justifies concern by stating, "(w)hile the Internet promises more connectivity, the number of meaningful personal connections an individual can have remains fixed at 125" (458). Although this statement reflects a social rather than a political focus, the quantity versus quality aspect is similar. Together, "the Daily Me" headline and reference to the inability of technology to improve social connections both reinforce a substantivist position by leaving little room for technology to support democratic involvement or high quality human interactions. The identity and the social world prominent discourse implies the inherent values of technology, such as a preferring quick communication and access to large quantities of information, are diminishing the quality of our interactions and weakening our knowledge base.

Additionally, two headlines attempt to substantiate concern for the negative elements of connectivity by focusing on the health and well being of children (478 and 384). Both headlines cast a shadow on the potential benefits of

connectivity offered by technologies by raising issues of safety and health. Also, both headlines imply a loss of human control, in terms of technology use by children, and a characteristically substantivist inevitability of technological development without consideration of implications.

A third statement from pollster Michael Adams, founding president of the Environics Research Group, draws a causal link between technology use and the declining health of youth (82). This reference demonstrates a possible response to the instrumentalist 'digital natives' discourse by acknowledging youth are increasingly living online but also warns of the potentially harmful side effects.

Finally, another headline introduces a new term, "sousveillance"[13] and raises caution regarding how personal technologies, such as digital cameras and cell phones are being used, increasingly by youth, to record every aspect of daily life (491). Although sousveillance has positive and negative implications, the headline leans towards a negative substantivist interpretation since video cameras have, without our knowledge or consent, "made eyewitnesses of us all" (491). Clearly, there is an attempt to raise concerns about technology use by echoing Orwellian themes of surveillance and control. Technology is shaping society and

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[13] Sousveillance, coined by Steve Mann, is the recording of activities, usually using a small portable or wearable recording device, and streaming images live to the Internet from the perspective of a participant.

specially erasing privacy boundaries, without consent or active involvement of individuals.

Collectively, the identity and the social world prominent discourse emerging from the ATA's Changing Landscapes document supports a strong substantivist position by associating technology with identity issues, the erosion of community and the trivialization of base. Although technology is acknowledged to have both positive and negative consequences within the globalized social world, the negative aspects and specifically the loss of human control, emphasized through such as filtering connections and swarm intelligence, consistently outweigh the positive aspects.

The interview data included reactions to substantivist assumptions most often in relation deterministic or instrumentalist way of thinking which seemed to imbue the technology policy implementation process. For example, participants suggested the call for proposals process, which often includes a data-gathering component, is not a pure research model because it is based on the expectation of positive findings or impact, a deterministic position.

> So there is pressure to determine what change is the result of the resources (time, money or energy) being applied. In relation to grants, what changes are we seeing as a result of this money we are putting in which also means the change should be positive. No one is ever willing to talk about the negative impacts of the grant. (…) So do we get honest research from grants? If you take research dollars from a tobacco company will smoking cause cancer? It's the same thing. (J. Skytt, ATA, Personal Communication, August 5, 2009)

Participants compared the optimistic view regarding the impact of technology dominating Alberta Education's discourse with that of other groups such as teachers, jurisdiction leaders and parents. For example, Mulder cited the potential for negative outcomes as one of the reasons parents support the central role of teachers regarding technology use. Parents see access to technology without proper supervision as risky and potentially harmful for students. The comment below reflects substantivism-based fears, especially around loss of control, related to technological development. As Mulder notes, parents look to teachers to be guides and guardians.

> What do our children have access to, and what are they doing with technology at school, and what should we be doing at home? We had a session on social networking. We discussed red flags and what to look for if your kids are on these sites. So there's a range of anxiety about not knowing, and a feeling of loss of control, to healthy curiosity – this is really cool what *are* they doing at school? (M. Mulder, ASCA, Personal Communication, August 6, 2009)

Although Mulder's comments demonstrate the influence of a substantivist position, the questioning tone and the recognition of possible benefits shifts this statement to a critical theory stance. The four substantivist prominent discourses in the ATA's Technology and Education and the Changing Landscapes documents positioned technology as uncontrollable, questioned the role of technology in education while also highlighting the negative impacts.

Critical theory

Figure 4: Feenberg's Table (1999) of Philosophical Positions – Critical Theory

Technology is...	**Autonomous**	**Humanly Controlled**
Neutral (complete separation of means and ends)	Determinism (traditional Marxism)	Instrumentalism (liberal faith in progress)
Value-laden (means forms a way of life that includes ends)	Substantivism (means and ends linked in systems)	**Critical Theory** **(choice of alternative means-ends systems)**

Eight prominent discourses emerging from the data reflecting a critical theory position accept technology as controllable by humans and shaped by the values of the social context. The related assumptions reflect a view of technology as socially constructed and shaped by societal forces. The findings show the critical theory quadrant is unique as it contains prominent discourses from Alberta Education, the ATA and ASCA.

For example, the ATA's Technology and Education document contains a prominent discourse, the pedagogical relationship and the common good, emphasizes the human dimensions of teaching and learning captured best in this assumption:

> The essence of teaching is a personal pedagogical relationship between teacher and student that may be assisted but not replaced by technology. Technology must be used in ways that are compatible with this understanding of the nature of teaching and learning. (63)

The teacher plays a central role in deciding how technology will augment and enhance student learning both in the classroom and in an online or distributed environment. This emphasis on the teacher as a decision maker marks a move towards a critical theory position.

Other related assumptions underscore the potential of technologies but consistently emphasize the need for teachers to be actively involved in making decisions about technology in relation to student learning. For example, the Internet has the "potential for unique and novel enhancements to good pedagogical practices" (154). The need to honour education as a human endeavour is underscored as "(f)ace-to-face communication improves the likelihood of a successful educational experience for the student" (115). This statement is supported by the suggestion that technology may also degrade the learning experience (259 and 261).

By calling attention to the human dimension of teaching and learning the prominent discourse, the pedagogical relationship and the common good, evokes a cautionary tone. "Teachers must be vigilant in ensuring that technology is used to enhance, not displace, the human dimension and purposes of education" (80). Technology is cast somewhat as an educational accessory as the teacher decides if, when and how technology is used to support student learning – clearly a

critical theory position. "It is not technology itself but the professional decisions that teachers make about technology and its use in the classroom that will determine its impact on student learning" (60). Through the pedagogical relationship and common good prominent discourse in Technology and Education, the ATA acknowledges the complex nature of learning and takes up a socially constructed view of technology in the classroom. This prominent discourse also emphasizes the human control of technology through the decision-making processes of teachers and educational leaders and strongly aligns with a critical theory orientation by recognizing the "potential of new technologies to enhance the humanistic, engaged enterprise of public education and to provide a sense of connectedness with community and civil society" (40). The potential benefits of technology are couched with a need for "educators to be thoughtful and reflective in an ongoing and embedded way" (264).

Throughout the ATA documents, other prominent discourses promote a discerning approach to technology in education (e.g. teacher control and online or distributed learning as a supplement to classroom instruction) by casting technology within the domain of teachers and the values-based purpose of public education. This cautionary stance is also prevalent in the prominent discourses from ASCA's documents.

ASCA underscores similar ideas through a prominent discourse, educational guidelines and use, emerging from the technology related resolutions document (Alberta School Councils' Association, 2008). ASCA recommends the

formation of a provincial committee to "set standards on Internet use in the schools, including: ethics, content, learning value, and site-based control" (20). This resolution reflects a critical theory stance by prioritizing human-control and decision-making regarding technology[14]. The resolution advocating for a provincial policy committee in this area seems to suggest that since the government provided access it should also consider issues related to values, ethics and educational use. The educational use and guidelines prominent discourse implies technology is value-laden necessitating careful consideration of appropriate use in education.

Another related resolution advocates school communities, likely to mean school councils, be able to provide input on the instructional use of educational technology classrooms (17). This statement, although far less specific, indicates an interest and possibly a concern regarding how technology is employed in the classroom. It is interesting to note the use of the terms instructional and educational in this resolution emphasizing the need for technology access to benefit student learning. By advocating for a more active role of local school

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[14] The Alberta government provided high-speed network connectivity and Internet access to all schools, post-secondary institutions, libraries, hospitals, provincial government buildings and regional health authorities (over 4,700 sites) but has not addressed standards, in terms of ethics, value or quality. Currently, decisions regarding Internet access are made at the school district level.

communities, the resolution could also be in response to the influence of provincial or jurisdiction initiatives on programming decisions impacting schools. The resolution may be indicating district programming decisions have been driven by provincial technology decisions and the provision of technology, and not by the interests of the school community[15].

A third related resolution makes specific reference to the role of teachers. ASCA advises, "Alberta Education and other provincial stakeholders take steps to ensure that computers do not replace teachers" (15). This resolution could be speaking generally to the ways technology can, by providing content, instructional aides and assessment tools, assume some of the work of teachers. The resolution could also be expressing concern with some of the issues emerging with the introduction of synchronous technologies[16]. In either case, by highlighting the role

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[15] For example, due to the provision of videoconferencing through a provincial initiative some school district chose to provide courses via videoconferencing to multiple sites.

16 Although the ATA and Alberta Education encouraged districts to ensure teachers were actively involved at each videoconferencing site (sending and receiving), some districts have chosen to provide basic supervision, support staff, of students at the receiving site. Here, the technology did not fully replace a teacher, since a teacher was always available from the sending site, but the physical presence of a teacher at the point of instruction became somewhat of a grey area. In rural and remote areas, where it is often difficult to attract and retain teachers especially in specialty areas, videoconferencing is often the only way to access courses.

of teachers, ASCA is responding to the deterministic and instrumentalist prominent discourses which tend to place teachers in a facilitation role and deemphasize the social context.

The common thread in these related resolutions seems to be a concern regarding the locus of control and influence, from a critical theory position, for technology decisions, shifting away from local, educational purposes and towards provincial priorities or perhaps economic efficiencies. Through the prominent discourse educational guidelines and use, ASCA resolutions advocate for a more locally controlled and educationally based approach to technology and education. Thus ASCA endorses a way of thinking about technology as value-laden and controllable.

Finally, Alberta Education documents also contain examples of critical theory prominent discourses. For example, one of the prominent discourses, critical technology literacy, emerging from the ICT program of studies is supported by related assumptions advocating an integrated approach to teaching with technology while also emphasizing the need to adopt an ethical orientation when considering the impact of technology. The critical technology literacy prominent discourse underscores the characteristics students will require to make sound decisions about technology in all aspects of their adult lives (18). This need for careful decision-making regarding the impact of technology is echoed in related assumptions about the prevalence of technology (20). The prominent discourse adopts a critical theory approach by acknowledging the dual nature of

technology as students are "encouraged to grapple with the complexities, as well as the advantages and disadvantages, of technologies in our lives and workplaces" (5).

However, one interview participant noted this way of thinking about technology may have garnered less attention in education policy circles because it centered on effective practice and integration, and less on cutting edge innovation. "Well, it's not really innovative, it's just good teaching. It's approaching a subject in an integrated way, holistically. It was about how best to teach using the technology in an integrated way" (P. Redhead, Former Alberta Education Senior Manager, Personal Communication, May 20, 2009). It appears the prominent discourses associated with transformative change, deterministically-based, may have overshadowed the critical technology literacy prominent discourse.

The interview data also contained evidence of a critical theory stance as many participants agreed the focus on access and human control, (an instrumentalism position) and on inevitable progress and economic prosperity (a deterministic position) may have contributed to downplaying the risks associated with technology. The comment below highlights how the instrumentalist and deterministic discourses may have effectively muted counter discourses related to risks – a critical theory position.

> There is a dark side, cyber bullying for example, so we make assumptions that the digital natives know everything, but we need to teach them the ground rules and that's the digital citizenship piece. We have to take back some of the control as adults and say, here this is what is appropriate and this isn't. We have to teach students digital citizenship – citizenship

> period. We have to teach student strategies if they are being bullied what to do and how to get help. (…) I'm sure cyber bullying will become a bigger issue after what's been in the press lately. We really need to teach our students the good and the bad. (E. Dach, District Technology Director, Personal Communication, June 20, 2009)

Participants also recalled allocating resources to get technology in schools remained a high priority for many educational leaders throughout the 90s, based on the instrumentalist and deterministic prominent discourses, resulting in little remaining funding for technology-related professional development.

> Resourcing it was also a problem…if the teachers have access to the technology and they don't know how to use it, how are they going to teach the students to learn how to use it? There was this disconnect where people didn't understand how professional development was going to help that. It was thought that the students who would benefit from it, it was the students who would need it in their future. I used to use a metaphor with the oxygen masks in the airplane. They tell you to always secure the mask over your own face before helping your child put on their mask. It's kind of counterintuitive in a way, but you have to do that or else you won't be able to help the child…you have to help the teacher first who then helps the students. (P. Redhead, Former Alberta Education Senior Manager, Personal Communication, May 20, 2009)

Redhead's comments establish a link between technology and the social context. The oxygen mask metaphor illustrates the philosophical difference between an emphasis on access (instrumentalism) and appropriate use within a social context (critical theory). Another participant confirmed funding for professional development continues to be an issue. "… this district is spending 5.5 million on technology in the next couple years so it's time we start talking about instructional supports (professional development)" (J. Percevault, District Technology Director, Personal Communication, August 20, 2009).

Most of the participants agreed funding for professional development has been and continues to be inadequate and also further suggested the belief that new teachers are prepared to integrate technology in the classroom may not be true. Participants suggested the common sense assumption that new teachers are a part of the 'digital natives' group and therefore able to use technology easily in all aspects of their teaching is not always the case. "(N)ot all our new teachers know about technology and not all our students, that we're calling digital natives, know about technology, those are assumptions" (E. Dach, District Technology Director, Personal Communication, June 20, 2009). This comment suggests the deterministic assumptions regarding high levels of comfort and use of technology by children and youth, prevalent in Alberta Education's documents, may inaccurately place unrealistic expectations on new teachers and students.

Mulder also suggested new teachers are not well prepared to use technology in their classrooms.

> The teacher should be comfortable with the technology in the classroom and their own ability to use it. It's a combination of teacher training and teacher attitude. I've talked to lots of teachers who say I just don't know what to do about this and I didn't get any training in my 4 or 5-year degree program. And I think innovation is important because you can have a piece of equipment in a classroom and never use it to its full potential. And I think that parents should be given an opportunity to be aware of and comfortable with the technology that is being used in classrooms. (M. Mulder, ASCA, Personal Communication, August 6, 2009).

Again, this comment suggests the prominent discourses emphasizing a high degree of use of comfort with technology, most specifically by individuals

under 30 years of age, have been taken up by broadly causing some problematic gaps in practice.

In sum, the prominent discourses located in the critical theory quadrant accept technology as value-laden and emphasize human control as it relates to decision-making regarding technology use in schools. The eight prominent discourses emphasized the need for technology in education to be ethically orientated and in keeping with the goals of public education in service of the common good. Although data from the ATA dominated this quadrant, prominent discourses from ASCA and Alberta Education also aligned with the critical theory position. Each interview participant referenced 21st century learning, often from a critical theory position, in relation to guiding current and future education policy dialogue.

Evidence of overlap: 21st century learning

The notion of 21st century learning, despite multiple meanings, seemed to resonate and build some consensus between groups regarding ways of thinking about technology in education and future opportunities for students as active participants in society, as citizens and employees. The documents from each organization and all of the interview participants related 21st century learning to educational change, accountability and leadership.

Most interview participants discussed 21st century learning in terms of changes to curriculum and assessment, that is, what students are able to know and

do - with or without technology. Mulder confirmed the notion of 21st century learning is also taken up by parents in relation to the potential of technology to offer new ways of learning.

> But parents on school councils are excited about it and they recognize their kids are totally different in terms of how they learn, where they learn, why they learn, compared to when they were in school and they sat in desks and it was memory work. They realize it's not about historical facts but about curiosity and being able to adapt, be resilient, and know where to find the answers when you don't know. So they are excited about it and I think they realize kids are going to be in this global situation because they see kids texting kids in China. (M. Mulder, ASCA, Personal Communication, August 6, 2009)

The data revealed consensus between organizations regarding the need to attend to the shifts in what students need to know and be able to do in our contemporary world. So while the ATA used the term knowledge society and advocated for an expanded notion of the competitiveness to include "the contributions of members of society and civic engagement" there is little difference between the ATA and Alberta Education regarding the existence and requirements of the new economy. Effectively both groups agree the knowledge, skills and attitudes required by future graduates should include "the development of essential skills such as critical thinking, problem solving, innovation, consensus building, collaboration and self-direction" (Alberta Education, 2008a, p. 3).

In considering technology policy in relation to 21st century learning Brandon described a model classroom in which technology is supports students in developing higher order thinking skills.

> All the energy in the system going towards improving student learning of the curricular outcomes through technology. I would also talk to kids and look at student work to see if there was depth in terms of the learning. So not an emphasis on the glitz but on the higher order thinking. If they were working on a project with students from other parts of the world for example, I would want to see how it would contribute to them being better global citizens. And I would want to see kids using it (technology) for their learning comfortably and not bowing down to it. I would want it to give students access to be better thinkers and better knowledge workers. So student-focused, learning-focused and around the bigger outcomes. I would want to see the people that support the technology understanding it was about the kids and not about them or the technology. I would want to see modeling in terms of learning being around it and not demonstrating their prowess. (J. Brandon, CASS, Personal Communication, October 27, 2009)

The description above highlights the shift in learning through and with technology and an emphasis on higher order thinking skills. The potential of technology to extend learning opportunities is highlighted but the positive comments are cautiously couched, as technology, the "glitz", can also become a distraction. It is also interesting to note the explicit reference to the power relationship between humans and technology. By advocating learning with technology rather than technological skill and "not bowing down to it", the comment suggests technology is value-laden and can cause educators to shift the focus to the technology itself.

In all cases, participants suggested the way of thinking about technology is moving from a more deterministic or instrumentalist position due to pressure to reconceptualize assessment and accountability. As teachers create new ways for students to demonstrate their knowledge, through utilizing technology, some assessment practices and accountability mechanisms remain the same. So while teachers may offer examples of how technology enhances learning, standardized tests (e.g. provincial achievement tests, PISA) may or may not reflect an improvement. The statement below captures the complex relationship between technology and student learning.

> It's hard to prove cause and effect with technology and improved student learning, I would say it enhances student learning. We can use technology to enhance engagement and we know engagement can result in increased achievement so in that way it may contribute to improved student learning. The clickers, with interactive whiteboards you can get every student involved in a better way than having one student respond to a question. So the technology can engage more students, but it could also be the teacher is just so dynamic that the students are engaged anyway – you can't separate it and say it's just the technology. So technology opens up the door to new ways of learning and teaching that may enhance learning but it's not a direct line to achievement. (J. Skytt, ATA, Personal Communication, August 5, 2009)

Skytt is responding to an instrumentalist position, in referring to the "direct line to achievement" connecting technology use with improved results and progress. Some suggested the challenge for education with respect to integrating technology has remained the same but the risks associated with not being able to demonstrate impact, in terms of increased student achievement using traditional methods, is becoming a central concern.

> The question is really how do we find out how technology can be a part of the learning in this subject so it can allow students to learn in better ways and it might not always show up in the traditional ways. (P. Redhead, Former Alberta Education Senior Manager, Personal Communication, May 20, 2009)

All of the participants' comments suggest assessment and accountability, in relation to technology and student learning, is a potential policy issue requiring attention. "We need strong policy statements that support learning and maybe we need to define what learning is. So all this work that grade 12s are doing for the diploma exam – is that learning" (P. Redhead, Former Alberta Education Senior Manager, Personal Communication, May 20, 2009)? Another participant drew a connection between technology integration and employability skills to emphasize the need for learning opportunities to mirror the technology-based workplace.

> We talk about improvements in student learning, not in student achievement. It's not about the scores on PATs (provincial achievement tests). If students are learning in a technology-infused environment so they are able to work outside our schools and if they can then they've learned something. If they are in a school with no technology, and they can do that then it isn't because of us, it's in spite of us. (J. Percevault, District Technology Director, Personal Communication, August 20, 2009)

Participants suggested new ways to assessing student learning that account for the impact of technology for technology are necessary if technology is to be seen as valuable and worth resourcing. "It all comes down to dollars. When the bean counters and assessment guys try to quantify what this is, and it's hard to quantify" (J. Percevault, District Technology Director, Personal Communication, August 20, 2009). Others admit the area of assessment needs attention but caution

a serious look at ICT assessment, depending on the philosophical orientation, could lead to a skills-based standardized test. "Well, what's the mantra - you measure what you value? But how do you get at those things and be careful what you ask for because you may get an ICT skills test" (Senior Manager, Alberta Education, Personal Communication, June 26, 2009).

Regardless of the philosophical starting point, participants agree educators need to grapple with fundamental issues related to technology and educational change to move forward in a discerning manner. The statement below may point to a need to revisit the purpose of technology in education but more broadly to the goals of public education.

> …but I'm hearing this (Education) Minister and the Deputy Minister talk about using 21st century thinking for 21st century problems. So what does it mean to be 'world class' today? Is it about getting one more point or about raising kids to be democratic citizens – civically engaged and forward thinking? I think in North America we talk about all kids but there's 30% of kids that aren't playing around with laptops and they don't know how they fit in. We're losing a lot and I'm not sure technology is the way to get them. (J. Brandon, CASS, Personal Communication, October 27, 2009)

Brandon seems to suggest the technology solution may not be a match for the problem of high school drop outs and further, the attention and energy given to improving standardized test scores may be causing a diversion of resources away from the other goals of public education.

In considering the history of technology policy discourse in Alberta and the challenges ahead, in terms of 21st century learning, the participants often tied

back to leadership. The statement below suggest technology decisions may have been made with little or no direction from the instructional leaders in the jurisdictions perhaps resulting in narrow approach to policy implementation.

> Leadership is significant for the cultural change piece, it's the principal principle and we really need superintendents to realize they are driving the bus and you can't delegate that driving away. Superintendents have to work with their IT people but they have to set the vision and they have to set the IT requirements. The IT people should be supporting them and the educational goals for the schools, instead of the tail wagging the dog. So we're trying to frame it as an IT governance issue and not just a leadership issue because if we keep saying it's about leadership superintendents already have studied a lot about leadership. We've also learned how we have underestimated how much work we have to do in the Ministry to help people understand this is a cultural change and not just a technological change. (Senior Manager, Alberta Education, Personal Communication, June 26, 2009)

Some participants suggested technology policy needs to be examined in relation to accountability and professional development. "I'm not sure they figured out the balance between the accountability side, the push – shove, strong-arm side and the capacity building side which is widely dispersed and somewhat fragmented" (J. Brandon, CASS, Personal Communication, October 27, 2009). Technology, perhaps because of a lack of clear understanding regarding assessment and accountability, has been supported haphazardly at the local level.

> It's highly decentralized, most decisions are left to the schools there is no real accountability. I don't think a previous generation of superintendents really backed the integration of technology in schools. Leave it to principals and some will back it and some won't and if there's no one questioning what's happening then they will set the priorities based on what they think they need and nobody cares (J. Percevault, District Technology Director).

The comment above suggest the existing funding model and accountability mechanisms may be limiting the engagement of educational leaders, superintendents and principals, resulting in the inconsistent implementation of technology in Alberta's education system. Participants emphasized that leadership, at the jurisdiction and school level, is vital to any implementation effort. "I think there's a lot of research that says if it isn't coming out of the superintendent's office it won't happen, it doesn't matter what the initiative is" (J. Percevault, District Technology Director, Personal Communication, August 20, 2009).

The notion of 21st century learning proved to be a fruitful starting point for bridging the philosophical divide in technology policy discourse. The document and interview analysis revealed significant overlap, in relation to 21st century learning, between organizations in terms of ways of thinking about technology and educational change. Further, it appears assessment and accountability are becoming increasingly problematic as educational leaders remain tied to traditional measures of learning and system performance.

Before I move on to address the related, sub-question regarding correlations with nodal discourses, I must address one of the most surprising aspects of the study specifically, a gap in the data. At the time of data gathering (2009) CASS was unable to provide a position on education.

Evidence of a gap: lack of a formal position on technology from CASS

The data gathering process revealed a surprising discursive silence. Although there was evidence of informal statements on technology and education policy, CASS did not, at the time of writing, have a formal position on technology and education. In absence of a formal position on technology and education, CASS offered documents related to their current initiative, Moving and Improving: Building System Leadership Capacity (College of Alberta School Superintendents, 2009a & 2009b). I reviewed the documents and noted a few minor references to technology.

I later learned, during the interviews, rather than generating a policy position or attempting to influence provincial direction with respect to technology in schools, CASS is adopting a practical approach by first ensuring members are provided with opportunities to use technologies in their own work. The Moving and Improving initiative has incorporated the use of technology to support communication and provide participants with practical experience. "CASS continues to explore ways and means (including the use of technology) to help school jurisdictions and CASS members share, network and dialogue regarding promising leadership practices" (College of Alberta School Superintendents, 2009b, p. 38).

Although traces of interest in technology was evident in a few CASS documents at the time of writing, there was insufficient data from which to

identify prominent discourses. The absence of data compelled me to connect the dots between education policy and implementation to determine the possible reasons for CASS' lack of engagement in technology policy discourse. In what follows, three possible reasons for the data gap are identified based on what policy requires of educational leaders in relation to technology. It appears an instrumentalist or deterministic orientation to technology in education backgrounds CASS' lack of involvement to date.

Possible reasons for a lack of a formal policy position from CASS

Three possible policy-based explanations for CASS, thus far, to assume a sideline position with respect to technology and education surfaced during data collection and analysis. CASS, by not actively contributing to technology policy discourse in Alberta, appears to be: 1) in agreement with Alberta Education's position and direction 2) delegating responsibility to technology directors and/or 3) channeling resources and attention to Accountability Pillar measures.

First, one possible explanation for the lack of a more extensive policy position on technology appears in CASS' handbook.

> In formulating a statement of educational policy for this Association, there is no point in repeating the general objectives of Alberta Learning. These are clearly set forth in the various departmental curricular bulletins. In the sense that any superintendent is an officer of education, in much the same manner as lawyers are considered to be officers of the court, local superintendents must seek to achieve the provincial objectives, notwithstanding their responsibility to bring about change if such objectives prove unacceptable (College of Alberta School Superintendents, 2002).

In essence, this background statement suggests CASS accepts the implementations of provincial technology policy and may not see a need to draft a formal position. However, CASS has taken a distinct position in other areas such as professional development, curriculum and specific initiatives such as Grade Level of Achievement reporting.

Second, leadership, and therefore power in terms of decision-making, in technology and education in Alberta has historically bypassed superintendents and emanated from two sources: Alberta Education and jurisdiction technology directors. Alberta Education, as shown in Chapter 1, has assumed an aggressive leadership role and created momentum by spearheading and resourcing several provincial technology initiatives, for example the development of LearnAlberta.ca, the Microsoft agreements and the videoconferencing initiative, which required consultation with education partners but no significant implications on local resources. Thus, Alberta Education has moved forward with a provincial agenda for technology and education, through the development and implementation of policy, while education partners have largely played a neutral, recipient role.

Alberta Education has endeavoured to create strong connections with jurisdictions to guide implementation and inform future policy development. Over the years, Alberta Education has sought input from education partners and remained fairly connected to jurisdictions through stakeholder groups such as the School Technology Advisory Council (STAC), Technology Advisory Group

(TAG) and the Jurisdictional Technology Contacts (JTC). (Interview participants noted the extent to which education partners believe the consultation opportunities have informed policy decisions is a matter of debate.) Based on my professional experience, the JTC and STAC agenda includes a balance of technical and curricular related agenda items while the TAG agenda is almost exclusively technical[17]. Although superintendents are invited and some do choose to attend these meetings, these groups have been comprised largely of technology directors, education technology consultants, representatives from faculties of education and the ATA.

Although Alberta Education has moved forward quickly and fairly aggressively in through policy and large-scale infrastructure projects, the consultation processes designed to support implementation failed to engage members of CASS. It appears likely technology directors in jurisdictions, as the primary conduit for Alberta Education, have assumed much of the responsibility for leadership in all areas related to technology and education – infrastructure, professional development, curricular connections – across the province. Effective implementation of policy therefore is largely dependent upon the knowledge, skills and values of technology directors.

At the jurisdiction level, technology directors are required to have the

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[17] As of 2009, consultation will only occur with the JTC group as STAC and TAG have been eliminated due to budget cuts.

knowledge and skills (educational and technical) necessary to make jurisdiction wide decisions to support ICT integration. Technology directors are challenged to ensure technology is utilized to support the jurisdictions' mission and strategic planning while also managing technical issues (purchasing, maintaining and securing technology infrastructure) and supporting curricular outcomes (professional development). 83% of individuals in this role are men and 35% hold Bachelors degrees, 37% Masters and 5% Doctorates (Hollingsworth et al., 2004, p 11). Hollingsworth's findings suggest superintendents, 85% of whom are men, may rely heavily on technology directors or I.T. leaders to handle most of the decisions related to technology.

> District I.T. Leaders generally rate their knowledge of ICT integration as Strong (41.7%) to Very Strong (48.3%). On the whole District I.T. Leaders rate their knowledge in this domain above self-ratings of Superintendents and School Administrators. While 90% of District I.T. Leaders rate their knowledge of ICT Integration as either strong or very strong, 65% of Superintendents and 68% of School Administrators offer the same self-rating (Hollingsworth et al., 2004, p. 13).

Hollingsworth's data provides a reason for superintendents to comfortably, perhaps informally, delegate technology decision-making to technology directors. Ultimately, though, superintendents are held responsible for the quality of teacher and learning in jurisdictions. Alberta Education relies on the Accountability Pillar as one way to evaluate jurisdictions and quite directly and transparently, superintendents (Alberta Education, 2007c).

The third reason technology may be seen as peripheral to the central concerns of superintendents, is related to how student learning is measured and publicized through the Accountability Pillar. The Accountability Pillar is a "mechanism to collect standard-based data for the public to compare and evaluate each district on the same measures while also assisting jurisdictions in identifying areas and strategies for improvement" (Alberta Education, 2006b). One of the technology related measures on the Accountability Pillar survey asks respondents to rate their satisfaction with student's opportunities to learn about computers, as a topic, alongside music, art and drama. Jurisdictions report (performance measure 1.2.1) the percentage of teachers, parents and students satisfied with the opportunity for students to receive a broad program of studies, including fine arts, career, technology, and health and physical education. This question seems not to support technology integration but rather to imply students learn about computers specifically. Besides narrowly defining ICT as computers and omitting other technologies included in the program of studies, it is likely the physical presence of computers in a school may lead parents to assume the students are using the computers effectively to support their learning - which may or may not be the case.

It is perhaps even more perplexing to consider how the Accountability Pillar results might be interpreted. For example, survey results indicating 90% of parents are very satisfied with their child's opportunities to learn about computers simply means the parent's expectations have been met. Therefore, a parent could

choose “very satisfied” even if their child never uses a computer at school if they believe children use computers enough at home and would prefer their children not to use computers much at school. And of course, the inverse is equally true.

It is possible this survey measure, directly through reference to learning about computers, may cause educational leaders to ensure technology figures prominently in their buildings (e.g. computer labs and interactive whiteboards) but would not induce significant attention to pedagogical considerations.

Based on anecdotal comments from educational leaders in the province, the satisfaction survey results are not the measures that matter most. Provincial achievement test results, as measures of student learning, draw much more attention from the public, principals and parents. Provincial achievement tests measures improvements in student learning, for the most part, through traditional assessment methods, (e.g. standardized, paper and pencil tests). To date, research has failed to prove a direct correlation between technology integration in learning and student achievement on standardized tests (Ravitz et al., 2002; Papanastasiou et al., 2003; Wenglinsky, 1998). Herein lies a potential disconnect.

Although technology has been shown to enhance student learning, it also provides more ways for students to engage in learning and demonstrate understanding, hence less of a focus on rote memory tasks and more of an emphasis on the construction of knowledge through application.

> Moves to increasingly constructivist or inquiry-based ways of teaching, or efforts to persevere with learning new technologies are frequently undermined by the perceived impossibility of reconciling standardized

> examination and curriculum coverage pressures with technology integration. In these cases, the prevailing understanding is that what gets tested gets priority. (Clifford, Friesen, & Lock, 2004).

Thus, a potential mismatch is evident between how technology enhances student learning and how the Accountability Pillar measures student learning offers a potential reason for a lack of interest or engagement in technology integration by CASS.

In sum, in attempting to find policy-based reasons for a lack of involvement of CASS in technology policy discourse three possible explanations became evident. CASS appears to be: 1) in agreement with Alberta Education's position and direction 2) informally delegating responsibility to technology directors or 3) channeling resources and attention to Accountability Pillar measures. All three reasons best support a deterministic or instrumentalist approach to technology by emphasizing access and improvements in predetermined measures. Given the lack of a formal statement on technology and education, this conclusion is a conjecture based on existing policy, governance structures and anecdotal comments from CASS members and representatives from Alberta Education.

I move now to conclude with a summary of the data analysis, including Alberta Education, the ATA and ASCA, demonstrating a discursive divide with Alberta Education consistently taking up a value-neutral orientation to technology.

Ways of thinking about technology in education policy discourse in Alberta: A summary

In broad strokes, the findings illustrate the ways of thinking about technology in education is most sharply divided along the value axis of Feenberg's table (1999). Specifically, the prominent discourses from the ATA appear in the bottom two quadrants (substantivism/critical theory) while the prominent discourses from Alberta Education are grouped in the top two quadrants (instrumentalism/determinism). The most explicit, polarized difference is evident between the positive deterministic prominent discourses (Alberta Education) and the negative substantivist prominent discourses (ATA).

Specifically, the document analysis reveals how the concept of technological development and change is portrayed positively as a linear, evolutionary process in Alberta Education's documents and more suspiciously and chaotically in the ATA's documents. So whereas Alberta Education's documents generally embrace technological change as progressive, the ATA's documents express a more guarded approach. For example, Alberta Education's Business Plan paints a fairly optimistic view of an increasingly technologically mediated world, while the ATA's Changing Landscapes document brings negative social and environmental issues to the fore. Again, this reflects a philosophical difference in values associated with technology between the ATA

and Alberta Education. Although this finding may be expected, the discursive gap is pronounced, consistent and could signal issues for policy implementation.

This fairly definitive division, perhaps predictably, reflects the beliefs, values and the jurisdiction of each organization and also illustrates the forces influencing each organization. For example, Alberta Education, through alignment with determinism and instrumentalism, reflects an external orientation. Here, education is economically valuable, as a contributor and indicator of competitiveness and technology secures access to learning, transforms education and improves results. Technology is always considered to be neutral and offers education legitimacy, currency and relevancy. The center of power, in terms of the influence on technology policy, resides in external economic, primarily global, interests. In this view, public education reflects and responds to technological development - an inevitable feature of the contemporary society.

The external motivation influencing the deterministic and instrumentalist position of technology in education policy links economic growth and technological change. Here, as Peters explains, through references to the work of Solow, Lucas and Romer, technological change is determined by economic activity and motivated by financial gain.

> The policy implication is two-fold: knowledge about technology and levels of information flow are critical for economic development and can account for differential growth patters. Knowledge gaps and information deficiencies can retard growth prospects of poor countries, while technology transfer polices can greatly enhance long-term growth rates and living standards. (Peters, 2007, p. 95)

Alberta Education policies proved to be highly permeable to notions linking economic competitiveness and future prosperity with technology in keeping with the values and goals of the Alberta government. In general, the prominent discourses appearing in the instrumentalist and deterministic quadrants endorse a symbiotic relationship between technology, economic growth and education.

The prominent discourses from the ATA and ASCA documents align more closely with substantivism and critical theory and take an internal orientation with a focus on the classroom, teacher and curriculum. Here, technology holds benefits and drawbacks for education and society. Technology can enhance and extend learning opportunities based on the teacher's professional discretion but also erode the quality of relationships. The center of power, in terms of influence on technology policy, resides in schools.

The prominent discourses evident in the substantivist and critical theory quadrants acknowledge the influence of external forces, chiefly the focus on economic growth through an emphasis on science and technology, and attempt to broaden the definition of progress to include for example, arts and culture, citizenship and wellness. The prominent discourses falling into the substantivist and critical theory quadrants attempt to critically assess, react and at times reject technological development and changes in the social world by reinforcing the role of public education in a civil society.

In all, the eighteen prominent discourses are distributed fairly evenly on Feenberg's table and as the summary table illustrates a clear pattern is evident (p. 142). Alberta Education's documents appear to be heavily weighted towards instrumentalism and determinism while the ATA and ASCA lean towards substantivism and critical theory. The groups are divided over the nature of technology as Alberta Education endorses a mostly positive, value-neutral approach and the ATA promotes a mostly negative, value-laden discourse. The data also provided some evidence of overlap as all three organizations, albeit in varying degrees, take up a critical theory position. The notion of 21st century learning proved to be a strong point of consensus for all groups effectively pulling education policy discourse away from extreme positions.

I turn now to address the related, sub-question guiding my inquiry: What relationship exists between the ways of thinking about technology in Alberta's education policy discourse and nodal discourses, specifically, the knowledge-based economy and globalization?

Here, I analyze the prominent discourses to ascertain the relationship, if one exists, with the two nodal discourses most relevant to my study: globalization and the KBE. I note positive or reactionary responses between the assumptions supporting the prominent discourses and the assumption grounding the two nodal discourses. Since nodal discourses are common sense notions, prominent discourses aligning positively with them share the same unquestioned acceptance in the main. In contrast, prominent discourses attempting to counter or reframe

nodal discourses, while resonating most strongly within the organization, may also allow an organization to gain some acceptance in the main by leveraging the common sense appeal while emphasizing another interpretation of the nodal discourse.

Examples of a prominent discourses aligning with the two nodal discourses

Turning first to Alberta Education's documents, there is evidence of a positive alignment between the prominent discourses and assumptions grounding the globalization nodal discourse. As noted in Chapter 2, globalization is based on three assumptions salient to technology and education policy: 1) globalization is about the liberalization and the integration of markets, 2) globalization is inevitable and irreversible and 3) globalization benefits everyone. These assumptions take up technological development as an integral to the growth of an interconnected, borderless market and although not drawn on specifically, form the backdrop for many of Alberta Education's documents.

For example, the international standings prominent discourse evident in Alberta Education's Business Plan ties into the three assumptions of globalization by positioning the education system within a global market (Alberta Education, 2008a). One assumption related to this prominent discourse highlights the need for Alberta Education to "provide(s) leadership and inspiration to the 21st century classroom and learning centre to support student achievement and maintain its world-class education system (29)." Another assumption advises the education

system must acknowledge the economic and social changes spurred by globalization, “if we wish to remain a leader in education, nationally and internationally (88)”. Through the international standings prominent discourse evident in Alberta Education’s Business Plan education is portrayed as part of the global market, as an inevitable reality, taking up the same competitive values. This way of thinking about public education feeds into a way of thinking about technology in education as a contributing to innovative, technology-rich classrooms and continuous improvements in student performance.

Alberta Education’s Business Plan also contains strong linkages to the KBE nodal discourse. As discussed in Chapter 2, three assumptions are foundational to the KBE discourse: 1) information technologies have a specific, strategic role, 2) knowledge-based society are integral to the globalised economy and 3) “knowledge” is an increasing important, new mode of production (more important than labour and capital). As with globalization, technology is viewed as a necessary for progress and future prosperity. Technology forms the backbone for the KBE by facilitating the production and trade of knowledge.

The prominent discourse change and the new economy in Alberta Education’s Business Plan highlights societal change in relation to the KBE. Here, the shift to the KBE, from primary resource-based and industrial economy, is taken up fully requiring students to become adaptable and take initiative to find opportunities to contribute to the economy. “Alberta's students need to be able to respond and adapt to change, as well as develop, transfer and apply their

knowledge and skills (94)". In essence, the education system and the students within it are required to acknowledge and respond to emerging changes resulting from the technology-driven reality of the KBE. The prominent discourse in the Business Plan requiring students to acquire knowledge, skills and attitudes in keeping with the demands of the new economy will resonate broadly due to the shared association with the KBE nodal discourse.

The change and the new economy prominent discourse is also apparent in Alberta Education's Learning and Technology Policy Framework. Here, several assumptions work together to build a strong connection between technology, education and future economic prosperity. "The availability of ICT offers great opportunities to enhance the speed with which knowledge is exchanged and thus contributes to increased competitiveness through innovation" (518). Given this reality, it follows "the ICT skills of Albertans will be improved to ensure their competitiveness in a knowledge economy, and to enable them to use technology to address other interests and needs" (120). Like the KBE, technologies play a key strategic role and knowledge is considered a product and mode of production.

Through these two prominent discourses, international standings and change and the new economy, Alberta Education is able to more easily dominate the technology policy discursive space by reflecting commonly held assumptions regarding education, technology and the economy. Technology is linked to future job prospects for Albertans in the global market and in turn, related to Alberta's future economic prosperity. As well, in order for Alberta's education system to

retain world-class standing, it must to respond to this new economic reality. In essence, due to the positive correlation with the nodal discourses, specifically globalization and the KBE, the prominent discourses in Alberta Education's documents are likely to sound familiar and therefore are more likely to be accepted and supported in the main.

Examples of prominent discourses reframing the two nodal discourses

In contrast, the prominent discourses in the ATA's Changing Landscapes document presents a reaction to the nodal discourses (Alberta Teachers' Association, 2008). For example, the prominent discourse identity and the social world presents the technological development as detrimental to the quality of communication and democratic engagement in contrast to the more natural, progressive notion of technological change associated with globalization. "Technology amplifies both the negative and positive consequences of our decisions in the midst of globalization (201)". Here, the identity and the social world prominent discourse, through related assumptions implying a lack of quality interactions and the trivialization of knowledge, questions the benefits of change in society and advocates a cautionary approach to technology in schools (387, 458 and 504). So whereas the nodal discourse of globalization endorses advances in and the adoption of technology in all sectors based on assumed benefits and few drawbacks, the identity and the social world prominent discourse counters by raising doubt and suspicion.

The ATA's Changing Landscapes document includes another prominent discourse, reframing economic competitiveness, which responds directly to the KBE. Here, related assumptions predict the future of public education is anchored in private interests, economic goals and values not in keeping with the goals of public education, the needs of students or the teaching profession (Alberta Teachers' Association, 2008). This prominent discourse suggests "economic competitiveness needs to be defined broadly, and must include the contributions of members of society and civic engagement" (132). The ATA uses the term knowledge society which as a discursive turn on KBE could improve the likelihood of acceptance outside the organization. Although the knowledge society is not defined within the document, the term acknowledges a shift in industry but downplays economic connotations and retains connections with civil or democratic society[18]. The reframing economic competitiveness prominent discourse is an attempt to shift public education from a close association with economic goals while at the same time leveraging the KBE nodal discourse to generate support in the main.

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[18] This conception of a knowledge society may be in keeping with the government of New Zealand's definition a knowledge society as: "(a) society that creates, shares and uses knowledge for the prosperity and well-being of its people" (retrieved 04/10 from http://www.digitalstrategy.govt.nz/Resources/Glossary-of-Key-Terms/).

The literature confirms this strategy, namely attempting to repurpose a nodal discourse, increases the potential uptake of an organization's message and therefore their ability to influence the discursive space (Fairclough, 2006, Cameron & Palan, 2004). The ATA is using the term knowledge society because it is likely to resonate within and outside their organization. However, by not challenging the KBE discourse more directly and choosing to simply modify the term by swapping 'society' for 'economy' the ATA may effectively reinforce the KBE nodal discourse rather than offering a strong counter discourse. Thus, by attempting to ride the coattails of a nodal discourse, the ATA has not challenged the assumptions grounding KBE but may have refocused it through a social lens.

The ATA's documents contained prominent discourses which attempted to counter or reshape the nodal discourses. This illustrates two things: first, the ATA's technology and education documents are somewhat permeable to nodal discourses and second, nodal discourses can be malleable in terms of how they are taken up by various organizations. In casting the nodal discourses in a more negative light and attempting to subtlety reframe the KBE nodal discourse through the term knowledge society, the ATA's document pushes the education policy discourse towards the core values of the ATA (i.e. equity, democracy) and the traditions of public education. Thus, by utilizing the nodal discourses, albeit through reinterpretation or reaction, the ATA's prominent discourses are more likely to influence the education policy discursive circle. Although the document analysis yielded several references to the nodal discourses, the interview data

showed the terms are susceptible to a multiple interpretation and therefore less influential within education policy discourse.

Evidence of the nodal discourses in the interview data

The interview data contained only a few traces of either globalization or the KBE. Participants, in most instances, combined and reframed the nodal discourses demonstrating the concepts are mutually reinforcing and perhaps susceptible to multiple meanings. Thus, the interview data supports the connection between the KBE and need for technology in schools but each participant offered a slightly different interpretation. For example, some participants mentioned globalization in relation to the KBE as a rationale for technology in education. The comment below is indicative of the common sense interpretation of the KBE nodal discourse and reflective of the prominent discourse leadership in the new economy gleaned from the document analysis.

> Our Minister sees a connection between education and the economy. I think there is a link there and we're sticking our head in the sand if we think our kids are going to be able to compete with others who are used to using these tools, and used to competing globally in a digital age if they don't use these tools in the classroom. Our Minister has a priority to grow the science and technology sectors in cooperation with advanced education so definitely the economy is a factor. Do parents make a connection between education and their kids' future economically? Absolutely. They want them to be well rounded and all that but if you're all that well rounded and happy and you can't get a job that's not really going to help you. (Senior Manager, Alberta Education, Personal Communication, June 26, 2009)

This statement emphasizes a connection between the economy and knowledge production within the science and technology sectors thus reinforcing the assumptions core to the KBE nodal discourse. By associating technological development with economic progress the statement is indicative of a deterministic position with respect to technology. Another comment succinctly captured the linkage between a lack of technology in a school with exclusion and missed opportunities through the deterministic connection between technology, education and future opportunities.

> The idea too that you're going to be left behind if you don't do this with technology was there too. Parents really bought into it, because they wanted their son or daughter to be able to do this or that with technology so they would be able to get a good job in the future. (P. Redhead, Former Alberta Education Senior Manager, Personal Communication, May 20, 2009)

This comment suggests, at least for some parents, the assumptions grounding the nodal discourses and linking technology, knowledge and the economy were valid.

While participants referred to globalization and the KBE as a certainty, and a given feature of our reality, some participants reframed nodal discourses and thereby adopting a critical theory position. In these cases, references to nodal discourses included the capacity of technology to extend learning opportunities (e.g. texting with students in China) and to shape our social reality.

For example, the KBE nodal discourse appeared most frequently in the interview data as simply the reality of the present day work environment often

through references to 21st century learning. All the participants agreed the growing awareness of the KBE has become a strong rationale for students to have access to technology. However some participants, rather than emphasizing the need for students to use technology in order to be competitive in the global economy, which is common to both nodal discourses, highlighted the social dimension of technology skills often in relation to participating as citizens.

> I do buy the well-documented federal and provincial need for students to have contemporary skills for the knowledge based economy. To be able to work in a changing global economy, to have computer skills and more importantly interpersonal skills to be able to work with people and change…sure because that's the world I live in. (J. Percevault, District Technology Director, Personal Communication, August 20, 2009)

Another participant acknowledged the need for students to attain post-secondary education to participate in the KBE but also suggested skilled trades are also important. "(parents) realize not everyone is going to university and there is a real interest in the skills based sector as well. It is just recognition that it takes everyone to run the ship (M. Mulder, ASCA, Personal Communication, August 6, 2009). This participant reframed the nodal discourses of the KBE by emphasizing a broader conception of public education and society while deemphasizing the assumed connection between higher education and economic prosperity. The comment below also challenges the common interpretations of the nodal discourses and suggests there is considerable uncertainty within the education policy discourse.

> The rhetoric around being more economically competitive and the focus on science, math and technology has been there for a while. …I'm hearing this (Education) Minister and the Deputy Minister talk about using 21st century thinking for 21st century problems. So what does it mean to be 'world class' today? Is it about getting one more point or about raising kids to be democratic citizens – civically engaged and forward thinking? I don't think we've figured out how to compete in this new economy. There's a lot of talk about wanting to compete in the 21st century. We still have issues with the oil sands. We haven't quite figured out what it means to be economically viable in the long term. We haven't figured out the well-rounded education and citizenship balance because of the corporate influence. (J. Brandon, CASS, Personal Communication, October 27 2009)

These comments attempt to reframe the nodal discourses by challenging the education policy response to the KBE and globalization and specifically the assumed the value of improved results on standardized tests.

Overall, the common sense interpretation of the nodal discourses appeared to hold little sway with the participants. As one participant noted the "knowledge-based economy is a catch-all phrase, and like any catch-all phrase it quickly loses its meaning" (Senior Manager, Alberta Education, Personal Communication, June 26, 2009). In fact, the interview data and the document analysis confirm this observation but also demonstrate although the meaning of the nodal discourse becomes diluted through reframing, nodal discourses remain valuable to organizations as discursive tools due to their common sense appeal.

In comparing the document and the interview analysis, it appears the assumptions grounding the nodal discourses are confirmed by Alberta Education thus reinforcing a deterministic position. However, the interview analysis also

revealed strong support for a critical theory stance as participants reframed the nodal discourses through association with higher order thinking skills, citizenship and 21st century learning. In all, the interview analysis affirmed nodal discourses, as representations of reality, but not exclusively within an economic frame or from a deterministic stance.

I move now to offer a brief summary of the dominant way of thinking about technology evident in the data based on congruence with the two nodal discourses, the KBE and globalization.

Ways of thinking about technology dominating education policy discourse: A summary

The education policy discursive field is more likely to be dominated by Alberta Education and prominent discourses associated with instrumentalism and determinism given the positive alignment with nodal discourses, KBE and globalization (Fairclough, 2006). In sum, the above examples represent a drawing upon and affirming of the assumptions grounding the nodal discourses consistent in prominent discourses across the documents from Alberta Education. Across the sample of documents from Alberta Education technology is positioned positively alongside globalization and the knowledge-based economy which are consistently presented as accurate representations of reality and future development. Thus, through the prominent discourses, technology serves to secure Alberta Education's reputation as a global leader by melding education into the growth of

the KBE and future prosperity. The education system as a whole and teaching and learning specifically, like the new global market, are transformed by and through technology as it enables new ways to deliver innovative learning opportunities. Also, by using technology in schools students are better positioned to compete for jobs in an increasingly connected, borderless market.

However, the prominent discourses emerging from the ASCA's and ATA's documents consistently offer a more reactionary stance and often a critical response to the nodal discourses. The ATA's documents present change as chaotic and technological development as problematic differing from the natural, inevitable and progressive notion of technology and change associated with globalization. The ATA's documents subtlety question the assumed benefits of change and promote a cautionary approach. So whereas the nodal discourse of globalization endorses advances and adoption of new technology in all sectors based on assumed benefits and few drawbacks, prominent discourses in the ATA's documents attempt to raise doubt by highlighting the negative impacts such as identity issues and environmental degradation (Alberta Teachers' Association, 2008).

ASCA's prominent discourses also reframe the nodal discourses by emphasizing the role of the teacher, the broader mandate of public education and highlighting the social issues associated with technology. While the common sense interpretations of the nodal discourses may resonate with some parents, ASCA's prominent discourses do not align positively with the nodal discourses. It

appears ASCA, by challenging the assumptions grounding the nodal discourses such as the presumed connection between higher education and economic prosperity, is expanding the focus of nodal discourses outside of the economic frame.

Effectively, the ATA's and ASCA's prominent discourses respond and reframe the KBE and globalization nodal discourses by attempting to philosophically shift technology and education policy towards critical theory by emphasizing the values and mandate of public education and the dual nature of technology. Together, the prominent discourses suggest technology should be taken up critically as to not erode the efficacy of the teacher in awareness of the positive and negative implications on the learning process. This more cautionary, measured approach to technology and education is less likely to be taken up in the main as it is not in keeping with the more enthusiastic embrace of technology common to the KBE and globalization nodal discourses.

However, there is evidence the ATA's and ASCA's prominent discourses are beginning to challenge to the deterministic and instrumentalist orientation reinforced through the nodal discourses. The notion of 21st century learning, in the most holistic sense, seems to be creating a need to re-examine the assumptions grounding the nodal discourses through a focus on re-defining learning.

Conclusion

The findings illustrate technology policy discourse in Alberta is divided along the values axis between the ATA and ASCA taking up substantivist and critical theory positions and Alberta Education moving between instrumentalist or determinist positions. The greatest difference was apparent between deterministic prominent discourses tying technology and education autonomously to future prosperity and substantivistic prominent discourses linking technology and education to the cause of many present and future social ills.

Despite the apparent philosophical divide in the ways of thinking about technology in education, the concept of 21st century learning emerged across the data drawing together prominent discourses from all four philosophical positions. Like the documents, a few participants positioned 21st century learning within an economic frame while most related it more directly to education, but there was consensus regarding the connection with assessment and more broadly accountability. This discursive point of overlap may be valuable to consider as a starting point in relation to future policy discussions.

The document analysis suggests Alberta Education's prominent discourses, because they are congruent with widely circulated and generally accepted conception of nodal discourses, are more likely to achieve dominance in the main. Alberta Education documents through a positive alignment with two nodal discourses the KBE and globalization, reproduces common sense notions

about technology, education and society. During the last 20 years, Alberta Education has enjoyed a discursive advantage over the ATA or ASCA by effectively reiterating the assumptions grounding the nodal discourses.

However, the notion of 21st century learning appears to resonate across the discursive field and is successfully challenging the assumptions grounding nodal discourses. While CASS has remained relatively silent with respect to technology and education policy during the time of my study, it is quite possible they will become more engaged in the years ahead. The interview data suggests CASS is most likely to enter the discursive circle by focusing on the implications of 21st century learning on leadership and accountability.

The interview data presented a richly nuanced picture of how nodal discourses work in education policy discourses. The interview data revealed nodal discourses can be interpreted within different philosophical positions and thus take on different meanings especially when associated with the notion of 21st century learning. Nodal discourses proved to be flexible, contested notions yet also constructive for each organization. The ATA and ASCA referenced nodal discourses in relation to their organizational values. Through this process of reinterpretation, the ATA and ASCA leveraged the common sense appeal of nodal discourses in order to find influence in the main.

Most importantly for my purposes, data analysis findings helped me better understand the assumptions underpinning technology policy in education. Specifically, in considering my conversation with the principal about Smartboards

(Chapter 1), it appears his thinking was grounded in a deterministic stance. It is likely he conceived of technology as a neutral, positive force in the school sure to improve students' future opportunities. This philosophical starting point may also ground his belief in the logical connection between technological development, economic prosperity and future employment opportunities for students. In the next chapter, I explore the findings in relation to my exchange with the principal and the questions guiding my inquiry.

Chapter 5: Discussion

In this chapter I revisit the initial incident motivating my inquiry by offering a response to the question and sub-question guiding my study and posit some implications for policy implementation.

I set out to understand why the principal of a high needs school saw interactive whiteboards as a solution to some of the problems in the school and key to future opportunities for students. I was intrigued to explore what influenced his thinking. I became interested in discovering the common sense notions and assumptions serving as rationales for technology and education. During my review of the literature I became curious about the persuasive power of some discourses, nodal discourses, over others.

I set my study in education policy and related documents because I wanted to examine the language in the texts guiding the practices and influencing the discussion in the education system. Given education policy, creation and implementation, is a process involving many organizations I needed to examine how technology and education was discussed in a variety of documents. Also, because any given policy text can be interpreted many ways, which I learned is partly shaped by the organization one represents, I needed to discuss technology and education policy with experienced professionals in Alberta.

The purpose of my study centers on excavating the common sense notions and assumptions about technology in education policy discourse in Alberta. As with many studies, in addition to meeting the purpose of my study and ultimately coming to understand more fully the principal's rationale for introducing interactive whiteboards, I was challenged to come to grips with some unintended findings. So although I set out with a bias, that is expecting to find a fairly direct correlation between Alberta's education policy and primarily economic rationale for technology in schools, I was not expecting my inquiry would lead to issues of governance, funding, accountability and leadership. In addition, I believe my findings may shed light on why the implementation of the ICT program of studies is occurring on a broken front (Hollingsworth, 2004).

I begin by considering the findings in relation to the primary research question and related sub-question:

1. What are the ways of thinking about technology in Alberta's education policy discourse?
- What relationship exists between the ways of thinking about technology in Alberta's education policy discourse and nodal discourses, specifically, the knowledge-based economy and globalization?

From here, I consider the possible implications of the findings in relation to implementation. The discussion concludes by offering a possible explanation for the principal's faith in interactive whiteboards based on my findings. In the

end, although I am satisfied with the outcomes of the study, many questions remain unanswered and still more unasked clearly suggesting technology in education deserves more attention from the research community.

What ways of thinking about technology are evident in Alberta's education policy?

To begin, Feenberg's (1999) philosophical categories proved to be a framework conducive to analyzing technology policy discourse. Overall, the document analysis reveals how the concept of technological change and society is portrayed positively as a linear, evolutionary process through the prominent discourses associated with determinism and more suspiciously and chaotically in the prominent discourses related to critical theory. So whereas Alberta Education's documents generally embrace technological change as progressive, the ATA's documents express a more guarded approach. Again, this reflects a philosophical difference in values associated with technology in the ATA's prominent discourses within the substantivist and critical theory positions.

In keeping with the more optimistic, deterministic outlook prevalent in Alberta Education's documents, related prominent discourses also endorse transformational change often in relation to the KBE. Here, technology naturally generates changes in the learning environment with or without the teacher's active involvement. The ATA's documents respond by advocating an ethical, informed approach to change through prominent discourses associated with critical theory.

A belief in the controllability of technology by humans distinguishes the two, as determinism suggests evolutionary advances in technology perpetuate transformational change while critical theory rests on human intervention and decision-making. In the critical thinking orientation, technology is imbued with values as it mediates the learning environment and therefore must be considered carefully by the practitioner.

Similarly, whereas teachers and students actively take up and control technology, within the instrumentalist orientation to accomplish predetermined ends, consideration of the social context is less important since technology is assumed to be value neutral. Therefore, both the instrumentalist and the deterministic positions, by effectively denying human control (determinism) or assuming technology is value neutral (instrumentalism and determinism), may seem to require less professional engagement of practitioners and educational leaders and promote a sense of acceptance or endorsement by parents, educational leaders and policy-makers.

A belief in the neutrality of technology tends to deemphasize both technology users and the social context. As a result, the prominent discourses emphasizing the teacher in the substantivist and critical theory positions, such as teacher control emerging from the ATA resolutions, stand in stark contrast to the view of the teacher as facilitator in the instrumentalist and deterministic orientations. Given technology is assumed to be value neutral, that is simply an addition to the classroom or a tool to be used, it follows prominent discourses

with a more instrumentalist or deterministic orientation are more likely to deemphasize users and the social world (i.e. teachers and classrooms). This may have implications, explored later, to the implementation of technology policy in education.

The interviews proved to be a highly valuable addition to the data set for three reasons. First, the interview data correlates and further develops the prominent discourses. For example, the prominent discourse international standings apparent in the Alberta Education's Business Plan is illuminated through the participants' description of the social milieu and linkages to the economic and political events during the last twenty years.

Second, the interview data provided evidence of different ways of thinking within organizations. As such, the interview data confirmed the discursive divide but also illuminated some of the contextual political and social realities serving to rationalize the positions. Thus the prominent discourses in technology policy discourse are a product of the competing interests of a time. For example, Redhead's comments (p. 150) revealed how a more instrumentalist position became politically popular and ultimately garnered more support within Alberta Education in the early 90s.

Thirdly, while the document analysis quartered the data into the four philosophical categories fairly cleanly, the interview analysis introduced many grey areas. For example, participants pinpointed how the deterministic stance included prominent discourses linking technology with Alberta Education's

position as global leaders may be based on incompatible assumptions about assessment, accountability and Alberta's economy. Participants noted the international standings and change in the new economy prominent discourses run alongside assumptions implying technology will ensure: 1) Alberta is able to continue to perform well on international tests and 2) Alberta's economy transitions to a KBE. Teasing out these two assumptions demonstrates some incongruence however, if we assume the KBE requires students to utilize knowledge and skills such as, critical thinking skills, collaboration and innovation, difficult to assess through standardized tests. The discrepancy between the two assumptions may have implications, as discussed later, for education policy.

Although the interview data augmented the document analysis allowing for a more nuanced interpretation, it was also clear one way of thinking about technology has dominated education policy discourse in Alberta during the last 20 years.

What relationship exists between the ways of thinking about technology in Alberta's education policy discourse and nodal discourses, specifically, the knowledge-based economy and globalization?

In addition to the significant philosophical divide evident in the analysis, the extent to which one overshadows another is noteworthy. The deterministic and

instrumentalist positions are more likely to dominate the technology and education discursive space due to governance structures and alignment with the two nodal discourses (Fairclough, 2006). First, Alberta Education's policy documents influence educational leaders (within Alberta Education and in jurisdictions) by setting direction, allocating funding, and providing incentives for specific initiatives (e.g. videoconferencing). Also, the prominent discourses evident in Alberta Education's documents are most likely to be dominant in the main given the close alignment with nodal discourses, KBE and globalization (Jessop, 2004; Cameron, & Palan, 2004).

However, the ATA's and ASCA's prominent discourses counter and reframe the nodal discourses effectively challenging the grounding assumptions. By adopting a more cautionary approach to technology and casting doubt on the assumed direct correlation between higher education and future job prospects, the ATA and ASCA deemphasize the economic "learning for earning" focus shared by the common sense interpretation of the nodal discourses. The interview data suggests CASS may take up a more active role in technology and education policy in the future as the notion of 21st century learning seems to bleed into one of their central concerns, assessment and accountability.

I suspect 21st century learning is attractive to many within and outside the education community for three reasons. First, 21st century learning acknowledges the need for education to rely less on information retrieval and more on the

learning process. In this view, technology serves education by providing students and teachers with more ways to engage the curriculum.

Second, as many of the interview participants noted, 21st century learning reflects the nature of living and working in a technology-mediated world but retains a focus on student learning and the social role of public education. The role of the teacher and the contribution of public education are not eroded and may rather be more highly valued given the social complexities and uncertainties of our time.

Third, although it may have sounded futuristic at one time, 21st century learning speaks to teaching and learning in contemporary society. Some teachers and educational leaders question if past practices – such as a reliance on textbooks and standardized tests – need to be considered given the extent to which information is accessible. The idea of 21st century learning provides starting point for discussions about what learning could look like today or tomorrow. It seems 21st century learning is taken up as a conservative approach to educational change that is chiefly about the nature of learning and less about technology, economic goals or a wholesale change of the education system.

Taken together, during the last 20 years it is likely education policy discourse in Alberta is more likely to consider technology as value neutral and positively associated with progress and prosperity. However, it is highly probable ASCA, the ATA and possibly CASS will force a shift to considering technology as value-laden especially within the context of 21st century learning.

What are the possible implications of the interpretation of the findings?

Public education is tasked with serving the needs of society and the economy – educating future citizens and workers. Taken together, the findings show economic and technology-based interests are preeminent in education policy discourse in Alberta, while the interests of society or the common good are overshadowed. In what follows, I identify three probable positive and negative implications of foregrounding the instrumentalist and deterministic philosophical orientations.

Education in Alberta has benefitted from the dominance of the deterministic and instrumentalist positions. For example, as outlined in Chapter 1, Alberta's infrastructure is robust, provincial technology initiatives have increased awareness of research in the field and partnerships have been struck allowing various stakeholder groups to collaborate. Alberta Education has been able to fast-track technology in education through a careful combination of resources, policy and political sensitivity. As a result, Alberta has garnered a reputation as leaders in technology and education internationally and truly innovative teaching and learning is occurring in some classrooms throughout the province (Hollingsworth, 2008; Yabsley, 2004). Despite the lack of funding to support technology-related professional development, targeted initiatives, such as the Emerge one-to-one laptop project, and arms-length professional development

providers, such as Galileo Education Network Association, have provided opportunities for some teachers to access resources, work with leaders in the field and learn from others in the community (Alberta Education, 2008b).

However, despite strong leadership from Alberta Education and a significant financial investment, upwards of 1.5 billion, technology integration in Alberta remains illusive (Alberta Teachers' Association, 2009, p. 4).

> …significant variance exists across the province in effectiveness at integrating ICTs. Fifteen percent of respondents indicate their district is weak or very weak at integrating ICTs. Another fifteen to twenty percent indicate they are undecided whether their district is strong or weak in this area. (Hollingsworth et al., 2004, p. 30)

It appears the dominance of the deterministic and instrumentalist position, which take up technology as neutral, may have multiple negative implications, not just for technology integration but also for public education more broadly, but I highlight only four: 1) hindering dialogue, 2) fostering a compliant or defensive posture by teachers, 3) promoting the underutilization of educational leaders and 4) narrowing futures for students. These four potential negative impacts are related in that each is a product of a lack of democratic engagement with the question of technology in education across the system.

I must preface this discussion of the four most significant drawbacks of the dominance of instrumentalist and deterministic positions in Alberta, by revisiting my own belief about public education and technology outlined in Chapter 1. Public education, in my view, is not just about training a child for a

path but rather about guiding the child to discover multiple paths. Ideally, education is best able to serve the needs of society when the child is able to realize their potential, contribute to society, and live a fulfilling life. Curriculum serves as a map, not a destination and teachers shift between being guides, explorers and experts. Technology is a tool, medium and subject of study.

In considering technology in education from this philosophical stance, it is vital educators "orient themselves toward technology such that (they) are allowed to reveal worlds in as open-ended a manner as possible" (Blacker, 1994, p. 6). My findings show the dominant discourse in education policy has restricted the ability of the education community to consider technology fully, that is, in relation the purposes of public education and more specifically, to the craft of teaching and the social worlds of the classroom and school. What then, are the implications of a narrow way of thinking about technology on the public education?

Hindering dialogue

By consistently associating technology with progress, efficiency and innovation, through deterministic and instrumentalist positions, the prominent discourses related to Alberta Education fail to acknowledge or even anticipate the possibility of less desirable results or unintended consequences. From this value-neutral position, "efficiency serves as the unique principle of selection between successful and failed technical initiatives. On these terms technology appears to borrow the virtues generally attributed to scientific rationality" (Feenberg, 2005,

p. 51). This way of thinking about technology could hamper debate and critical consideration of technology in relation to the work of teachers. Rather than fostering professional dialogue, a determinist position could forestall debate and in a quite literal sense, narrow what educators are able to see and hear in classrooms.

For example, one participant suggested jurisdictions must focus on finding positive results to meet the intent of the grant and increase the likelihood of future funding (Skytt, p. 164). Thus, the professional learning communities gathered around the implementation of a specific technology, such as videoconferencing, are encouraged to share best practices possibly dissuading them from highlighting critical issues. In short, only highlighting what is gained from the introduction of technology in schools and not what could potentially be lost, narrows the research base for policy-makers and also alienate those leaning towards a substantivist or critical theory philosophical position.

In effect, a neutral focus on technology as a tool or as integral to economic progress in education policy could also limit the ability of educators to question technology and consequently, fail to teach students how to engage in the same inquiry. “The important task becomes, therefore, not that of studying the “effects” and “impacts” of technical change, but one of evaluation the material and social infrastructures specific technologies create for our life’s activity” (Winner, 1986, p. 55). Although the prominent discourses in the ATA’s documents emphasize the value of professional dialogue and critical inquiry about technology and the social

world of the classroom, my findings suggest this type of dialogue has not been a feature of education policy discourse in Alberta.

Fostering a compliant or defensive posture by teachers

A deterministic stance places emphasis on the physical presence of technology and therefore the focus becomes that of installing and upgrading technology to keep up with new developments. Next, by implication, an instrumentalist position requires users to acquire technical skills to implement a given technology. It is assumed once a user has access to technology, he/she will use it in the manner intended and realize the inherent benefits. This position accepts human control, technical skill, but may not necessarily uphold the need for pedagogically based knowledge. Together, both positions tend to prioritize hardware, software and technical skills over pedagogical use and appropriateness. The craft knowledge of teachers, which includes skills and a way of life and traditions associated with certain values, is pushed aside and replaced by "other values having little to do with it and its tradition" (Nordkvelle, 2005 p. 21).

It is possible then, some teachers may take a stand off or compliant approach to technology because the prominent discourses linking technology to access emphasizes technical skill over pedagogical concerns or curricular integration. Therefore, I posit my finding lend further support to the conclusion an instrumentalist or deterministic philosophical orientation may support technology use, but not necessarily promote effective use in classrooms (Somekh, 2000,

Watson, 2006, & Cox & Marshall, 2007). It follows then, since technology is considered to be value neutral, that is not a force onto or shaped by the social context of use, the instrumentalist and deterministic positions may not foster change in teaching practice and consequently enhanced learning opportunities.

In this view, technology is used to replicate traditional practice as teachers utilize newly acquired technical skills. Quite simply, if the dominant way of thinking about technology endorses the notion of assured positive results, such as increased student engagement, based on physical presence and use, teachers may assume a spectator role as the values and traditions of their craft are rendered no longer relevant. It appears educational leaders have also adopted this same role.

Promoting the underutilization of educational leaders

The lack of data from CASS, discussed in Chapter 4, suggests the dominance of prominent instrumentalist and deterministic discourses may have inadvertently dissuaded educational leaders from engaging in a more intentional way. CASS, by remaining relatively silent on matters pertaining to technology policy and initiatives, and possibly avoiding some of the risks associated with endorsing a position or direction with respect to technology initiatives, missed opportunities to inform direction and perhaps bring balance to technology policy discourse.

In a broad sense, the disinclination of CASS to present a position on technology in education has likely also inhibited the possibility of providing

leadership relative to a critical inquiry of technology in relation to the role of schools and the education system. The lack of leadership at the jurisdiction level may have rendered the education system more accepting of the dominant deterministic and instrumentalist discourses. Thus, public education "the one place in society where it might be possible to learn about the cultural nature of technology, other than how to promote its further development, is unable to challenge the myth that equates technological development with social progress" (Bowers, 2000, p. 183). CASS members could play an essential role in promoting a professional culture that questions the role of technology in classrooms and in the system. The data analysis revealed the notion of 21st century learning, which resonated across philosophical orientations, could serve as a entry point should CASS choose to become more engaged in technology policy discourse in the future.

Narrowing futures for students

First, as noted in chapter 2, the KBE nodal discourse rests on contested assumptions and may in fact be perpetuating an unrealistic direct connection between education and the world of work. Research indicates students who pursue higher education in the hopes of securing high paying jobs could instead be perpetually underemployed (Livingstone, 1997, Brown & Lauder, 2006). In essence, by emphasizing the need for students to be prepared for the KBE, we may well create a large pool of qualified knowledge workers for a relatively

small, highly competitive market. Not only is this near-sighted, but streaming students into fields favored by the KBE limits our ability, as teachers, to see our students as more than future knowledge workers.

As a teacher, I believe futures are imagined and not inevitable. While I realize the K-12 education system must prepare students for the work world, I also hope it can be a place for students to follow their interests and dispositions. Education, in this view, should hold both at once while ultimately guiding students to discover what makes life meaningful. I do not see this as utopian ideal but rather a reasonable guiding purpose for public education within the social commons. My findings suggest technology and education policy discourse during the last twenty years may have contributed to narrowing the view of the future for students in two ways.

First, by underscoring the assumed connection between technology, education and the KBE, technology and education policy discourse may have resulted in allocating resources away from programs (e.g. humanities, fine and practical arts) which seem peripheral within the KBE. As described in Chapter 1, Alberta's focus on technical infrastructure was cost intensive and necessarily siphoned funding from other areas. For example, portions of the fine arts program of studies are now over twenty years old[19]. The Languages initiative, also discussed in Chapter 2, demonstrates how a program could attract significant

[19] See: http://education.alberta.ca/teachers/program/finearts.aspx

funding if it was made to fit the assumptions of the KBE nodal discourse specifically improving students' ability to be competitive in the global market by using technology (e.g. videoconferencing) to learn another language. So whereas learning a language has traditionally been associated with developing an awareness of other cultures and insight into other ways of expressing our thoughts, language learning in Alberta also became a means to a technical and ultimately economic end.

Second, the drive to increase participation in higher education, a common education policy response to the KBE nodal discourse, may have caused students to believe enrolling in post secondary education is not an option, but simply a natural extension of their K-12 learning. Thus, public education has become "dedicated to raising the standards of all and facilitating greater access to higher education in order to arm the workforce with credentials, knowledge and skills that are valued in the global labour market" (Brown & Lauder, 2006, p. 28). The educational aspirations of parents and students, and interestingly especially visible minority immigrant Canadians, have never been higher proving they have taken up the promises of the KBE and specifically the assumed connection between higher education and employment opportunities (Krahn & A. Taylor, 2005). So while education policy discourse acknowledges the diversity in schools populations and jurisdictions work to ensure parents have choice in schools, the end goal remains the same.

> While we are not advocating for earlier streaming in schools, we agree that the societal denigration of non-professional occupations and the primary focus of high schools on university-destined students is problematic. A wider range of educational and career possibilities needs to be presented to all students. (Krahn & A. Taylor, 2005, p. 28)

I wonder if Alberta's high school drop out rate represents one way students are responding to the lack of choices? Perhaps in channeling students towards the nebulous world of knowledge workers and thus privileging some learning over others and some life goals over others, schools have pushed some students out.

> In schools, we create artificial learning environments for our children that they know to be contrived and undeserving of their full attention and engagement. Without the opportunity to learn through the hands, the world remains abstract and distant, and the passions for learning will not be engaged. (anonymous teacher as quoted in Crawford, 2009, p. 11).

Further, I wonder how students who experience great dissonance between their natural inclinations and abilities and their university programs will fare? Also, given the rates of underemployment or unemployment, how many students following this well-worn path to university programs, will secure a position in the workforce that utilizes their knowledge and skills? "It seems we must take a cold-eyed view of "knowledge work," and reject the image of a rising sea of pure mentation that lifts all boats. More likely it is a rising sea of clerkdom" (Crawford, 2009, p. 47).

My findings suggest technology and education policy discourse has further entrenched an instrumental – a means (credential) to an end (employment) – view of public education. This narrow view may be foreclosing the possibilities for

students by not honoring the many paths that can lead to meaningful work and ultimately a fulfilling life.

Conclusion

My study was sparked by an exchange with a principal regarding his perceived need for interactive whiteboards. Despite my professional experience with technology in education, I could not reconcile the mismatch between the potential affordances of interactive whiteboards and the learning needs of the children in his school. My inquiry focuses on excavating the common sense notions and assumptions foundational to his way of thinking about technology and education.

The eighteen prominent discourses resulting from document analysis demonstrated adherence to the four philosophical positions: substantivism, critical theory, instrumentalism and determinism, outlined in Feenberg's (1999) chart discussed in Chapter 2. The findings illustrate tension in the dialogue on technology policy between organizations as the ATA and ASCA tend towards a substantivist or critical theory position and Alberta Education more consistently assumes an instrumentalist or determinist position. Instrumentalism and determinism are more likely to dominate the discursive field given the scope and reach of Alberta Education and alignment with two nodal discourses: the KBE and globalization.

The findings revealed prominent discourses related to instrumentalism and determinism, evident in policy and related documents, have most influenced technology in Alberta's education system. These two schools of thought regard technology as neutral, that is both endorse a complete separation of means and ends, were evident primarily in Alberta Education's documents. The interview data further corroborated the correlation by highlighting political and economic factors contributing to the creation and resonance of prominent discourses related to access, leadership in the new economy and engaging learning environments.

Further, the prominent discourses related to instrumentalism and determinism are amplified through an overlap with two nodal discourses, globalization and the KBE. Alberta Education's documents drew upon and affirmed the two nodal discourses through prominent discourses related to for example: international standings and change and the new economy. Technology in education serves to secure Alberta Education's reputation as a global leader and to melding the purposes of education into the growth of the KBE. The education system as a whole and teaching and learning specifically, like the new global market, are transformed by and through technology as it enables new ways to deliver learning opportunities.

Also, by using technology in schools students are better positioned to compete for jobs in an increasingly connected, borderless market. In these ways, the prominent discourses within the instrumentalist and deterministic orientation reflect an external orientation focused on connecting students with learning

opportunities, achieving international recognition and securing a competitive advantage economically.

It seems probable these same prominent discourses provided a rationale for the principal (Chapter 1) to see interactive whiteboards as a much-needed addition to his school.

In contrast, the ATA documents aligned most closely with substantivism and critical theory by promoting a more skeptical approach to technological change. The ATA's prominent discourses also attempt to provoke a critical response to, rather than an endorsement of, the nodal discourse of globalization while reframing the KBE.

For example, the ATA's documents consistently emphasize the chaotic nature of change differing from the natural, inevitable and progressive notion of change associated with globalization. The ATA's documents subtlety question the assumed benefits of change, often precipitated by technology and globalization, and promote a cautionary approach. So whereas the nodal discourse of globalization endorses advances and adoption of new technology in all sectors based on assumed benefits and few drawbacks, prominent discourses in the ATA's documents attempt to raise doubt.

Effectively, the response appears as an attempt to philosophically shift technology and education policy towards critical theory by broadening the scope beyond economic imperatives by emphasizing the mandate of public education within civil society. In this view, technology is taken up critically as to not erode

the efficacy of the teacher recognizing the positive and negative implications on the learning process. The ATA's prominent discourses reflect an internal orientation focused on teacher control, the classroom and school community. If we are to assume the prominent discourses evident in the ATA's documents are commiserate with the majority of teachers, then it seems probable teachers reluctance to embrace technology may be based on a lack of philosophical resonance with the prominent discourses associated with instrumentalism and determinism.

ASCA's resolutions, especially those focusing on access, reflect a more deterministic position but taken together, alongside the organizational vision and goals, tend toward a critical theory orientation by promoting human control and assuming technology is value-laden. The data demonstrated ASCA shares more in common with the ATA, in terms of ways of thinking about technology in education, as both underscore the role of the teacher as a decision-maker and acknowledge both the potential benefits and drawbacks of technology. ASCA, like the ATA, reframed the KBE nodal discourse, often through a connection with the notion of 21st century learning, by emphasizing the value of active engagement in contemporary society.

Three potential positive and negative implications of the findings, with respect to the dominance of the deterministic and instrumentalist position, for the integration of technology to support student learning and the role of public education were identified. In addition to establishing an international reputation as

leaders in technology and education, the education system has benefitted through: 1) the creation of robust infrastructure, 2) increased awareness of research in the field and 3) partnerships between various stakeholder groups.

However, technology policy has not met a primary goal, systemic technology integration and change in teaching and learning and may have caused public education to be more attune to economic imperatives. Four possible negative implications of the dominance of deterministic and instrumentalist positions were critically examined: 1) hindering dialogue, 2) fostering a compliant or defensive posture by teachers, 3) promoting the underutilization of educational leaders and 4) narrowing futures for students. All four drawbacks stem from a lack of engagement by all members of the education community with the question of technology in relation to the social world of the classroom and school and the goals of public education.

Although some may take issue with the findings or the potential implications identified, it seems apparent the divide between the philosophical positions evident in the data and the dominant instrumentalist and deterministic approach is difficult to dispute. Indeed, many other scholars have found the same philosophical emphasis regarding technology in education policy (Watson, 2001, 2006; Robertson, 2000, Nordkvelle, 2005, Selwyn, Gorard, & Williams, 2001). The issue, from my perspective, is not that there are differing philosophical positions, the field is richer and more challenging for them, but rather the issue is the dominance of one over others. The education community would be better

served if future technology policy discussions began by critically examining the common notions and assumptions foundational to how these groups think about technology in relation to the purpose of public education. Technology in education can no longer be considered a side project or the exclusive purvey of technical experts.

> The last twenty years in the philosophy of technology has been an attempt to think technology as something we do. The next twenty years must be an attempt to think meta-technology as something we are part of. (Mitcham, 1995)

My findings suggest the dialogue needs to be informed and initiated by, perhaps previously disengaged, educational leaders as they possess the expertise and experience required to ensure the potential of technology to support student learning does not go unrealized or continue to narrowly support technical goals.

Also, the data demonstrated convergence across organizational groups regarding the concept of 21st century learning, which indicates two things. First, 21st century learning may be a potential discursive starting point for future policy discussions. Indeed some educational leaders, including the Minister of Education in Alberta, are currently attempting to clearly define 21st century learning in discussing educational reform or transformation (Alberta Education, 2010). Based on my findings, in order to encourage more active engagement by the education community, the notion of 21st century learning should consider technology as value-laden. Also, the conversation circle regarding technology and education

needs to be broadened to include teachers, principals, jurisdiction leaders and parents in a more meaningful way.

Second, 21st century learning could also become a strong internal discourse for the education community to utilize in challenging the assumptions grounding the KBE and globalization nodal discourses. While external forces are always at work in educational reform, 21st century learning could be a useful anchor in addressing fundamental pedagogical questions.

In sum, my findings suggest technology in education policy is consistently associated with progress through notions of innovative practice, enhanced learning and future economic prosperity. Additionally, the language in education policy, by focusing on access, delivery and impact, has foregrounded the tools and disregarded practice. This way of thinking about technology reflects the beliefs and values of a time. During the last 20 years, the pressure to keep up with technological developments coupled with the unquestioned assumptions tying technology to progress and prosperity, through the nodal discourses of the KBE and globalization, effectively blinkered education policy discourse. In this discursive space, technology is not considered fully – that is as both a supplement and a detriment – to the social world of the classroom.

Thus, if we accept education policy is "part of a wider system of social relations, framing what is said and thought" (Blackmore & Lauder, 2005, p. 98) and technology policy discourse is dominated by a way of thinking about technology as neutral, controllable, progressive and natural, full engagement

around the question of technology in education is at best limited. Further, if technology policy discourse in Alberta is limiting professional dialogue, then one wonders if students are not being given opportunities to consider technology as "not merely the servant of some predefined social purpose; (but as) …an environment within which a way of life is elaborated" (Feenberg, 1995, p. 10). It appears a more expansive approach to question of technology in relation to the purpose of education is needed.

The findings revealed technology and education policy discourse in Alberta is polarized. However, the interview data shows the discourse continues to evolve and shed the more extreme aspects of each philosophical position. Given the economic, social and political forces linking technology to a transformation of education, organizational groups may need to find philosophical common ground while acknowledging and respecting divergent beliefs.

> The task of philosophy in this situation becomes neither the meaningful rejection nor the equally meaningless affirmation of technology, but to try to see where technical and technological thinking, with no other principle but itself, must lead us; and whether some countervailing mode of thought may not be called for. (Barrett, 1978, p. 208)

Education policy is one place where we, the education community, use words to carve out possible futures based on what we know about our discipline, the resources available to us and the challenges and opportunities in our world. Education policy is a reflection of what a society values and imagines. What does

it mean then, when we narrowly imagine technology as neutral tool at our disposal or technological development as a natural part of societal progress?

The language circling around technology in education policy has limited our ability to conceive of technology as anything more than efficient, engaging devices and symbols of progress. In this limiting discursive space, salient pedagogical questions remain unasked. This is significant given "(d)iscourse is a practice not just of representing the world, but of signifying the world, constituting and constructing the world in meaning" (Fairclough, 1993, p. 64). If we wish to foster a professional dialogue about technology in education, we will need a more open, professionally honest discursive space. "We can help each other to see things that are commonly not placed in the political foreground: For instance, over the unending din of economic rhetoric, we need to speak of what happens to people" (Franklin, 1999, p. 177). Robertson suggests technology policy, often through linkages to the KBE and globalization, effectively usurps the broader goals of public education. "Surely, setting out education's highest purpose as getting students to passively adapt to a predetermined future is a poor substitute for persuading students that they can contribute to the creation of better futures" (2003, p. 292). Watson also underscore the need for educators and policy makers need to consider technology within a social construct, such as UNESCO's

seven facets of knowledge[20], rather than simply a catalyst for change within an economic paradigm (Watson, 2001).

We need to have access to language that legitimizes what we know about teaching and learning, acknowledges teachers not as curriculum delivery channels and students not as whitewashed 21st century learners.

> …for our world – the concrete world in which we live – does not come to us as something independent of language; we do not construct our world independently and then add it on to our experience; our world transpires within language. (Barrett, 1978, p. 76)

Public education would be better served and the affordances of technology in education more likely realized if education policy discourse stopped presenting technology as a generic solution for the complex challenges facing our schools and begins to acknowledge the centrality of teaching practice, the uniqueness of student learning and the medium of technology itself. Likewise, the students in our education system must be given the opportunity to fully engage the question of technology especially given many of the problems they will inherit, for example, global warming and antibiotic-resistant disease, are outgrowths of our fascination and unquestioned development of technology.

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[20] Morin, E. (1999). Seven complex lessons in education for the future. Retrieved on 05/10 from http://unesdoc.unesco.org/images/0011/001177/117740eo.pdf

Education, and perhaps many other sectors and the world itself, is at precipice as some established notions and the voices of experts are being challenged. We may be entering a time when we must confront "problems with which technical thinking is not prepared to cope" (Barrett, 1978, p. 211). Simply knowing the facts is no longer enough since the facts are now everywhere. The ability to use technology is less important as ones ability to discern if and how best to use it within a specific context. It is increasingly clear educators, much like other professionals, must be able to articulate what learning looks like in a connected age. In a time when course content is easily accessible, why should students still come to school? How do classrooms and schools contribute to our understanding of who we are, our communities and the world?

It would seem our ability to conceive of technology in its fullest sense, in relation to the timeless questions of our discipline – what does it mean to be educated and what kind of life do we wish to foster – must include imaging technology as value-laden. To provide a possible way to engage the question of technology in education policy, we need to adopt a more holistic approach. In what follows, I highlight three areas of inquiry, based on Feenberg's (1996) work, as possible starting points for future policy deliberations and implementation initiatives.

First, technology must not be considered in isolation, outside of the social context, and rather as a process of interaction. Feenberg suggests the following

assumptions position the study of technology within the realm of hermeneutic constructivism.

> Technology is not the product of a unique technical rationality but of a combination of technical and social factors. The study of these factors must include not only the empirical methods of social science but also the interpretive methods of the humanities in order to get at the underlying meaning of technical objects and activities for participants. Meaning is critically important insofar as technical objects are socially defined. (Feenberg, 1996)

Certainly this type of research is occurring in Alberta but it is seems to have occurred after implementation (e.g. videoconferencing), and favoured the identification of improvements or enhancements to learning over the discovery of possible unintended, negative impacts (e.g. calls for proposals). Taking up technology as socially constructed may require a shift from blanket approach to technology implementation to a much more discerning approach considering what is most appropriate in a given context.

Second, Feenberg's suggests the introduction of technology in education has been guided by a historical pattern of scientific developments and a natural course of progress. Citing Kuhn, Feenberg suggests technological change can no longer be accepted as improving and enhancing society.

> Instead of regarding technological progress as a deterministic sequence of developments, we have learned to see it as a contingent process that could lead in many different directions. (…) (T)he illusion of neutrality and autonomy of the technical professions arises from the way in which they construct their history. (Feenberg, 1996)

The notion of evergreening, the ongoing replacement of old technology with new, and the adoption of new, under-researched technology in schools both reflect deep-seeded historical belief in the natural and progressive evolution of technology. Challenging the assumed pairing of technology and progress will require studying how learning is changed by the introduction of a particular technology. It is not enough to assume learning is enhanced because a school has been outfitted with interactive whiteboards. We need to explore if and in what form learning is improved or enhanced given the introduction of technology while being cognoscente of the possibility of replication and negative outcomes. We need to be able to discern when technology is more than a symbol of progress, a hood ornament for schools.

For example, the assumed link between technology and progress was evident in the KBE nodal discourse in both the ATA and Alberta Education documents. The seeming agreement with the KBE suggests the goals of public education are being set within an economic agenda but there was evidence of some resistance. The ATA and ASCA attempted to counter the benefits-for-all assumption of globalization and reframe the KBE nodal discourse. This discursive strategy may have allowed the ATA to leverage the common sense appeal of the nodal discourses while also challenging the core assumption grounding each. It is also possible, by simply using the term knowledge society instead of KBE, the ATA could also have reinforced the common sense interpretation of the KBE.

Third, Feenberg also sees the need for decisions regarding technological developments to become a part of the democratic sphere. So while in the past, technical matters have been given over to experts (e.g. programmers, technicians), Feenberg suggests the public needs to become more informed and involved. "A technological society requires a democratic public sphere sensitive to technical affairs" (Feenberg, 1996).

In the case of education, although many technology directors in jurisdictions are teachers, teachers in classrooms are not often able to contribute to decision regarding the technology in schools and provincial directions. In taking up technical democracy, we assume the users can and should contribute to the design, development and implementation of technology. Feenberg notes as participants in the process, teachers and indeed students, are able to "perceive and actualize overlooked potentialities not envisioned in the technical, economic or political rationality already inscribed in the network. They give new meaning on the basis of a "situated knowledge" rooted in their unique relation to technology" (Feenberg & Bakardjieva, 2004, p. 16). It is highly likely providing teachers with a forum to question and share insights regarding technology and learning would result in realizing the educational value of technology and the innovative potential it affords to enhance student learning while also a more engaged, committed professional body.

My findings suggest the notion of 21st century learning, which cuts across philosophical orientations suggesting a measure of consensus across

organizational groups, could be a valuable social construct to elicit active engagement by all members of the education community. The ATA and ASCA have also reframed the nodal discourses of the KBE and globalization and challenged the common sense interpretations by making connections with 21st century learning.

In sum, these three approaches to technology, hermeneutic constructivism, historicism and technology democracy would not only serve to open up a discursive space for education policy, they may also allow education to be better prepared for the challenges ahead. Educational leaders will need to examine the assumptions guiding their decisions to ensure technology in education is best able to support teaching and learning and in keeping with the role of public education within the social commons.

As noted in Chapter 1, Alberta Education has garnered international recognition as one of the best education systems in the world. Despite the many challenges presented by our organizational structure, the diversity of Alberta's student population and the multitude of economic and social issues, Alberta is consistently able to achieve excellent results.

Now, Alberta Education, in concert with partners and stakeholders, is signaling a need for transformation with many suggesting technology will be a vital part of the process but to what end (Alberta Education, 2010)? What will teaching and learning look like post-transformation? These questions need to be addressed with a firm grip on the science and art of our discipline. A

philosophical approach to the question of technology in education provides a framework for analyzing our assumptions, considering implications and consciously adopting a more inclusive, critical approach.

Reflections

As I look back on my doctoral studies, a few observations come to the fore. First, in my early discussion with my supervisor, Dr. Norma Nocente, I expressed an interest in uncovering the dominant discourses regarding technology by analyzing education policy documents. At the time, and perhaps due to my recent professional experience with Alberta Education, I was quite convinced the documents would offer clear evidence of the beliefs and values guiding technology decision-making. In the end, my supervisor persuaded me to include interview data although the policy documents were foundational to my inquiry and did indeed contain evidence of the technology-related discourses circling in education, they fell short of being rich, meaningful data sources. Also, in addition to adding much needed context, depth and complexity to my study, the interviews themselves were rewarding professional learning experiences.

Second, as outlined in Chapter 1, with what I would consider now to be a fairly superficial understanding of education policy and rather fixed image of the organizations most directly involved. During the research process I began to appreciate the intricacies of public education policy, the varied interests engaged in technology discourse and multifarious nature of the relationships between

organizational groups. As a result, I have come to see education policy as an evolving, highly nuanced reflection of competing interests and not simply a two-way struggle for power and control.

Lastly, throughout my inquiry I struggled with the confines of my chosen methodological approach, CDA. While I did see other methodological approaches as offering a more nuanced, richly layered analysis, I also was somewhat apprehensive about embarking on doctoral work - already a lonely journey - without a map. As a graduate student, CDA offered some measure of security – in terms of boundaries and a path to follow – which was reassuring but along the way I became aware of the limitations. While I am convinced CDA was the best fit for my research questions, at times I did not appreciate how it seemed to bind my analysis to the text itself. Thus, concessions were made along the way in order to make my philosophical inquiry of education policy fit within the methodological structure of CDA.

For example, technology is a vast, complex subject of study. My inquiry examined technology in a rather blunt way using a philosophical lens. That is to say I did not tease out multiple forms or interpretations of technology (e.g. the things themselves or as a system of power). A hermeneutic or phenomenological inquiry, for example, would have allowed me to study technology in a more multifaceted, experiential manner (Smith, 2006, Adams, 2006).

Second, while my inquiry revealed how different ways of thinking about technology are portrayed by organizational groups and to some extent time

periods, it does not explain much about the social process that is, how different discourses are taken up in schools by teachers, parents and students. Although the interviews allowed me to 'get behind the policy' to better understand why some ways of thinking about technology are produced, reshaped or countered, another research methodology would need to be employed to study how individuals interact with, interpret and act on the prominent discourses.

Also, I approached my inquiry from a fairly broad stance, gathering education policy documents and interviewing individuals from four organizational groups. I did not choose to hone in on a particular focal point (e.g. 21st century learning, the KBE or digital literacy) but instead chose to highlight overarching themes and consider possible implications for the education system. As with any research decision, some questions are not addressed or only superficially and others remain unasked. For example, I would have liked to flesh out the issues around accountability and innovation or delve into the notions tying technology to the transformation of education.

Finally, throughout my professional career I have been a member of the discursive circle I studied. While making subjective decisions throughout the research process I wondered if or how I, as 'insider', would be able to uncover the networks of discourse patterns that might be natural or invisible to me as a researcher. At best, I can only be explicit and aware of my own perspective, be clear about the interpretation process and hope that while not claims of truth, the findings allow me and perhaps others to "understand the world and the way it is

shaped in or for (us) to transform it" (Kincheloe & McLaren, 2000, p. 297).

In any research process, decisions must be made along the way based on what you know at the time. While I have some misgivings about my decisions regarding the methodology, it served my purposes by providing a much-needed scaffold for my inquiry.

References

Adams, C. (2006). PowerPoint, habits of mind, and classroom culture. *Journal of Curriculum Studies*, *38*(4), 389-411.

Alberta Assessment Consortium (AAC). (2006). *Grade level of achievement reporting: Teacher and administrator handbook.* Edmonton, AB: Alberta Education.

Alberta Education. (1987). *Visions 2000: A vision of educational technology in Alberta by the year 2000*. Edmonton, AB: Alberta Education.

Alberta Education. (1997). *Teaching quality standard applicable to the provision of basic education in Alberta* [Ministerial order #016/97]. Retrieved from http://education.alberta.ca/department/policy/standards/teachqual.aspx

Alberta Education. (2004a). *Learning and technology policy framework*. Retrieved from http://education.alberta.ca/media/531415/ltfwrk.pdf

Alberta Education. (2004b). *Alberta invests $6 million in provincewide video-conferencing initiative* [News Release]. Retrieved from *http://education.alberta.ca/department/newsroom/news/archive/2005/february/20050214.aspx*

Alberta Education. (2004c). *Government unveils initiative to increase language learning* [News Release]. Retrieved from http://education.alberta.ca/department/newsroom/news/archive/2004/april/20040422.aspx

Alberta Education. (2005a). *Social studies program of study: Kindergarten to grade 3*. Edmonton, AB: Alberta Education.

Alberta Education. (2005b). *Overseas school accreditation.* Retrieved from http://www.education.alberta.ca/students/internationaleducation/accreditation.aspx

Alberta Education. (2005c). *Business plan 2005 - 2008*. Retrieved from http://education.alberta.ca/media/589304/bp2005-08.pdf

Alberta Education. (2006a). *Video-conferencing research community of practice research report*. Retrieved from education.alberta.ca/media/822749/vccopreport.pdf

Alberta Education. (2006b). *The accountability pillar brochure*. Retrieved from http://www.education.gov.ab.ca/accountability/pdf/APBrochureFINALNov2006.pdf

Alberta Education. (2007a). *Alberta's 15-year olds place among world's best on international tests.* Retrieved from http://education.alberta.ca/department/newsroom/news/2007/december/20071204.aspx

Alberta Education. (2007b). *Government-Microsoft partnership enriches student learning*. Retrieved from http://education.alberta.ca/department/newsroom/news/2007/october/20071030.aspx

Alberta Education. (2007c). *The accountability pillar*. Retrieved from http://education.alberta.ca/admin/funding/accountability/about.aspx

Alberta Education. (2007d). *Funding manual for school authorities*. Retrieved from http://www.education.gov.ab.ca/funding/

Alberta Education. (2007e). *Government response to ATA resolutions 2007*. Retrieved from http://education.alberta.ca/media/815121/governmentresponseto2007ataararesolutions.pdf

Alberta Education. (2007f). *ICT program of studies rationale and philosophy*. Retrieved from http://www.education.gov.ab.ca/ict/ictfront.asp

Alberta Education. (2007g). *Implementation of technology mediated learning to improve student engagement and success in high school*. Retrieved from http://education.alberta.ca/media/814657/46223 call for proposals.pdf

Alberta Education. (2007h). Students benefit from teachers' second language learning. Retrieved from http://education.alberta.ca/department/newsroom/news/2007/september/20070925-1.aspx

Alberta Education. (2008a). *Business plan 2008 - 2011*. Retrieved from http://education.alberta.ca/media/779918/bp2008-11.pdf

Alberta Education. (2008b). *Emerging technologies in the 21st century: A summary of final reports*. Retrieved from http://education.alberta.ca/media/823917/etreport.pdf

Alberta Education. (2008c). *International test results*. Retrieved from http://education.alberta.ca/admin/testing/nationaltesting.aspx

Alberta Education. (2008d). *Schools broaden technology use to transform students' learning opportunities.* [Media release]. Retrieved education.alberta.ca/department/newsroom/news/2008/april/20080430.aspx

Alberta Education. (2009a). *Learning and technology in Alberta (1975 - 2009*). Retrieved from http://education.alberta.ca/media/1105176/learning%20and%20technology%20in%20alberta%202009%20final.pdf

Alberta Education. (2009b). *Principal quality standards*. Retrieved from http://education.alberta.ca/admin/resources.aspx

Alberta Education. (2009c). *Technology in schools: Videoconferencing*. Retrieved from http://education.alberta.ca/admin/technology/video.aspx

Alberta Education. (2010). *What Albertans said about...."Bold and Courageous" Changes for the Future of Education Research Findings from Inspiring Education: A Dialogue with Albertans.* Retrieved from http://inspiringeducation.alberta.ca/Documents/tabid/124/Default.aspx

Alberta Learning. (2003). *Alberta's Commission on Learning. Every child learns, every child succeeds: report and recommendations.* Retrieved from http://education.alberta.ca/department/ipr/commission.aspx

Alberta School Boards Association. (2007). *Strategic plan: 2007 - 2010*. Retrieved from http://www.asba.ab.ca/files/pdf/strategic-plan/strat_plan_07_10.pdf

Alberta School Councils' Association. (2008). *Resolutions 2006 - 2008*. Edmonton, AB: Alberta School Councils' Association.

Alberta School Councils' Association. (2009). *Profile statement.* Retrieved from http://www.albertaschoolcouncils.ca/

Alberta Teachers' Association. (2006). Grade level of achievement reporting: Education partners call on government to reconsider initiative. *ATA News, 40*(19).

Alberta Teachers' Association. (1999). *Technology and education*. Retrieved from http://www.teachers.ab.ca/About%20the%20ATA/Governance/PolicyandPositionPapers/Position%20Papers/Pages/Technology%20and%20Education.aspx

Alberta Teachers' Association. (2007 - 2009). *Annual representative assembly: Technology related resolutions*. Edmonton, AB: Alberta Teachers' Association.

Alberta Teachers' Association. (2008). *Changing landscapes: Shaping a preferred future 2008 - 2028*. Edmonton, AB: Alberta Teachers' Association.

Alberta Teachers' Association. (2009). *Initial response to Alberta education: Draft technology in education policy*. Edmonton, AB: Alberta Teachers' Association.

Althusser, L. (1969). *For Marx* (B. Brewster Trans.). London: Allen Lane.

Anderson, K. (2008, February). Talkin' shop with Stelmach. *Gauntlet.* Retrieved from http://thegauntlet.ca/story/12219

Anderson, T., & Rourke, L. (2005). *Videoconferencing in kindergarten-to-grade 12 settings: A review of the literature*. Edmonton, AB: Alberta Education.

Armstrong, D., Laird, A., & Mulgrew, A. (2008). *Grade level of achievement reporting: Teacher and administrator handbook, revised*. Edmonton, AB: Alberta Education.

Association of School Business Officials of Alberta. (2007). *Strategic plan: 2007 - 2009*. Edmonton: Association of School Business Officials of Alberta. Retrieved from http://www.asboa.ab.ca/PDF/StratPlan.pdf

Aviram, R., & Tami, D. (2004). *The Impact of ICT on education: The three opposed paradigms, the lacking discourse*. Retrieved from http://www.elearningeuropa.info/extras/pdf/ict_impact.pdf

Bakhtin, M. M. (1981). The dialogical imagination. Austin, TX: University of Austin Press.

Ball, A. F., & Freedman, S. W. (2004). *Bakhtinian perspectives on language, literacy, and learning*. Cambridge, UK: Cambridge University Press.

Ball, S. J. (1990). *Politics and policy making in education: Explorations in policy sociology*. London, UK: Routledge.

Ball, S. J. (2007). *Education PLC: Understanding private sector participation in public sector education*. London, UK: Routledge.

Barber, M., & Mourshed, M. (2007). *How the world's best performing systems come out on top*. McKinsey and Company. Retrieved from http://www.closingtheachievementgap.org/cs/ctag/view/resources/111

Barrett, W. (1978). *The illusion of technique: A search for meaning in a technological civilization*. New York, NY: Anchor Books.

Bergvall, V. L., & Remlinger, K. A. (1996). Reproduction, resistance and gender in educational discourse: The role of critical discourse analysis. *Discourse & Society, 7*(4), 453-479.

Bernstein, B. (1990). *The Structuring of Pedagogic Discourse.* London, UK:

Routledge.

Blacker, D. (1994). Philosophy of technology and education: An invitation to inquiry. *Philosophy of Education Society*. Retrieved from http://depts.washington.edu/edtech/blacker.pdf

Blackmore, J., & Lauder, H. (2005). Researching policy. In B. Somekh, & C. Lewin (Eds.), *Research methods in the social sciences* (pp. 97-104). London, UK: Sage.

Boutain, D. M. (1999). Critical language and discourse study: Their transformative relevance for critical nursing inquiry. *Advances in Nursing Science, 21*(3), 1-8.

Bowers, C. A. (2000). *Let them eat data: How computers affect education, cultural diversity, and the prospects of ecological sustainability*. Athens, GA: University of Georgia Press.

Buenfil-Burgos, R. N. (2000). Globalization, education and discourse political analysis: Ambiguity and accountability in research. *International Journal of Qualitative Studies in Education, 13*(1), 1-24.

Burbules, N. C., & Callister, T. A. (2000). *Watch IT: The risks and promises of information technologies for education*. Boulder, CO: Westview Press.

Burbules, N. C., & Torres, C. A. (2000). Globalization and education: An introduction. In N. C. Burbules, & C. A. Torres (Eds.), *Globalization and education: critical perspectives,* (pp. 1-26). London, UK: Routledge.

Brown, P., & Lauder, H. (2006). Globalisation, knowledge and the myth of the magnet economy. *Globalisation, Societies and Education, 4*(1), 25-57.

Cameron, A., & Palan, R. (2004). *The imagined economies of globalization*. London, UK: Sage.

Carnoy, M. (1999). *Globalization and educational reform: what planners need to know*. Paris, France: United Nations Educational, Scientific and Cultural Organization (UNESCO).

Castells, M. (2010). *The rise of the networked society* (2nd ed.). West Sussex, UK: Wiley-Blackwell.

Chambers, J. M. (2007). Ecological literacy materials for use in elementary schools: A critical analysis. (Unpublished doctoral dissertation). University of Alberta, Edmonton.

Clifford, P., Friesen, S., & Lock, J. (2004). *Coming to teaching in the 21st century: A research study conducted by the Galileo educational network*. Edmonton, AB: Alberta Education.

College of Alberta School Superintendents. (2002). *Policies and practices*. Edmonton, AB: College of Alberta School Superintendents. Retrieved from http://www.cass.ab.ca/policies___practices

College of Alberta School Superintendents. (2008a). *CASS practice standard, leadership dimensions and descriptors*. Edmonton, AB: College of Alberta School Superintendents. Retrieved from http://www.cass.ab.ca/cass_practice_standard

College of Alberta School Superintendents. (2009a). *Moving and improving: Building system leadership capacity*. Edmonton, AB: College of Alberta School Superintendents.

College of Alberta School Superintendents. (2009b). *Moving and improving: Building system leadership capacity phase one report*. Edmonton, AB: College of Alberta School Superintendents.

Crawford, M. C., (2009). *Shop class as soulcraft: An inquiry into the value of work*. New York, NY: Penguin.

Culp, K. M., Honey, M., & Mandinach, E. (2005). A retrospective on twenty years of education technology policy. *Journal of Educating Computer Research, 32*(3) 279-307. Retrieved from http://courses.ceit.metu.edu.tr/ceit626/week12/JECR.pdf

Darwin, C. (1958). *The origin of species*. New York, NY: Penguin.

Deetz, S. A. (1982). Critical interpretive research in organizational communication. *Western Journal of Communication, 46*(2), 131-149.

Dewey, J., Boydston, J. A., & Hook, S. (1985). *Democracy and education 1916*. Carbondale, IL: Southern Illinois University Press.

Drucker, P. (1993). *The post industrial society*. London, UK: Heinemann.

Ellul, J. (1964). *The technological society*. New York, NY: Alfred A. Knopf.

Fairclough, N. (1992). *Discourse and social change*. Cambridge, MA: Polity Press.

Fairclough, N. (1996). A reply to Henry Widdowson's 'discourse analysis: A critical view'. *Language and Literature, 5*(1), 49-56.

Fairclough, N. (2003). *Analysing discourse: Textual analysis for social research*. London, UK: Routledge.

Fairclough, N. (2005). Discourse in processes of social change: 'Transition' in central and Eastern Europe. *British and American Studies,* Volume XI, 9-34.

Fairclough, N. 2005. Discourse analysis in organization studies: The case for critical realism. *Organization Studies, 26*(6), 915-939.

Fairclough, N. (2006). *Language and globalization*. Oxon, UK: Routledge.

Feenberg, A. (1991). *Critical theory of technology*. New York, NY: Oxford University Press.

Feenberg, A. (1996). *Summary remarks on my approach to the philosophical study of technology*. Retrieved from http://www.sfu.ca/~andrewf/Method1.htm

Feenberg, A. (1999). *Questioning technology*. London, UK: Routledge.

Feenberg, A. (2003). *What is the philosophy of technology?* Retrieved from www.sfu.ca/~andrewf/komaba.htm

Feenberg, A., & M. Bakardjieva. (2004). Consumers or citizens? The online community debate. In Feenberg, A. and D. D. Barney, (Eds.), *Community in the digital age: Philosophy and practice* (pp. 1 – 27). Lanham, MD: Rowman & Littlefield.

Feenberg, A. (2005). Critical theory of technology: An overview. *Journal of Tailoring Biotechnologies*, *1*(1), 47-64.

Feenberg, A., & Hannay, A. (1995). *Technology and the politics of knowledge*. Bloomington, IN: Indiana University Press.

Ferneding, K. A. (2003). *Questioning technology: Electronic technologies and educational reform*. New York, NY: Peter Lang.

Flower, D., & Booi, H. (1999). Challenging restructuring: The Alberta Teachers' Association. In T. W. Harrison, & J. L. Kachur (Eds.), *Contested classrooms: Education, globalization, and democracy in Alberta* (pp. 123-135). Edmonton, AB: University of Alberta Press.

Foucault, M. (1982). The order of discourse. In M. J. Shapiro (Ed.), *Language and politics* (I. McLeod Trans.). (pp. 108-138). Oxford, UK: Basil Blackwell.

Foucault, M., & Gordon, C. (1980). *Power/knowledge: Selected interviews and other writings, 1972-1977*. New York, NY: Pantheon.

Fowler, R., Hodge, B., Kress, G., & Trew, T. (1979). *Language and control.* London, UK: Routledge.

Foray, D., & Lundvall, B. A. (1996). The knowledge-based economy: From the economics of knowledge to the learning economy. In D. Foray and B. A. Lundvall (eds.) *Employment and growth in the knowledge-based economy*. (pp. 115-122). Paris: OECD.

Franklin, U. (1999). *The real world of technology* (2nd ed.). Toronto, ON: House of Anansi Press.

Gannon, N. C., & Throndson, L. J. (2004). *Quality standards of practice for school principals*. Edmonton, AB: College of Alberta School Superintendents. Retrieved from http://o.b5z.net/i/u/10063916/h/Publications/Quality%20Standards%20for%20Principals.doc

Giddens, A. (1979). *Central problems in social theory*. London, UK: Macmillan press.

Government of Alberta. (2007). *Budget 2007*. Retrieved from http://www.education.gov.ab.ca/department/budget/2007/

Guile, D. (2001). Education and the Economy: Rethinking the question of learning for the 'knowledge' era, *Futures*, *33*(6), 469-483.

Guile, D. (2003). From 'Credentialism' to the 'Practice of Learning': Reconceptualising learning for the knowledge economy, *Policy Futures in Education*, *1*(1), 83-105.

Hajer, M. A. (1995). *The Politics of Environmental Discourse: Ecological Modernization and the Policy Process*. Oxford, UK: Oxford University Press.

Hall, S. (1986). The problem of ideology: Marxism without guarantees. *Journal of Communication Inquiry, 10*(2), 28-44.

Hall, S. (2001). Foucault: Power, knowledge and discourse. In S. Wetherell, & S. J. Taylor & Yates (Eds.), *Discourse theory and practice: A reader* (pp. 72-81). London, UK: Sage.

Halliday, M. A. K. (1978). *Language as social semiotic: The social interpretation of language and meaning*. London, UK: Edward Arnold.

Heidegger, M. (1977). *The question concerning technology, and other essays*. New York, NY: Harper & Row.

Hickman, L. A. (2006). Theoretical assumptions of the critical theory of technology. In T. J. Veak (Ed.), *Democratizing technology: Andrew Feenberg's critical theory of technology* (pp. 71-81). New York, NY: State University of New York Press.

Hodge, R. I. V., & Kress, G. R. (1993). *Language as ideology* (2nd ed.). London, UK: Routledge.

Hollingsworth, M. (2008). *Excellence in IT/ICT leadership*. Retrieved from http://people.uleth.ca/~m.hollingsworth/itl/excellence/itlexcellence.pdf

Hollingsworth, M., Mrazek, R., Steed, M., Spence, G., Percevault, J., Balding, P., et al. (2004). *Information technology leadership in education: An Alberta needs assessment*. Retrieved from http://www.uleth.ca/education/sites/education/files/ITL_needs_research.doc

Introna, L. D. (2007). Maintaining the reversibility of foldings: Making the ethics (politics) of information technology visible. *Ethics and Information Technology, 9*(1), 11-25.

Jantzie, G. N. (2002). New technologies and the struggle for the classroom: Investigating the attitudes of teachers and a teachers' professional organization toward the implementation of new communications and information technologies. (Unpublished doctoral thesis). University of Calgary, Calgary, AB.

Jessop, B. (2004). Critical semiotic analysis and cultural political economy. *Critical Discourse Studies, 1*(2), 159-174.

Kaufman, R., & Zahn, D. (1993). *Quality management plus: The continuous improvement of education*. Thousand Oaks, CA: Corwin Press.

Kellner, D. (2001). Feenberg's questioning technology. *Theory, Culture and Society, 18*(1), 155-162.

Kinscheloe, J. L., & McLaren, P. (2000). Rethinking critical theory and qualitative research. In N. K. Densizen & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (2nd ed., pp. 279-313). Thousand Oaks, CA: Sage.

Kompf, M. (2005). Information and communications technology (ICT) and the seduction of knowledge, teaching, and learning: What lies ahead for education. *Curriculum Inquiry, 35*(2), 213-233.

Kozma, R., & Shank, P. (1998). Connecting with the 21st century: Technology in support of educational reform. *Association for Supervision and Curriculum Development Yearbook, 1998,* 3-30.

Krahn, H., & Taylor, A. (2005). *Resilient teenagers: Explaining the high*

educational aspirations of visible-minority youth in Canada. Working paper (WP02-05). Edmonton, AB: Prairie Centre of Excellence for Research on Immigration and Integration.

Krings, B. (2006) The sociological perspective on the knowledge-based society: assumptions, facts and visions. *Enterprise and work innovation studies*, *2*(2), 9- 19.

Levin, B. (2001). Conceptualizing education reform. In *Reforming education: from origins to outcomes*, (pp. 19-34). London, UK: Routledge/Falmer.

Lisac, M. (1995). *The Klein revolution*. Edmonton, AB: NeWest Press.

Livingstone, D.W. (1997). The limits of human capital theory: expanding knowledge, informal learning and underemployment. *Policy Options*, July/August, 9-13.

Livingstone, D.W. (2004). *The education-jobs gap: Underemployment or economic democracy*. Toronto, ON: University of Toronto Press.

Marcuse, H. (1941). Some implications of modern technology. *Philosophy and Social Science, 9*, 414-439.

Marcuse, H. (1964). *One dimensional man*. Boston, MA: Abacus.

Marcuse, H. (1972). *Nature and Revolution*. In Counter-Revolution and Revolt. Boston, MA: Beacon Press.

Marcuse, H. (1977). The new forms of control. In A. H. Teich (Ed.), *Technology and man's future* (2nd ed.). New York, NY: St. Martin's Press.

Marx, K. (1906 reprint). *Capital,* (Engels, F, Ed.). New York, NY: Modern Library.

McEwen, N. (1995). Educational accountability in Alberta. *Canadian Journal of Education, 20*(1), 27-44.

McGinnis, S. (2009, March 8). “Alberta's high school graduation rate has stalled”. *Calgary Herald*.

Mehan, H. (1996). The construction of an LD student: A case study in the politics of representation. In M. Silverstein, & G. Urban (Eds.), *Natural histories of discours*e (pp. 253-276). Chicago, IL: University Of Chicago Press.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. London, UK: Sage.

Mitcham, C. (1994). *Thinking through technology: The path between engineering and philosophy*. Chicago, IL: University of Chicago Press.

Mitcham, C. (1995). Notes toward a philosophy of meta-technology. *Society for Philosophy and Technology, 1*(1-2). Retrieved from http://scholar.lib.vt.edu/ejournals/SPT/v1_n1n2/mitcham.html

Moll, M. (1997). *Tech high: Globalization and the future of Canadian education.* Ottawa, ON: Canadian Centre for Policy Alternatives/Fernwood

Morrow, A. R., & Torres, C.A. (2000). The state, globalization and education policy. In N. C. Burbules, & C. A. Torres (Eds.), *Globalization and education: Critical perspectives,* (pp. 27-56). London, UK: Routledge.

Moyle, K. (2010). Building innovation: learning with technologies. *Australian Education Review*, *56*(1).

Mumby, D. (1988). *Communication and power in organizations: Discourse, ideology, and domination*. Norwood, NJ: Ablex.

Mumby, D. (1997). The problem of hegemony: Rereading Gramsci for organizational communication studies. *Western Journal of Communication, 61*(4), 343-375.

Mumby, D., & Clair, R. P. (1997). Organizational discourse. In T. A. van Dijk (Ed.), *Discourse as structure and process: Discourse studies* (pp. 181-205). London, UK: Sage.

Mumby, D. (2004). Discourse, power and ideology: Unpacking the critical approach. In D. Grant, C. Hardy, C. Oswick & L. & Putnam (Eds.), *Sage handbook of organizational discourse* (pp. 237–258). London, UK: Sage.

Negroponte, N. (2007). *One laptop per child*. Retrieved from http://laptop.org/en/vision/index.shtml

Noble, D. F. (1995). *Progress without people: New technology, unemployment, and the message of resistance*. Toronto, ON: Between the Lines.

Nordkvelle, Y. T., & Olson, J.K. (2005). Visions for ICT, ethics and the practice of

Teachers. In *Education and Information Technologies* (pp. 12–17). Boston, MA: Springer.

Nussbaum, M. C. (2010). *Not for profit: why democracy needs the humanities*. Princeton, NJ: Princeton University Press.

Oppenheimer, T. (2003). *The flickering mind*. New York, NY: Random House.

Organization for Economic Co-operation and Development (OECD). (2007). The value of people. In Keeley, B. (Ed.) *Human Capital,* (Chapter 2). Retrieved from *www.oecd.org/insights/humancapital*

Ozga, J., & Lingard, B. (2007). Globalisation, education policy and politics. *The Routledge Falmer Reader in Education Policy and Politics,* 65-82.

Papanastasiou, E., Zembylas, M., & Charalambos, V. (2003). Can computer use hurt science achievement? The USA results from PISA, *Journal of Science and Technology, 12*(3).

Papert, S. (1980). *Mindstorms: Children, computers, and powerful ideas.* New York, NY: Basic Books.

Parsons, J. (2004). *Alberta initiative for school improvement (AISI) technology projects summary of findings from cycle one: 2000 - 2003.* Retrieved from http://education.alberta.ca/media/325809/What10.pdf

Pecheux, M., & Nagpal, H. (1982). *Language, semantics and ideology*. New York, NY: St. Martin's Press.

Peters, M. (2001). National education policy constructions of the 'knowledge economy': towards a critique. *Journal of Educational Enquiry*, *2*(1), 1–22.

Peters, M. A. (2006). Chapter 3: Towards philosophy of technology in education: Mapping the field. In J. Weiss, J. Nolan & J. Hunsinger (Eds.), *The international handbook of virtual learning environments* (pp. 95-116). Netherlands: Springer.

Pinch, T. J., & Bijker, W. E. (1984). The social construction of facts and artefacts: Or how the sociology of science and the sociology of technology might benefit each other. *Social Studies of Science, 14*(3), 399-441.

Ravitz, J., Mergendoller, J. and Rush, W. (2002), *What's school got to do with it? Cautionary tales about correlations between student computer use and academic achievement*. New Orleans, LA: AERA.

Redhead, P. (2001). *Investigating the total cost of technology in schools: Tools and strategies for managing technology investments.* Edmonton, AB: Alberta Learning.

Reisigl, M., & Wodak, R. (2000). *The semiotics of racism: Approaches in critical discourse analysis.* Vienna, AT: Passagen.

Reisigl, M., & Wodak, R. (2001). *Discourse and discrimination: Rhetorics of racism and antisemitism*. New York, NY: Routledge.

Robertson, H. J. (2003). Toward a theory of negativity: Teacher education and information and communications technology. *Journal of Teacher Education, 54*(4), 280-296.

Rogers, R. (2004). An introduction to critical discourse analysis in education. In *An introduction to critical discourse analysis in education* (pp. 1-18). London, UK: Lawrence Erlbaum.

Rogers, R., Malancharuvil-Berkes, E., Mosley, M., Hui, D., & Joseph, G. O. G. (2005). Critical discourse analysis in education: A review of the literature. *Review of Educational Research, 75*(3), 365-416.

Romaniuk, E. W. (1983). *The report of the minister's task force on computers' in schools*. Edmonton, AB: Alberta Education.

Sahlberg, P. (2009). Creativity and innovation through lifelong learning. *Journal of Lifelong Learning in Europe*. Retrieved from http://www.pasisahlberg.com/downloads/Creativity%20and%20innovation%20in%20LLL%202009.pdf

Schienstock G, & Hamalainen T. (2001). The transformation of the Finnish innovation system: A network approach. *Sitra Reports Series 7*. Helsinki, Finland: Hakapaino Oy.

Sclove, R. E. (1995). *Democracy and technology*. New York, NY: The Guilford Press.

Selwyn, N., Gorard, S., & Williams, S. (2001). The role of the 'technical fix' in UK lifelong education policy. *International Journal of Lifelong Education, 20*(4), 255-271.

Smith, D. (2006). Not rocket science: on the limits of conservative pedagogy. In *Trying to teach in a season of great untruth: Globalization, empire, and*

the crises of pedagogy. (15-34). Rotterdam, NL: Sense.

Somekh, B. (2000). New technology and learning: Policy and practice in the UK, 1980–2010. *Education and Information Technologies, 5*(1), 19-37.

Stack, M. (2006). Testing, Testing, Read All about It: Canadian Press Coverage of the PISA Results. *Canadian Journal of Education*, *29*(1), 49-69.

Steger, M. (2005). *Globalism: Market ideology meets terrorism.* Lanham, MD: Rowman and Littlefield.

Stubbs, M. (1996). *Text and corpus analysis*. Boston, MA: Blackwell Publishers.

Stubbs, M. (1997). Whorf's children: Critical comments on critical discourse analysis (CDA). *British studies in applied linguistics,* 12, 100-116.

Sullivan, B.M. (1988). A legacy for learners: Report of the Royal commission on education. Victoria, BC: The Commission.

Taylor, A. (2001). *The politics of educational reform in Alberta*. Toronto, ON: University of Toronto Press.

Taylor, A., & Neu, D. (2000). Funding mechanisms, cost drivers and the distribution of education funds in Alberta: A case study. *Alberta Journal of Educational Research.* Retrieved from http://ajer.synergiesprairies.ca/ajer/index.php/ajer/article/view/213/205

Taylor, A., & Wishart Leard, D. & Shultz, L. (2005). A new regime of accountability for Alberta's public schools. In T. Harrison (Ed.), *The return of the Trojan horse* (pp. 236-253). Toronto, ON: Black Rose.

Taylor, S. (1997). *Educational policy and the politics of change*. Oxon, UK: Routledge.

United Nations Educational, Scientific and Cultural Organization (UNESCO) (2007). *ICT in education.* Retrieved from http://www.unescobkk.org/index.php?id=500

van Dijk, T. A. (1984). *Prejudice in discourse: An analysis of ethnic prejudice in cognition and conversation*. Amsterdam, NL: J. Benjamins.

van Dijk, T. A. (1991). *Racism and the press*. London, UK: Taylor & Francis.

van Dijk, T. A. (1993). Principles of critical discourse analysis. *Discourse and Society, 4*(2), 249-283.

Van Tighem, V. G. (1983). *CASS: A historical overview*. Edmonton, AB: College of Alberta School Superintendents. Retrieved from http://www.cass.ab.ca/cass_handbook

Watson, D. (2001). Pedagogy before technology: Re-thinking the relationship between ICT and teaching. *Education and Information Technologies, 6*(4), 251-266.

Watson, D. (2006). Understanding the relationship between ICT and education means exploring innovation and change. *Education and Information Technologies*, *11*(3–4), 199-216.

Weber, M. (1958). *The protestant ethic and the spirit of capitalism* (T. Parsons Trans.). New York, NY: Scribners.

Wenglinsky, H. (1998). *Does it compute? The relationship between educational technology and student achievement in mathematics*. Princeton, NJ: ETS Policy Information Center – Research Division.

Widdowson, H. G. (1995). Book review: Discourse and social change. *Applied Linguistics, 16*(4), 510-516.

Winner, L. (1986). *The whale and the reactor: A search for limits in an age of high technology*. Chicago, IL: University of Chicago Press.

Wittgenstein, L. (1953). *Philosophical investigations, trans*. Oxford, UK: Blackwell.

Wodak, R. (1989). *Language, power and ideology: Studies in political discourse*. Amsterdam, NL: John Benjamins.

Wodak, R. (1996). The genesis of racist discourse in Austria since 1989. *Texts and Practices: Readings in Critical Discourse Analysis,* 107-128.

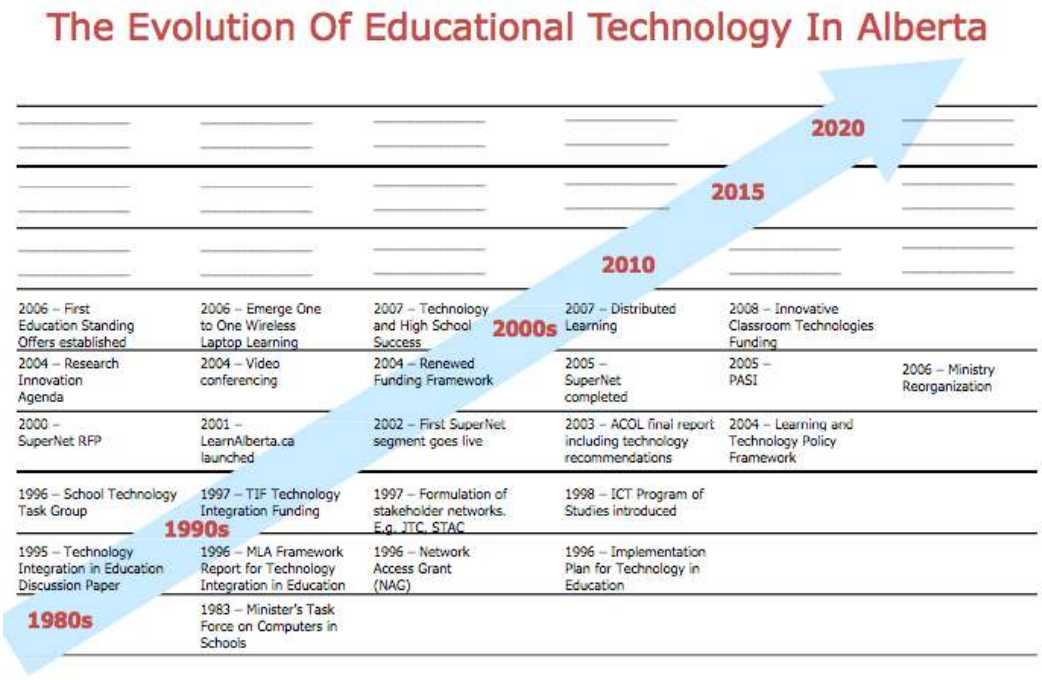
Wodak, R. (2007). Pragmatics and critical discourse analysis; a cross disciplinary inquiry. *Pragmatics and Cognition, 15*(1), 203-225.

Woodside-Jiron, H. (2004). Language, power, and participation: Using critical discourse analysis to make sense of public policy. In R. Rogers (Ed.), *An introduction to critical discourse analysis in education* (pp. 173-206). London, UK: Lawrence Erlbaum.

Yabsley, D. E. (2004). A comparison of educational reform in the provinces of Newfoundland and Labrador and Alberta: A document analysis of the North American economic business model and its effect on education reform in Newfoundland and Labrador and Alberta. (Unpublished masters thesis). Memorial University, Newfoundland.

Yeatman, A. (1990). *Bureaucrats, technocrats, femocrats: Essays on the contemporary Australian sta*te. Sydney, AU: Allen & Unwin.

APPENDIX A: THE EVOLUTION OF EDUCATIONAL TECHNOLOGY IN ALBERTA, ALBERTA EDUCATION



Alberta Education. (2009). *The evolution of educational technology in Alberta*. Edmonton: Alberta Education.

APPENDIX B: TECHNOLOGY AND EDUCATION, ALBERTA TEACHERS' ASSOCIATION – PRIMARY DOCUMENT

Technology and Education
[1999, revised 2004, 2007]
Technology and Educational Change

New information and communications technologies have the potential to transform education in profound and largely unforeseen ways. It is vital that the teaching profession participate in the process of shaping educational policy and practice in this area.

Skill sets of today's multi-literate students in the area of technology cannot be ignored. Technology offers teachers a new range of opportunities to enhance the learning environment of students; however, rapid change makes it difficult to establish which pedagogical strategies are most effective. This is compounded by the fact that there are few longitudinal studies regarding technology implementation with significant sample sizes for comparison purposes, especially at the elementary and middle levels.

Just as educators adapt emerging technologies to enhance student learning, new technologies come forward. Compounding the complexity is that emerging technologies can influence almost everything from infrastructure to classroom teaching, and educational policy almost always lags behind the implementation of technology. Since teachers are most aware of the complex circumstances in which implementation of a technology occurs, they have a unique and essential perspective that must be considered in the public discussion in terms of the place and purposes of technology in schooling. Teachers are in the best position to determine the value of an emerging technology in terms of its potential for the enhancement of teaching and learning.

In addition, teachers are committed to a vision of public education that must be vigorously defended at a time when the trend toward privatization and corporate interest in the "education industry" can exert a powerful influence on the way that technology affects educational change.

There is an increasing tendency in public life to see the world and ourselves solely in economic terms. Education is no exception. From such a perspective, technology is advocated as a necessary lever of change that will adapt education to the needs of globalization, restructuring and the marketplace. In responding uncritically to the imperatives of the Information Age, this view emphasizes the need to bring schools more into step with the world of work, so that students will possess the skills to survive in a changing marketplace and be prepared to meet the needs of employers.

The profession is concerned that this focus on preparing children in K–12 education for the world of work has begun to distract us from the broader goals of education, causing us to lose sight of the social and developmental needs of children.

The teaching profession is committed to a more balanced vision of public education—one founded on the principles of universality and equity, the fostering of the potential of individuals and the development of citizens in a democratic community. It is within this context that the Association sees potential for the new technologies to enhance the humanistic, engaged enterprise of public education and to provide a sense of connectedness with community and civil society. The Association believes that integration of emerging technologies should be supported in a way that respects these ongoing values and traditions of public education.

Technology, Teaching and Learning

Distributed learning, which is defined as "an instructional model that allows instructor, student, and content to be located in different, noncentralized locations so that instruction and learning occur independent of time and place (Saltzberg & Polyson, 1995)" is on the rise. Distributed learning can augment traditional classroom lessons, replace traditional correspondence courses, and create virtual classrooms through the use of video-conferencing and online tools. It has the capacity to extend and expand the educational experience for students and further enhance technology literacy. Distributed learning can be blended with the traditional classroom environment to combine traditional teaching methodologies with online activities to produce rich learning opportunities. To authentically enhance the learning, teachers must ensure that the use of technology is rooted in the curriculum and the needs of the learner.

As professionals, teachers use their knowledge and experience to analyze the classroom context as they make decisions about the teaching strategies, learning experiences and assessment practices that are best suited to the needs, interests and motivation of the students. It is not technology itself but the professional decisions that teachers make about technology and its use in the classroom that will determine its impact on student learning.

The essence of teaching is a personal pedagogical relationship between teacher and student that may be assisted but not replaced by technology. It is evident when teachers are able to seize the teachable moment, to communicate their passion for learning and to spark the student's imagination. Technology must be used in ways that are compatible with this understanding of the nature of teaching and learning.

Teachers are required to be flexible, responsive, innovative and creative in working with students. Technology must support, not constrain, these aspects of the teaching process. In all learning situations, emphasis must be placed on the pupil–teacher relationship, since the most advanced technologies will never replace the need for human interaction in the development and construction of

knowledge. Teachers should embrace technological innovations based upon their potential to expand and extend the educational experiences of students and for their potential to help students meet the needs of the knowledge society. Although teachers may be personally committed to this pedagogical interpretation of how technology should be used, it would be a mistake to assume that teachers can be fully in control of its influence in our classrooms. Teachers must use critical judgment when determining how technology should be integrated into the curricular and pedagogical dimensions of their teaching practice. Teachers must be vigilant in ensuring that technology is used to enhance, not displace, the human dimension and purposes of education.

Technology in the Learning Environment

The teaching profession needs to proceed carefully and responsibly in integrating technology into the learning environment. Teachers should use technology for its unique attributes and not in ways that replicate what face to face teaching can do as well or better.

Information and communications technology can, for example, expose students to real world problems and place learning in a relevant context. It can enable students to visualize scientific data in concrete form. Students can safely and easily manipulate variables in complex experiments and observe the results. The new technologies also make it possible for students to represent and communicate their knowledge using multimedia. Many students can edit their work more effectively and are able to produce professional-looking assignments.

Distributed learning may include assessment tools, such as quizzes and self-assessment, and facilitate assignment submission and return. Online learning environments may also include collaborative and communication tools that expand learning opportunities, enable interaction with outside agencies, and facilitate virtual field trips.

Students with special needs, in particular, stand to benefit from opportunities for drill and practice, because the trial-and-error process is less threatening when done through interaction with the computer. Individuals with learning difficulties can be assisted by distributed learning activities which suit their learning needs. It is important that special education teachers are able to understand the potential of assistive technologies to facilitate learners with disabilities. It is important that assistive technologies be reviewed by teachers and that special education teachers be supported in the development of resources.

The use of computers and other technologies often increases students' motivation and confidence. Personalization and individualization are seen as strengths of distributed learning, leading to higher student motivation. The capacity to support individualized learning in a classroom or school can be enhanced with technology in the appropriate circumstances. Distributed learning offers new forms of choice for students. Distributed learning addresses some small and rural school issues as well by expanding educational options and providing greater access to courses for some learners.

Interaction between student and teacher is the key variable to success in the effective use of technology in learning environments. Face-to-face communication improves the likelihood of a successful educational experience for the student.

Younger learners may be less successful in distributed learning environments because they lack the ability to work autonomously in a learning system that requires more independence. Teachers need to be aware of supervision requirements, especially with younger students, to facilitate learning. Although technology based learning activities can augment and enrich the learning environment, face-to-face instruction is preferable as the primary mode of instruction, especially in younger grades. In the formative years, foundational skills such as literacy and numeracy need to be developed, and it should be left to the professional judgment of the early childhood teacher to determine when and how technology should be introduced.

Learning environments and activities need to be aligned with constructivist theories, and should be age specific. These theories suggest that children may lack the rich experiences needed to construct knowledge of the world around them and distributed learning activities will need to be tailored to provide slowly increasing levels of independence. These must be developmentally appropriate and respect differentiation of students.

The full potential of technology integration and distributed learning is not being realized in K-12, but ongoing assessment by teachers of programs, courses and activities will add to the knowledge level and help move distributed learning in a positive direction for increased student learning. Based on diagnosis, teachers can make decisions regarding combining content and tools which can complement aspects of traditional face-to-face instruction. Teachers can mix online or video-conferencing with face-to-face and other modes of instruction in ways to benefit and maximize student learning.

By contrast, software that merely provides an online workbook is perhaps the most ineffective and costly use of the technology. As a research tool, the Internet not only offers students access to vast new material but also raises important concerns. Unlike text based resources, this material is not refereed or censored, creating a tension between free speech and offensive content. As a result, teachers will need to focus more than ever on the exercise of critical judgment and address the need for media awareness.

Students must know how to respond to aggressive advertising, racist and offensive content, cyberbullying, and to strangers they may meet on the Internet. Cyberbullying on the Internet is a growing concern for the safety of students in and out of the school. Many students experience the threats and humiliation that is associated with cyberbullying or cybersmearing, and there is an increased need for school divisions to develop policies to deal with this issue. In addition, teachers must advise students on how to become discerning with respect to digital communication, and how to respond appropriately when they are targeted by

inappropriate online activity. All students using the Internet must be supervised by a teacher, and younger students should only use the intranet or sites on the Internet that a teacher has previewed. These concerns aside, it may well be that, of all the technological applications, the Internet offers the most potential for unique and novel enhancements to good pedagogical practices.

Greater access to information does not equate with knowledge, but when teachers have thoughtfully constructed a purposeful and appropriate learning experience for and with students in which the Internet plays an indispensable part, it can be a valuable addition to the total repertoire of teaching practice.

Resources

While teachers normally use their professional judgment in selecting resources, they now face new and special problems concerning the quality and suitability of technology based resources. Schools are currently being bombarded with sophisticated sales promotions for material of questionable merit. Since the development and marketing of technology based educational resources is expensive and because there are a limited number of publishers for this material, there is a danger that unsuitable materials will be used in classrooms.

When technology-based resources are evaluated for authorized use in the Alberta curriculum, they must be vetted for Canadian content and adherence to the principles of tolerance and understanding by the Department of Education. A government supported centralized clearinghouse could ensure that these resources meet the same standards as other authorized learning resources and teachers would be able to make their selection from a list of screened resources, saving time and money at the school level.

Funding for the True Cost of Ownership

The initial expenditure on technology infrastructure is only the tip of the iceberg when all the other associated costs are considered. Schools must budget to include the costs of acquisition, maintenance, upgrading and replacement of technology for schools. As well, the costs of software, licencing agreements, network infrastructure, Internet access, technical support and personnel, and professional development must be ongoing.

Keeping up with changing technology is almost an impossible task for schools with limited funding. To support the technology budget, some schools may reduce funding or cut staff in other programs. The long term effects of these decisions will result in a narrowed curriculum and diminished educational experiences for students unless there is an increase in funding for education.

Introducing distributed learning initiatives with the expectation of reducing costs to the district or school is inappropriate. When working in distributed learning environments, enhancing and improving student learning must be the primary objective. In order to establish environments conducive to providing quality learning experiences for students, teachers must be provided with adequate time and resources, and teachers must be assigned reasonable work.

In the context of present funding levels and with the increased cost of technology, teachers must be judicious in identifying the most appropriate uses for technology.

Professional Development

Effective technology integration requires three major components: training for professional staff, timely technical support and access to hardware and software. Underutilization or poor utilization of existing technology in schools inevitably results from inadequate attention to professional development. The positive effects of computer based technologies in facilitating student learning and performance will be seen only when teachers have the knowledge and skill to use it appropriately.

Teaching methodologies in distributed learning are significantly different from traditional teaching and teachers require substantial professional development to be effective in online environments. Access to professional development and ongoing support is required and must be in place. Also, to be effective, professional development must reflect the context of classroom teaching and curriculum rather than be restricted to skills training.

Teachers require significant professional development to adjust to the pedagogical needs of teaching in distributed learning environments. However, distributed learning also has the potential to provide new and flexible professional development opportunities for teachers.

Engaging in reflection and dialogue about the relevance of learning activities in distributed learning environments will be paramount to professional growth. Time must be allotted to enable teachers to become familiar with available software, design lessons and discuss technology use with other professionals.

Distributed Learning

The Association believes that distributed learning can augment and enrich traditional delivery methods and has the potential to extend learning opportunities for Alberta students. Teachers recognize that distributed learning can address the learning needs of some students and it provides opportunities for collaborative work spaces that are highly engaging.

Distributed learning has the potential to shift the emphasis towards greater learner-centered pedagogy and highly personalized learning. This can only be achieved if proper monitoring and supervision of students is in place and if work loads for distributive teachers are realistic and are driven by educational goals rather than financial targets.

Teachers at remote sites cannot be responsible for protecting the safety of students in a distant classroom and adequate supervision of students must be provided for by caring and responsible educators at all times. Implementation of distributed learning environments requires proper monitoring and supervision of students in the school.

Decisions of whether distributed learning programs are appropriate must be based on the professional knowledge of teachers within the context of that learning environment and informed by educational research.

Visionary leadership is needed to encourage flexible learning environments that will provide opportunities for distributed educational programs that are relevant to students becoming responsible caring citizens in a democratic society while at the same time safeguarding the learning environment.

Necessary Conditions

The appropriate integration of technology cannot be achieved simply by decree and the provision of hardware in schools.

The following conditions are necessary to ensure that technology serves to enhance the goals of education and schooling:

A vision of the role of technology in public education based on humanistic and democratic principles

proactive leadership to achieve the vision

Commitment to the central importance of the teacher's professional judgment in decisions about the use of technology

Identification of appropriate curriculum linkages

Access to technological resources that are specific to learner needs

Access to technology hardware, software and telecommunication networks

Timely access to technical support

Time for teachers to learn about technology and to develop technology supported curriculum

Public funding that addresses the total cost of ownership for technology

School organization and culture that supports effective teaching and learning

Policies at the system and school level that support the appropriate integration of technology

Acceptance of the teacher as final arbiter in the use and application of technology

Conclusion

The Association believes that the integration of technology in our schools should occur in a way that enhances the potential for engaged, pedagogical relationships as the secure foundation of children's education.

Technological trends will emerge and some will have immediate educational relevance or impact. The relevance of other technologies in terms of their potential for improving the learning and teaching process will be marginal or non existent. Teachers should ask questions in regard to teaching and learning outcomes, available content, cost-effectiveness, leadership and vision, student acceptance, parental support, risk, professional development, applicability, and sustainability. The Association believes that developing and implementing digital age educational activities has the potential to revitalize schools and engage stakeholders in new ways that will require educators to be thoughtful and reflective in an ongoing and embedded way.

In order for the integration of technology to be effective, it must serve curricular objectives and be consistent with a vision of public education that is committed to humanistic and democratic principles and to the development of students both as individuals and as citizens. In pursuit of this vision, teachers must assert their professionalism and ensure that, in the great rush to implement change, technology does not become an end rather than a means.

This is especially important since the necessary conditions of adequate funding, equal access for schools and children, and appropriate investment of time, resources and support for professional development are not yet in place. The Association encourages the government, school districts, schools and teachers to communicate about these realities and to find solutions that will benefit students and public education.

APPENDIX C: ANALYSIS - TECHNOLOGY AND EDUCATION, ALBERTA TEACHERS' ASSOCIATION

Technology and Education, revised twice since 1999, is a foundational policy statement for the ATA (Alberta Teachers' Association, 1999). The summary table indicates the assumptions identified in the document led to the emergence of three prominent discourses: 1) change, complexity and uncertainty, 2) the new KBE, and 3) the pedagogical relationship and the common good. Following the table, I note the relationship between key assumptions, patterns and textual features that contribute to three prominent discourses demonstrating a close association with both substantivist and critical theory philosophical positions.

Prominent Discourses	**Existential**	**Propositional**	**Value**
Change, complexity and uncertainty	Skill sets of today's multi-literate students in the area of technology cannot be ignored. (8)	New information and communications technologies have the potential to transform education in profound and largely unforeseen ways. (5)	Since teachers are most aware of the complex circumstances in which implementation of a technology occurs, they have a unique and essential perspective that must be considered in the public discussion in terms of the place and purposes of technology in schooling. (17)
	Technology offers teachers a new range of opportunities to enhance the learning environment of students; however, rapid change makes it difficult to establish which pedagogical strategies are most effective. (9)	emerging technologies can influence almost everything (15)	

	the fact that there are few longitudinal studies regarding technology implementation with significant sample sizes for comparison purposes, especially at the elementary and middle levels. (11)	educational policy almost always lags behind the implementation of technology. (17)	
	Teachers are in the best position to determine the value of an emerging technology (21)	teachers must assert their professionalism and ensure that, in the great rush to implement change, technology does not become an end rather than a means. (271)	
	the necessary conditions of adequate funding, equal access for schools and children, and appropriate investment of time, resources and support for professional development are not yet in place. (274)		
	It is not technology itself but the professional decisions that teachers make about technology and its use in the classroom that will determine its impact on student learning. (60)		
The knowledge-based economy	From such a perspective, technology is advocated as a necessary lever of change that will adapt education to the needs of globalization, restructuring and the marketplace. (28)	trend toward privatization and corporate interest in the "education industry" can exert a powerful influence on the way that technology affects educational change. (24)	In responding uncritically to the imperatives of the Information Age, this view emphasizes the need to bring schools more into step with the world of work, so that students will possess the skills to survive in a changing marketplace and be prepared to meet the needs of employers. (30)
	this focus on preparing children in K–12 education for the world of work (34)	increasing tendency in public life to see the world and ourselves solely in economic terms (27)	Teachers should embrace technological innovations based upon their potential to expand and extend the educational experiences of students and for their potential to help students meet the needs of the knowledge society. (72)

		has begun to distract us from the broader goals of education, causing us to lose sight of the social and developmental needs of children. (35)	
The pedagogical relationship and the common good	In order for the integration of technology to be effective, it must serve curricular objectives and be consistent with a vision of public education that is committed to humanistic and democratic principles and to the development of students both as individuals and as citizens. (268)	The Association sees potential for the new technologies to enhance the humanistic, engaged enterprise of public education and to provide a sense of connectedness with community and civil society. (40)	Teaching profession is committed to a more balanced vision of public education—one founded on the principles of universality and equity, the fostering of the potential of individuals and the development of citizens in a democratic community. (37)
	The essence of teaching is a personal pedagogical relationship between teacher and student that may be assisted but not replaced by technology. (63)	The Association believes that developing and implementing digital age educational activities has the potential to revitalize schools and engage stakeholders in new ways that will require educators to be thoughtful and reflective in an ongoing and embedded way. (264)	Teachers must be vigilant in ensuring that technology is used to enhance, not displace, the human dimension and purposes of education. (80)
	Face-to-face communication improves the likelihood of a successful educational experience for the student. (115)	The Association believes that the integration of technology in our schools should occur in a way that enhances the potential for engaged, pedagogical relationships as the secure foundation of children's education. (256)	
		The Association believes that integration of emerging technologies should be supported in a way that respects these ongoing values and traditions of public education. (42)	
		Internet offers the most potential for potential for	

		unique and novel enhancements to good pedagogical practices (154)	
		Technological trends will emerge and some will have immediate educational relevance or impact. The relevance of other technologies in terms of their potential for improving the learning and teaching process will be marginal or non existent. (259)	
		Teachers should ask questions (261)	

APPENDIX D: CHANGING LANDSCAPES OF THE NEXT ALBERTA, ALBERTA TEACHERS' ASSOCIATION – SECONDARY DOCUMENT

Changing landscapes of the next Alberta: Shaping a preferred future 2008 -2028
As we move further into the province's second century, Albertans find themselves blazing a trail into the unknown – with unprecedented opportunities and challenges. The Alberta Teachers' Association (ATA) invites you to be part of the exploration that awaits Alberta's next generation as our province defines its place in the world.
As the voice of the province's teaching profession, the ATA developed Changing Landscapes of the Next Alberta as part of its long-term commitment to engage Albertans in a conversation about our shared future.
This document was prepared with the input of the Association's research staff, its Strategic Planning Group and numerous external experts representing a cross-section of forward-thinking Albertans and organizations.
The Alberta and Albertans we want to become
A cornerstone of the Alberta we want to create is a strong public education system that develops the full potential of all children to learn, to care about one another and to contribute to the collective prosperity of Albertans in an inclusive and democratic society.
– Preamble to the ATA's Preferred Futures
The objective of the ATA is to see public education play a significant role in contributing to our shared future, urging further conversations around Changing Landscapes of the Next Alberta. In coming to know the perspectives of some of the leading experts who have been part of exploring Alberta's next twenty years, you are also encouraged to participate in this significant conversation.
A vision shared
The staggering truth is, almost everything that we've accomplished in the 20th century can be attributed to our public education system.
– Lois Hole, former Lieutenant-Governor of Alberta
Crossing over Alberta's 21st century divide
Between 2004-2007, the Alberta Teachers' Association and the Creating Tomorrow Foundation engaged forward-thinking Albertans in three symposia with the common thread: Being Alberta in 2025. Participants were challenged with the provocative question,"What kind of Albertans do we want to become?" Conversations surrounding the imagined ideal of the Alberta in 2025, along with the cultural project of asking ourselves, "What did we do to get there?" quickly shifted into an existential and personal question: "What kind of Albertans did we

become?" The Association carried forward the dialogue into its environmental scanning work and asked itself two questions: "In advancing public education, what kind of teachers do we want to become?" and "What kind of ATA do we need to be to support this work?"

Creating new narratives

The future is not some place we are going to, but one we are creating. The paths are not to be found, but made, and the activity of making them changes both the maker and the destinations.
– John Scharr

In this spirit, the symposia brought together some of the world's leading thinkers to examine the prospects for Alberta and the kind of Albertans we want to become.

1. Learning the 21st Century: Seeing, Thinking and Living Our Future
September 8–9, 2004
• Thomas Homer-Dixon, Director of the
Pierre Elliot Trudeau Centre for Peace

2. Finding Common Ground: Becoming the Alberta We Want April 5-6, 2006
• Michael Adams, President, Environics Research
• Maureen O'Hara, Past-President of the Saybrook School and Research Center
• Pasi Sahlberg, Senior Education Specialist with the World Bank.

3. Beyond the Illusion of Certainty
March 15-16, 2007
• David Peat, Director, Pari Institute
• Justin Trudeau, community advocate and commentator

Their contributions to our conversations are outlined in the following four common-places:

- Individuals, relationships and community
- Work and the economy
- Governance and politics
- Emerging technologies

We are all laying our paths down walking.
– Humberto Maturana

Individuals, relationships and community

Who might Albertans become?

In the midst of Alberta's tremendous growth and resource bubble economy, what will the next twenty years hold for human relationships, identity and community? By 2050, our planet's population will increase by three billion, with three-quarters living in industrialized societies like our own. If the entire world lived as Albertans do today, we would need three planets – by 2050 we will need six. Pollster Michael Adams states that the cultural and psychological differences between Americans and Canadians will have significant implications in the

evolution of the two societies' next generation. In his view, Albertans have, through a vigorous public education system, an incredible opportunity to create a society that fosters diversity and inclusion rather than one that increasingly appears to value privilege.

Emerging technologies and the changing nature of work have both positive and negative impacts on our lives. Albertans work more hours per week than any other Canadians, resulting in reduced time for family and civic life, political engagement and volunteerism. While multi-tasking and virtual networking are common-place in youth culture, the resulting collateral impacts of a sedentary lifestyle cannot be ignored, as demonstrated in the growing concern surrounding declining health and well-being of youth. Contributing to these complex challenges is urban sprawl and the growth of suburbs in our major centres.

Some rough terrain in our current psychic landscape

None of us are born into the same world that we are invited to live out our lives in.

Clinical psychologist Maureen O'Hara expresses concern that Albertans' individual and collective responses to change might take the form of denial and institutional inertia. She notes that, according to the World Health Organization, depression will be second only to heart disease as a source of illness in the world. Ironically in the midst of our booming economy, Alberta has Canada's highest rate of adult depression, at five per cent. It is estimated that 44,400 school-aged children in the province received doctor's care in 2007 for mental health issues, with half the cases of depression beginning by 14 years of age. Fifteen per cent of Alberta children and youth have been diagnosed with a mental disorder.

In O'Hara's view, Albertans are caught at an individual and collective level between two responses to future prospects as a province: psychosis (striking out at others and the outside world) or neurosis (shoring up old defence mechanisms that focus only on the individual's internal psychic life).

The importance of "gentle actions"

David Peat, world-renowned expert on chaos theory and author of over 20 books (including Blackfoot Physics: A Journey into the Native American Universe), describes how chaos theory illustrates the power of minor differences in complex systems. Complex organic systems like modern society can be influenced in positive ways by, what he calls, small but powerfully disruptive "gentle actions" – like a stone tossed into a calm pool of water. Pointing to examples such as Rosa Parks (who stood up against segregated busing in Alabama) and Nelson Mandela (who fought apartheid in South Africa), Peat emphasizes that complexity science teaches each of us to take "responsibility for uncertainty" and to accept the moral imperative that small life choices do, in fact, make a big difference.

Living in a world that, at times, seems ambivalent and hopeless, educators are called upon to put their expectations in "creative suspension." Peat suggests that, rather than dreaming up large social action projects for students to change the world, it would be better to focus on "small but powerful positive disturbances,"

such as an assignment to get someone to smile on a city bus, or an examination of the environmental impact of drinking bottled water.

Work and the economy

The promises of volatility, uncertainty, complexity and ambiguity

As with other endeavours, teaching and learning in Alberta will continue to experience the pressures of a volatile global economy. It is projected that by 2010 the top ten in-demand jobs will not have existed in 2004. An individual's identity wrapped solely around a life-long career is a thing of the past.

Pasi Sahlberg, a former consultant with the World Bank, points to the experiences of the Finnish forestry company Nokia during the global recession of the late 1980s and a decline in commodity prices, where it was discovered that chainsaws aren't as powerful or profitable as innovative ideas. The decline in pulp and lumber prices nearly led to the collapse of the company, but, within ten short years, Nokia was able to reinvent itself and became a leader in communication technologies.

The next Alberta – an opportunity we cannot lose

Sahlberg describes the paradox facing Albertans in the diagram below. An important consideration of Sahlberg's view is that "economic competitiveness" needs to be defined broadly, and must include the contributions of members of society and civic engagement. While business and community leaders call for economic competitiveness, creativity and ingenuity (left side of the triangle), governments (including Alberta) have pushed an educational policy emphasizing standardization and narrowly defined outcomes (right side of the triangle) while focusing on results that can be easily measured through large-scale testing programs. The following diagram illustrates the predictable result: a contradiction between what is measured and what is valued in the system.

Intended Change

Fostering a culture of ingenuity

Thomas Homer-Dixon suggests that ingenuity is closer to a tangible product than we might imagine, and provides examples in ways the mind can be used for the cultivation of ingenuity. He emphasizes the need for both boundary-crossers (individuals who cannot be confined to a single discipline or line of thinking) and divergent and inventive thinkers (individuals who will challenge conventional thinking in a discipline or system, and compels us to look at new possibilities). Homer-Dixon reminds us that lifelong learning must become more than a catchphrase. Curriculum needs to be shaped by the awareness of global events and their connection to local circumstances. Education is required in developing the ability and creativity to deal with catastrophic breakdown of key systems. Front-loading ingenuity within Alberta schools means a search for increased resilience in ourselves and in our institutions.

In the Alberta of 2025 we need to create a network of innovation and innovators who will offer improved access to education and health care. Alongside these networks we will need the physical and social conditions that will make the next

Alberta possible: a rail link from Edmonton to Calgary that costs $50 for the 30-minute trip; an Alberta where all Aboriginal land claims have been settled and where homelessness is a thing of the past and seniors are cared for at no cost. We have the resources to accomplish these goals. Only our lack of vision will stop us.

– Stephen Murgatroyd, Chief Scout, Innovation Expedition.

Governance and politics

Certainty is the rabbit hole of the anxious

Justin Trudeau invites Albertans to reflect on the image of the earth as the size of a basketball. The thin layer around the ball that sustains life is equivalent to the thickness of a layer of plastic wrap. The analogy reminds us of not only humanity's vulnerabilities, but also our possibilities. We are so tightly interconnected and therefore it is possible for us to make a difference. Volunteerism and service learning are reminders of how society is built on unconscious day-to-day relationships of trust. Daily, we thrive on trust in ways we are unaware of, such as driving on the freeway or eating food produced by those we do not know. In Trudeau's view, volunteering and contributing to the community disrupts the media message being conveyed to young people that the world is dominated by mistrust and avarice. Popular media all too often fuels the message that we cannot trust each other or the world.

Agency does matter

Resistance is needed to prevent withdrawal into the insularity of solitary lives focused on consumption and materialism. Happiness does not come from improved efficiency and increased consumption. Nor does it come from paralysis and ambivalence. It is important to recover the truth that human beings thrive when they reach out to each other.

Access to information cannot be simply equated to personal and/or political agency. For example, 43 per cent of girls and 28 per cent of boys in Grades 3 and 4 report being frightened by newscasts, feeling their personal safety is at risk. Although young people become less afraid as they grow older, they are also less likely to report that they can make a difference in the world.

Leadership is perhaps our greatest technology

We live in an extraordinary time in this province yet we are continually challenged by a preoccupation with reductive thinking. We need leaders who are centrifugal not centripetal thinkers. Centrifugal thinkers can be recognized by their rejection of boosterism, comparisons, ranking and ordering. They are leaders who display a deep kindness. They are the sorts of leaders we need for a province like ours: three million people on the edge of the world. Without leaders who find creative ways to link public policy needs with private business, the arts and education, community will not be possible. At the end of the day, Albertans must recognize that learning and innovation are the most important qualities for building the kind of Alberta we want.

– Colin Jackson, President, EPCOR Centre for the

Performing Arts, Calgary

Emerging technologies

The accelerated returns of technology

Technology amplifies both the negative and positive consequences of our decisions in the midst of globalization. Seamless access to technologies and the emergence of multi-literacies is shifting our understanding of learning and culture while challenging assumptions about what it means to be a learner. With the onset of the semantic web and information capacity doubling every 18 months (Moore's Law), education cannot compete with the Internet as a form of content production. Neither can conventional forms of assessing student progress, such as standardized texts, help to foster creativity and critical thinking.

Ultimately, Alberta schools must become a place of relationships.

– Ken Chapman, Cambridge Strategies

The brittleness of our complicated systems

For Thomas Homer-Dixon, the challenges we face as humanity call for the timely and successful applications of technology through ingenuity – a race that we may not win. He documents examples such as climate change and terrorism and suggests that, first and foremost, we should stop habitual behaviours including our oil dependency and centralized decision making in our institutions. For example, the concentration of computing power and business intelligence in single locations creates a node that could destroy a system or network. The 2008 melt-down of world financial systems points to the challenges we face. Given some of the vulnerabilities Albertans face, such as water shortages, energy sustainability and terrorism, diffuse systems with layers of back-up are required. The reliance on brittle systems needs to end, so that one natural disaster or moderately successful terrorist attack cannot bring down entire systems such as provincial power grids or national financial institutions.

Ingenuity Gap

Ingenuity as learning

Thomas Homer-Dixon outlines his assessment of the intersection between new technologies and our capacity to capitalize on the change they will bring to Alberta. It is imperative to recognize that complex and interdisciplinary approaches to learning are essential. Attempts at curriculum standardization and narrowly defined notions of rigour and educational accountability will create students who lack the conceptual understanding and problem-solving skills necessary for dealing with uncertainty.

Education is needed that develops the ability to deal with catastrophic breakdown. Front-loading ingenuity within Alberta schools means a search for increased resilience in ourselves and in our institutions. Creativity is the basis for resiliency and is needed in preparation for the breakdown of increasingly brittle social and political systems.

TREND 1

Primary resource dependence Alberta's wealth continues to depend on primary resources and commodities in spite of the growth in many new enterprises and the decades-old emphasis placed on economic diversification. What are the implications of this dependence for public education and its goals in Alberta's future?

Individuals, relationships and community

The poverty of plenty paradox

● Calgary will produce 220,000 new jobs in the next ten years.

● Albertans are the oil-richest people on the planet with 51,900 barrels per person in proven reserves; yet, currently one out of 12 Alberta children live in poverty.

Work and the economy

Energy superpower or satellite?

Alberta gets AAA's credit rating based on diversified economy.

Allan Gregg, The Walrus, September 2006

● By 2030, Canada will produce five million barrels per day making it the world's largest oil producer.

● Canada currently represents less than 1% of world trade while the "BRIC" economies expand (Brazil, Russia, India, and China).

Energetic cities

Governance and politics

Commodities and surpluses

Soaring prices and windfall revenues lead to $12B surplus.

Calgary Herald, June 13, 2008

Emerging technologies

● By 2035, Alberta's population will grow to 4.6 million and booming cities will struggle to avoid social fragmentation.

● Fort McMurray will reach 250,000 people within 20 years.

● Many rural centres depopulating.

A burning truth – the new reality of peak oil

● Projections of $200/barrel oil will make $1.30 per litre at the pumps seem like a bargain as we scramble to get innovative energy sources online.

TREND 2

Looming environmental crises Public awareness and concern are growing as governments struggle to effectively respond to current environmental crises. What are the implications of these crises for leadership and management of our public education system?

Community – a river runs through it

● Northern First Nations along the Deh Cho (Mackenzie) and Athabasca Rivers raise the alarm regarding health-effects of energy and oil sands development.

● $2.00 litre gas and the end of cheap suburbs.

● One-third of Edmonton Public students take the bus to school.

● The typical Alberta high school student spends 3.5 hours per week on the bus.

Water – Alberta's next hot commodity

● Alberta has only 2.2% of Canada's renewable freshwater.

● 80% of Alberta's water is in the North, while 80% of its population is in the South.

● Provincial water use will increase 21% by 2025.

● The largest users: petroleum industry (due to increased tar sands production) and agricultural irrigation.

Runaway climate innovation possible

● 35% reduction in oil dependency possible in five years through wind power.

Action to curb global warming may prove "totally consistent with economic growth."

Gregg Easterbrook, The Atlantic Monthly, September 2006

Local initiative – national delay

● Oil sands development will consume all of Canada's current natural gas supply (92%) by 2030; yet, governments continue to permit unsustainable development.

Cities, provinces and states pick up the slack on addressing climate change.

John Ibbitson, The Globe and Mail, November 16, 2007

Environmental governance

To the welfare state add the environmental state.

James Meadowcroft, Alternatives Journal, 33:1, 2007

Constitutional rights for nature?

● Alberta's response to environmental issues framed by international awareness.

● Ecuador – the first country to recognize natural communities and ecosystems as possessing an inalienable and fundamental right to exist and flourish.

● Geo-Engineering – large scale environmental engineering projects that attempt to mitigate the effects of global warming.

Greenwashing vs the politics of hope

● Short-term tweaking such as biofuels and the Alberta government's $2 billion carbon capture and sequestration program remain marginal in reducing ecological footprint.

TREND 3

Resistance to globalization

Public resistance is growing to globalization's relentless expansion and perceived contribution to free-market fundamentalism, economic inequality and broken social contracts.

What role does public education play in addressing globalization?

"More" separates from "better"

Our continued devotion to growth makes our lives worse, on balance.

Bill McKibben, Mother Jones, March/April 2007

The corporatization and marketization of research

● Educators, along with universities, are caught up in the drive to "academic capitalism" that limits research in priority areas such as mental health, community development and the environment.

EnCana realized a profit in excess of $1 million per employee in 2007; yet, was one of the companies opposing a royalty review by the Alberta government.

Manufacturing desire

Alternatives are needed to global capitalism and unsustainable resource consumption.

Timothy Garton Ash, Guardian Weekly, March 2-8, 2007

2008 Global financial crisis

Government bailouts – a stop-gap blood transfusion for a patient with massive internal bleeding.

Nobel Laureate, Joseph Stiglitz, BBC News, October 2, 2008

The economy for society or society for the economy?

● Alberta 2007: the first province in Canadian history to bring more people into its jurisdiction under the temporary foreign worker program (22,392) than through Canada's mainline immigration system (20,717).

Volatility and intensity at work

● In 1991, only 12% of the adult population worked 50 hours more per week. This has increased to 26% in 2008.

● Albertans work more hours each week than other Canadians.

● Teachers, as with other professions, are working more than ever, with Alberta teachers averaging a 53 hour work week.

New genuine wealth indicators challenge public policy makers

Alter-globalists

World Social Forum proposes another world is possible.

International Herald Tribune, February 2-4, 2007

● Authors, such as Richard Florida and Mark Anielski, are re-defining "profit," "progress" and "community."

Key drivers of work intensification are technologies like BlackBerries, which create the expectation that employees will be available 24/7. That probably explains why

43% of women say their partners work too much. More than a third of men say the same.

– Linda Duxbury, Carleton University

Many cultures, one reality

When the next billion come online, "it will change the way we think."

Jimmy Wales,

The Guardian Weekly, June 20, 2008

TREND 4

Broadening learning opportunities

Expanded and instant access to “point and touch” digital technologies, and the need to be connected to others in both the virtual and the physical worlds, are expanding the interest and capacity to offer broadened learning opportunities. How will educators address issues such as core learnings, commodification of content and student assessment as these opportunities unfold?

Growing talents for serendipity

The new 3 Rs will be relationships, responsibility and resiliency. Developing “strong inner selves” will be a way of learning amidst complexity.

Diversity and complexity

● Currently, 1,500 new children arrive in Alberta each month.

● Alberta’s K-12 student population will grow from 593,200 in 2008 to 677,422 in 2022 – requiring an additional 4,870 teachers.

● 25% of Calgary’s children under the age of 15 are a visible minority.

● By 2016, Alberta will be tied with Ontario with the largest First Nations population in Canada.

High school confidential

● The city of Calgary has the highest post-secondary education rates per capita among the general adult population (73%); yet, only 63.5% of high school graduates go on to post-secondary education.

● Alberta’s high school drop-out rate is 16.4% in rural areas compared to 9.2% in urban centres.

The intensification of childhood

● One third of Alberta parents have hired a tutor for their child. Typically, the child is already an honours student.

● 88% of parents expect their children to attend post-secondary – 57% expect university attendance.

Indian company Tutor-Vista signs on Canadian students

Calgary Herald, April 7, 2008

Internet safety

Governments plan to make the Internet safer for children.

The Guardian Weekly, April 4, 2008

The Daily Me

Technology's bright promise of increased access to information has a dark side: individuals and groups often choose to filter out what they do not want to know. Has the Political Blogosphere become simply an echo chamber?

Cass Sunstein, Republic.com

Accessibility meets excess-ability

Digital mobility

Mobiles become a portable learning tool.

The Guardian Weekly, January 11, 2008

● A week’s worth of the New York Times contains more information than what a person in the 18th century was likely to read in a lifetime.

● Rural access to the Internet will grow dramatically

(e.g. 5 MB bandwidth on conventional copper wire).

TREND 5

Governments centralize authority while the provincial government continues its efforts to centralize authority, particularly in the wellness and learning portfolios, Alberta citizens look for ways to actively engage the political process at local, regional and national community levels. How are public educators helping to revitalize the role of citizens in the public space and broaden the definition of democratic public accountability?

Shifting political (dis)engagements?

● First Nations seek nation-to-nation political relationships with governments.

● The proportion of the public with a "great deal of confidence" in public schools remains high, just below that of the Supreme Court and churches.

● Municipal authorities seek access to tax revenues and fiscal capacity (currently collecting only 8% of total taxes despite growing responsibilities).

Privateering: privatization and profiteering meet

– George Lakoff

● The rise of P-3s: The Alberta government implements privatization through public/private partnerships for public infrastructure including school construction.

● Franken City? Alberta government's plan to privatize a Fort McMurray subdivision through a public private "partnership."

Need for democratic reform

Restricted hearing

40 year-old legislation limits public participation in ERCB energy hearings.

Cindy Chiasson, Edmonton Journal Letters, June 24, 2008

● Only 41% of eligible voters in Alberta turned out in the 2008 provincial election.

● Super boards – one provincial health board replaces nine regional health authorities.

Counting confused with accountability

Advances in information management systems will increasingly enable governments to data-mine student achievement records, tracking school performance in reaching externally imposed performance targets measured by high-stakes tests.

TREND 6

Fluid personal identity

Personal identity, previously more fixed and stable, is increasingly becoming a matter of personal conviction with a growing capacity to express different "selves" in diverse and complex social relationships. How will the challenge of personal identity creation affect the expectation of teachers to socialize and impart values?

Rekindled narratives for Albertans and Alberta

● Alberta's gay community celebrates k.d. lang's Honorary Doctorate of Laws at the University of Alberta, June 2008.
● 15% of Alberta children and youth have a psychological disorder..
The new escribitionists
"Your private and public self are interdependent in previously unthinkable ways."
Marina Hyde, The Guardian Weekly, November 16, 2007
Sequential careers
● Women, who represent four out of five Alberta teachers, are deferring starting a family until they have established their careers.
● The average age of first-time mothers in this country is now 31.
● 40% of Canadian women say they've put their careers on hold to raise their children, compared with 13% of men.
● One out of two Alberta teachers will not be teaching in the same school in five years.
Spending trumps earnings
"A total identification between consumption and the self in the form of consumer."
Mark Kingwell, The Globe and Mail, September 1, 2007
New metaphors for governing
The Many Me's
"We live on many levels;" beware the "controlling unified self."
Charles Taylor, Sources of the Self
Connectivity vs connection?
● One out of every eight couples who married in the U.S. last year met online.
● While the Internet promises more connectivity, the number of meaningful personal connections an individual can have remains fixed at 125.
Student as Avatar
Digital persons learn in a virtual world in a virtual classroom.
TechNewsWorld, Education, June 13, 2007
www.technewsworld.com/rsstory/57590.html
TREND 7
Youth as society's technology scouts
In a hyper-reality, freed from the constraints of time and distance, youth are willing to tangle with the promises of technology and expand into new creative, social and work relationships that dissolve the boundaries between person and machine, inner and public lives, information and entertainment, and domains of knowledge. What challenges and opportunities emerge for the new ways of creating learning in public schools?
The immersive media culture
● The number of text messages sent and received every day exceeds the population of the planet.
● A day in the life of a Canadian student:

54 minutes instant messaging, 50 minutes downloading music, 44 minutes playing online games, 30 minutes on homework.

● 22% of Alberta children are considered overweight with 8% characterized as obese.

Cyberkinders

Europeans debate the arrival of cellphones for six year-olds.

International Herald Tribune, March 8-9, 2008

Friending online

From Facebook to do-it-yourself online social networks using “open toolkits.”

The Economist, The World in 2008

Uncertainty and ambiguity at work

Tech brain, lyrical heart

“The competitive edge; education in technology and the arts.”

John Naisbitt, The Futurist, March-April 2007

To think different

In a high-tech world, humanities education will be more relevant than ever.

Leon Botstein, Fast Company, October 2000

Digital eyewitnesses

Welcome to the world of “sousveillance” where video cameras have “made eyewitnesses of us all.”

Margaret Wente, The Globe and Mail November 20, 2007

Enhanced digital story-telling

● Open education resources in Web 3.0 environments will further enable the sharing of “ones selves” through a creative commons and the semantic web.

Hyperlinked Multimedia Maestros

Oral traditions and the Internet have more in common with each other than with books. Vancouver Sun, June 2, 2008

“A constant and pervasive presence” leading to “conflicting notions” of childhood.

Kathryn C. Montgomery, Generation Digital: Politics, Commerce and Childhood in the

Age of the Internet

The intelligent swarm

Collective intelligence in a wiki world?

National Geographic, July 2007

APPENDIX E: ANALYSIS - CHANGING LANDSCAPES OF THE NEXT ALBERTA: 2008 – 2028, ALBERTA TEACHERS' ASSOCIATION

In terms of background, the Changing Landscapes document was produced in connection with a series of discussions featuring several fairly high profile writers and researchers hosted by the ATA during 2004 – 2007. The ATA endeavoured to stimulate conversations about economic and social trends while asking participants to envision a preferred future for Alberta. The series was built around four themes: individuals, relationships and community, work and the economy, governance and politics and emerging technologies. In the supporting document, Changing Landscapes of the Next Alberta: 2008 – 2028, the series of events and discussions is described as a "cultural project" designed to engage the education community in considering, "(i)n advancing public education, what kind of teachers do we want to become?" (Alberta Teachers' Association, 2008).

Briefly, the supporting document is in color brochure format and includes several illustrative graphics, quotes from popular journals and newspapers, photos of the featured speakers, and statistics. The first three panels of the brochure include summaries from each of the speakers connected to the key concepts in the four themes. The document concludes by identifying seven trends each of which is supported by an existential assumption and bold-faced sub-titles with related quotes from mass media sources (e.g. National Geographic, The Globe and Mail) and graphics (primarily photos). The 7 trends follow the speaker summaries and

include references to the four common spaces guiding the series: individuals, relationships and community, work and the economy, governance and politics and emerging technologies. Overall, the titles of the seven trends set a cautionary tone: primary resource dependence, looming environmental crises, resistance to globalization, broadening learning opportunities, governments centralize authority, fluid personal identity and youth as society's technology scouts.

The document serves as a secondary document because it has the potential to reach a variety of audiences thereby reproducing the prominent discourses identified in the primary documents. Also, the design of the document, color-brochure style, pithy, short statements and use of high profile experts such as Thomas Homer-Dixon and Justin Trudeau, suggest may have intended the document for a fairly large, diverse audience. Changing Landscapes has the potential to be picked up and read by parents and teachers but would likely also be of interest to business leaders, politicians and interest groups. Whereas the Technology and Education documents may be at work at the institutional level, Changing Landscapes has the potential to work at a broader, societal level.

Although emerging technologies is one of the four "common spaces" set apart in Changing Landscapes, technology or some aspect of technology appeared consistently throughout the document. The analysis of Changing Landscapes included all statements which referenced technology directly or related aspects of technology. After the technology-related assumptions were identified and clustered, three prominent discourses emerged: 1) identity and the social world, 2)

access to information versus learning, and 3) reframing economic competitiveness.

Prominent Discourses	Existential	Propositional	Value
Identity and the social world	Technology amplifies both the negative and positive consequences of our decisions in the midst of globalization. (201)	Has the Political Blogosphere become a simply an echo chamber? Cass Sunstein, Republic.com (389)	While multi-tasking and virtual networking are common-place in youth culture, the resulting collateral impacts of a sedentary lifestyle cannot be ignored, as demonstrated in the growing concern surrounding declining health and well-being of youth. (82)
	While the Internet promises more connectivity, the number of meaningful personal connections an individual can have remains fixed at 125. (458)	The intelligent swarm: Collective intelligence in a wiki world? National Geographic, July 2007. (504)	Digital Eyewitnesses: Welcome to the world of "sousveillance" where video camera have made eyewitnesses of us all." Marge Wente, Globe and Mail, November 20, 2007. (491)
		The Daily Me: Technology's bright promise of increased access to information has a dark side: individuals and groups often choose to filter out what they do not want to known. (387)	
		Cyberkinders: Europeans debate the arrival of cellphones for six year-olds. (478)	
		Internet safety: Government plan to make the Internet safer for children. The Guardian Weekly, April 4, 2008 (384)	

Prominent Discourses	Existential	Propositional	Value
Access to information versus learning	Expanded and instant access to "point and touch" digital technologies, and the need to be connected to others in both the virtual and the physical worlds, are expanding the interest and capacity to offer broadened learning opportunities. (356)	Digital mobility: Mobiles becomes a portable learning tool. The Guardian Weekly, January 11, 2008. (393)	Access to information cannot be simply equated to personal and/or political agency. (182)
	…education cannot compete with the Internet as a form of content production…(n)either can convention forms of assessing student progress such as standardized tests, help foster creativity and critical thinking. (205)	Seamless access to technologies and the emergence of multi-literacies is shifting our understanding of learning and culture while challenging assumptions about what it means to be a learner. (202)	
	In a hyper-reality, freed from the constraints of time and distance, youth are willing to tangle with the promises of technology and expand into new creative, social and work relationships that dissolve the boundaries between person and machine, inner and public lives, information and entertainment, and domains of knowledge. (466)	Students as Avatar: Digital personal learn in a virtual world in a virtual classroom. TechNewsWorld, Education, June 13, 2007. (460)	
		Open education resources in Web 3.0 environments will further enable the sharing of "ones selves" through a creative commons and the semantic web. (496)	
Reframing economic competitiveness	Emerging technologies and the changing nature	Counting confused with accountability:	An important consideration of

Prominent Discourses	Existential	Propositional	Value
	of work have both positive and negative impacts on our lives. (79)	Advances in information management systems will increasingly enable governments to data-mine student achievement records, tracking school performance in reaching externally imposed performance targets measured by high-stakes tests. (424)	Sahlberg's view is that "economic competitiveness" needs to be defined broadly, and must include the contributions of members of society and civic engagement. (132)
	Key drivers of work intensification are technologies like Blackberries… (346)	Tech brain, lyrical heart: "The competitive edge: education in technology and the arts" John Naisbitt, The Furturist, March-April 2007. (485)	"(e)ducators, along with universities, are caught up in the drive to "academic capitalism" that limits research in priority areas such as mental health, community development and the environment" (317)
		To think different: In a high-tech world, humanities education will be more relevant than ever. Leon Botstein, Fast Company, October 2000. (488)	

APPENDIX F: ANALYSIS - INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) PROGRAM OF STUDIES – RATIONALE AND PHILOSOPHY, ALBERTA EDUCATION

In January of 1998 the interim ICT program of studies was released with a full provincial mandated implementation to follow two years later. The ICT program of studies had a broad scope and emphasized what students were

expected to know, be able to do and consider with respect to technology. The ICT program of studies includes three interrelated categories:

- communicating, inquiring, decision making and problem solving
- foundational operations, knowledge and concepts
- processes for productivity.

Essentially, the curriculum guides students to consider "how to use and apply a variety of technologies, and the impact of ICT on self and society" (Alberta Education, 2007f, p. 1).

Since its launch in 1998, the ICT program of studies has been integrated across the curriculum in keeping with its original intent to be "infused within core courses and programs". For example, within the social studies curriculum students "create visual images using paint and draw programs" thereby demonstrating skills of oral, written or visual literacy (Alberta Education, 2005a, p. 25). Although the ICT program of studies was not intended to be treated as an isolated program, in schools it was often taught and assessed in a computer lab setting, during a specific block of time and often by one teacher. The infusion of the ICT program of studies across the curriculum now requires instruction and assessment to occur within the core courses and programs.

As the table below indicates, the analysis of the philosophy and rationale of the Alberta Education's ICT program of studies yielded two prominent discourses related to technology: 1) curriculum and practice-based and 2) critical technology literacy.

Prominent Discourses	**Existential**	**Prepositional**	**Value**
Curriculum and practice-based	(t)echnology is best learned within the context of applications (9)		a way of doing things (28)
	(a)ctivities, projects and problems that replicate real-life situations are effective resources for learning technology (9)		
Critical technology literacy	Advanced technologies are more pervasive today than they have ever been, and their uses are expanding continually…significantly enhancing and altering human activity, and enabling us to live, work and think in ways that most of us never thought possible (20)	Students…will be encouraged to grapple with the complexities, as well as the advantages and disadvantages, of technologies in our lives and workplaces (5)	Technology will serve today's students well—in entry-level work and beyond, in further study and lifelong learning, and in their personal lives as inquisitive, reflective, discerning and caring citizens (18)
	Since technology has an increasingly significant impact, and such broad implications for everyone—individuals, groups and entire nations—students must be prepared to understand, use and apply ICT in effective, efficient and ethical ways (24)		
	nature and affect of technology, the moral and ethical use of technology, mass media in a digitized context, ergonomic and safety issues, and basic computer, telecommunication and multimedia technology operations (44)		

APPENDIX G: MEDIA RELEASE – SCHOOLS BROADEN TECHNOLOGY USE TO TRANSFORM STUDENTS' LEARNING OPPORTUNITIES, ALBERTA EDUCATION – SECONDARY DOCUMENT

Media Release: April 30, 2008
Schools broaden technology use to transform students' learning opportunities
Videoconferencing capability highlighted during Education Week 2008
Edmonton – The Alberta government is investing over $55 million this year to broaden technology initiatives in schools across the province to encourage students to complete their education and create meaningful learning experiences.
"Today's students live in an interconnected world. They are digitally literate and technology is part of their daily life," said Education Minister Dave Hancock. "Through these investments in innovative technologies, Alberta's teachers are empowering today's learners and improving student success in high school."
Budget 2008 includes $18.5 million in new funding in each of the next three years to support the further integration of technology in Alberta classrooms. This funding will be allocated for a variety of initiatives which will be announced in the future. This is on top of the $36 million in ongoing funding included in the budget for enhancing and supporting videoconferencing and online resources.
An additional government grant of $700,000 was allocated to the 2Learn.Ca Education Society for the Video Conferencing Regional Leads Network (VC RLN) to support the educational system by developing the skills and human capacity required for the successful implementation of videoconferencing and associated SuperNet applications.
"The Network provides Alberta's teachers with the opportunity to take exceptional ideas about using technology for learning, and convert those ideas into effective practice," said John Hogarth, Executive Director for the 2Learn.ca Education Society. "We have seen exciting transformations in curriculum delivery and truly enhanced learning opportunities for students."
The VC RLN is also a sponsor of the Video Conference for Hope, a student fundraising activity being held during Education Week 2008, involving 15 schools across Alberta. Students are using videoconferencing technology to raise funds to build a school for street children in Nicaragua, while learning the values of global citizenship.
In addition, an investment of $6.5 million from 2007-08 supports 24 pilot projects in schools across the province that use a variety of technologies, including electronic whiteboards, videoconferencing, laptops, and other hardware and software. Each project received one-time funding to a maximum of $300,000 for a two-year period. School jurisdictions are also required to commit funding or in-

kind support to the total cost of their projects. Each jurisdiction will conduct its own internal project evaluation. Alberta Education will also evaluate the success of these projects to identify promising practices that use technology to improve student engagement and high school completion.

Studies indicate that technology can be used to create a dynamic learning and teaching environment that engages the 21st century learner. In our knowledge-based economy, technology can improve collaboration, and analytical and problem solving skills that Alberta's students need to remain competitive in our interconnected world.

Alberta is seen nationally and internationally as a leader for integrating new technology into the educational system. The government has been instrumental in the development of the SuperNet, which significantly supports the use of technology in schools. For additional information, please visit: education.alberta.ca/admin/technology

APPENDIX H: ANALYSIS - MEDIA RELEASE – SCHOOLS BROADEN TECHNOLOGY USE TO TRANSFORM STUDENTS' LEARNING OPPORTUNITIES, ALBERTA EDUCATION

The selected media release accompanied the spring budget and details the allocation of funding to support various technology projects but highlights videoconferencing and the supporting infrastructure, SuperNet (Alberta Education, 2008d). In terms of context, at the time high school completion remained a high profile priority for the Ministry.

The table below summarizes the two prominent discourses related to technology in education emerging from the document: 1) Engaging learning environments and 2) change and the new economy.

Prominent Discourses	**Existential**	**Prepositional**	**Value**
Engaging learning environments	Schools broaden technology use to transform students' learning opportunities (2)	government is investing over $55 million this year to broaden technology initiatives in schools across the province to encourage students to complete their education and create meaningful learning experiences. (4)	Alberta Education will also evaluate the success of these projects to identify promising practices that use technology to improve student engagement and high school completion. (34)
	We have seen exciting transformations in curriculum delivery and truly enhanced learning opportunities for students (22)	provides Alberta's teachers with the opportunity to take exceptional ideas about using technology for learning, and convert those ideas into effective practice (20)	
	Through these investments in innovative technologies, Alberta's teachers are empowering today's learners and improving student	Studies indicate that technology can be used to create a dynamic learning and teaching environment that engages the 21st century	

Prominent Discourses	Existential	Prepositional	Value
	success in high school. (8)	learner. (37)	
Change and the new economy	Today's students live in an interconnected world. They are digitally literate and technology is part of their daily life (7)	In our knowledge-based economy, technology can improve collaboration, and analytical and problem solving skills that Alberta's students need to remain competitive in our interconnected world. (38)	
	Students are using videoconferencing technology to raise funds to build a school for street children in Nicaragua, while learning the values of global citizenship. (27)		
	Alberta is seen nationally and internationally as a leader for integrating new technology into the educational system. (41)		

APPENDIX I: LEARNING AND TECHNOLOGY POLICY FRAMEWORK, ALBERTA EDUCATION – PRIMARY DOCUMENT

Learning and Technology Policy Framework July 2004 (pages 1 – 4, 10 – 24)

Introduction

Whether it is used to enhance classroom learning, to provide skilled trades training to apprentices and journeymen at their place of work, or to expand the range of learning options for non-traditional learners and people living in remote geographic locations, information and communication technology (ICT) is an important tool for extending the reach and increasing the flexibility and responsiveness of Alberta's lifelong learning system.

Technology can provide greater access to resources, expose students to real-world problems and authentic contexts for learning, and provide alternative methods of representing and communicating their knowledge. It fosters innovation, facilitates dialogue and offers potential for developing new practices among the education and research communities.

In addition, the acquisition of ICT skills is fundamental to participation in the knowledge- based economy, and to the ability to discern and fully benefit from the technologies available in today's society.

Further, ICT plays a significant role in enhancing learning system management, coordination, and collaboration.

Together, these roles of technology (learning delivery, knowledge and skill acquisition, learning system management, innovation) contribute to the achievement of the Campus

Alberta vision for the learning system:

Albertans will have the opportunity to participate in lifelong learning supported by a learning system in which learning providers collaborate to deliver quality and innovative learning opportunities – where and when

Albertans need them – to enhance their social, cultural, and economic well being.

The Alberta Commission on Learning, in its October 2003 report, recognizes the transformational impact of technology on learning and the need to integrate technology fully into Alberta's learning system.

Within this context, technology offers the potential to:

- increase access to learning opportunities
- adapt teaching to different learning styles, preferences and paces
- customize learning materials and services
- provide access to interactive educational resources
- expand research and knowledge creation
- individualize the tracking and recording of learning progress
- develop new learning communities for the sharing of knowledge and best practices

• improve information management and administrative processes.

The definition of "technology" is evolving with the convergence of digital, telecommunications and television technologies. For the purposes of the Framework, "ICT" and "technology" are used interchangeably and a broad definition of technology (i.e. beyond computer-based technologies) is implied.

Rationale for a Policy Framework on Learning and Technology

The Learning and Technology Policy Framework is proposed to provide direction and coordination for the use of technology in Alberta's learning system. The Framework will inform Ministry decisions by:

• establishing a context for the assessment of trends, needs, best practices, and new initiatives

• ensuring that investment in technology is consistent with learning system objectives/priorities and optimizes benefits to learners

• clarifying Ministry and stakeholder roles in the area of technology.

Scope of the Framework

The scope of the Learning and Technology Policy Framework includes:

• all sectors of the learning system (e.g. K-12, adult learning, apprenticeship and industry training)

• a range of technology purposes (e.g. knowledge and skill acquisition, learning delivery, research and innovation, learning system management)

• learning and technology stakeholders (e.g. traditional and non-traditional learners, educators, parents, administrators, researchers, employers, not-for-profit organizations, industry)

• a number of learning environments (e.g. school/post-secondary institution, home, workplace, virtual)

• a variety of learning delivery modes (e.g. classroom, online learning3, blended classroom/online learning, multimedia, audio/videoconferencing)

• formal and informal learning opportunities.

Key learning and technology components and activities that may be informed by this Framework include research, infrastructure, digital content, learning outcomes, professional growth, learning delivery, learning supports, technology planning and funding, learning information systems, and innovation.

"Online learning" involves the use of Internet-based technologies to deliver instruction, access learning resources, and facilitate communication among learners and educators for both face-to-face and distance learning.

VISION

The following vision statement is proposed to guide the use of technology for learning in Alberta:

Information and communication technology supports Alberta's globally recognized learning community by enhancing learning delivery, knowledge and skill acquisition, learning system management, and innovation.

PRINCIPLES

The following principles are proposed to focus the use of technology on learning:

Learner-centred Technology is used to enhance learning opportunities and to support successful learning outcomes for Albertans.

Accessible Technology is used to expand learning opportunities for all Albertans, including non-traditional learners.

Collaborative Technology is used to build relationships and foster partnerships within the learning community and with other stakeholders.

Accountable Technology decisions are based on learning system/government priorities and the enhancement of learning outcomes, and are evaluated using established performance criteria.

Responsive Technology is used to increase the flexibility of educators to address individual needs and preferences.

Innovative Technology effectiveness is advanced through the identification, evaluation, and, where appropriate, adoption of emerging technologies and promising practices.

Equitable Technology infrastructure and applications are consistent and readily available, within reason, across the learning system.

GOALS

The following goals will provide direction for the use of technology and support the achievement of Alberta learning system objectives:

1. Access to quality learning opportunities is expanded

The use of ICT reduces geographical and time constraints, enabling Albertans to access new learning opportunities across the province and around the world. Technology is beneficial in increasing learning options for rural Albertans and reducing barriers to learning for people with disabilities. Stakeholders will have the tools to identify quality online learning opportunities.

2. Learning is enriched

The availability of the Internet and sophisticated multimedia tools is changing approaches to learning delivery – in the classroom, in distance learning, and in other learning contexts. ICT provides new ways to present information and illustrate concepts, and provides educators and learners with access to a broad array of learning resources.

It offers learners new approaches to demonstrate their learning. It also facilitates the development of diverse, global learning communities and promotes information sharing and dialogue among learners and educators.

3. Learning outcomes are improved

ICT will be used to improve learner participation, achievement, and satisfaction with the learning process. The ability to adapt learning content, delivery, pace, and structure to individual needs and preferences may be particularly beneficial for non-traditional learners and learners with special needs. ICT will support parents and employers in their efforts to assist learners to meet learning and career

objectives. Educator expertise in pedagogy and facilitating learner success will be recognized.

4. Information and communication technology skills of Albertans are enhanced

The ICT skills of Albertans will be improved to ensure their competitiveness in a knowledge economy, and to enable them to use technology to address other interests and needs.

5. The efficiency of learning system management is improved

ICT supports the policy, planning and accountability processes essential to effective learning system management. Learning information systems and quality data will inform Ministry and learning provider decisions. Administrative burden will be reduced.

6. Research and knowledge creation are advanced

Information and communication technology enhances theoretical and applied research capability and facilitates academic inquiry. The use of technology in the learning system will be informed by new technologies, tools, and practices developed by the education and research communities and the private sector. Mechanisms to disseminate learning and technology research findings will be enhanced.

7. Markets for learning programs, resources and services are expanded

As part of the International Education Strategy, Alberta learning providers will obtain access to worldwide markets for their programs and services. Alberta will be recognized as an international leader in online learning. In addition, innovative technologies, applications, and resources will enhance Alberta's presence in international markets

Pages 10 – 14

Learning Outcomes

Policy Direction

Technology will be used to improve learners' success and prepare them to participate in a knowledge-based and technologically advanced society.

Rationale

Technology is significantly enhancing and altering human activity, enabling individuals to live, work, learn and play in different ways. Alberta's Commission on

Learning has recognized that technology is a powerful tool for improving the achievement of students. Technology facilitates greater access to the learning system by individuals whose learning options may be limited by geography, time or personal circumstances. It enhances the learning process. And, for some learners, the technology itself increases their motivation to learn.

In order to contribute in an information-rich future, learners require ICT skills to use technology tools for organization, communication, research, and problem solving.

They need to understand the impact of technology on everyday lives, and need to be able to use computers and other technologies flexibly, creatively, and

purposefully to support their learning. They must be prepared to understand, use and apply ICT in effective, efficient and ethical ways.

Mastering isolated ICT skills is insufficient as an end goal – students must be able to recognize what they need to accomplish, determine which technologies (if any) will assist them, and be able to apply various ICT skills in accomplishing meaningful tasks as part of the learning process. Technology is best learned within the context of applications. Therefore, ICT learning outcomes can no longer be viewed as separate from other content area and process outcomes.

This integrated approach to the instruction and application of ICT has significant impact for learners and the learning system. ICT skills can and should be embedded into content instruction and integrated appropriately into content-area outcomes across the curriculum/program. Resource selection and development should reflect the infusion of ICT into course content. Assessment of learners' progress in meeting

ICT outcomes must be integrated into and aligned with other assessment of student progress. Clarity and shared understandings about the role of ICT in learning must be articulated between senior high school and post-secondary programs to ensure continuity in learning. Well-defined learner outcomes, well-designed student projects, and effective assessment strategies are required.

While learners will use and apply ICT skills within the context of their regular subjects/programs, they will also have the opportunity, through dedicated programs/courses, to explore more fully specific technologies and to prepare for related careers.

The attainment of these goals requires ongoing support and adaptation in many other areas of the learning system, such as effective pre-service programs, sustained professional development, and appropriate physical and technical infrastructures.

Outcomes

• learners will use technology to support and enhance the achievement of curriculum/program goals within relevant contexts of their regular learning activities
• increased learner participation and retention
• increased satisfaction with the learning process
• increased ability to address learning preferences and special needs
• learners will develop skills and competencies in the use of ICT and an understanding of the role of ICT in society
• learners will be critical and informed users of ICT
• learners will have opportunities to explore and prepare for careers that specialize in the use of ICT
• parents and employers will have information and tools to support learners in achieving their learning and career objectives.

Potential New Actions

• integrate ICT into a wide variety of learning experiences to ensure that all learners have equitable opportunities to develop ICT skills:
• review K-12 ICT outcomes on a regular basis and evergreen, as appropriate, to reflect changing competency expectations
• ensure that resource selection and development is consistent with ICT outcome expectations
• integrate assessment of students' progress in meeting ICT outcomes into other assessment of student progress
• develop mechanisms to articulate and align the role of ICT between senior high school and post-secondary programs to ensure continuity of student learning
• work with post-secondary institutions, employers, industry associations, professional organizations, industry sector councils, and other government ministries to ensure that education and training programs anticipate and address changing ICT requirements in the workforce, as is already occurring in some sectors.

5. Professional Growth

Policy Direction

Educators will develop the necessary knowledge, skills, and attributes to use technology effectively to support learning and teaching.

Rationale

Teachers, faculty and instructors are critical in ensuring effective use of technology in learning. As the report from Alberta's Commission on Learning emphasizes, it is essential that educators develop the competencies to integrate technology successfully into their teaching and to guide students in the use of technology to achieve learning goals.

The expansion of information and communication technologies in our society and the introduction of technology into the learning environment present challenges for educators in all areas of the learning system. K-12 educators are particularly impacted by:

• the Information and Communication Technology (ICT) curriculum, which is a mandatory program of studies for K-12
• the infusion of ICT outcomes within other curriculum, which requires regular classroom teachers to be skilled in using technology, rather than relying upon specialists to teach ICT skills in stand-alone technology courses
• the rollout of Alberta SuperNet, which will provide new opportunities for learners through increased access to online learning, expanded options for collaboration
and professional development, and the use of new applications such as videoconferencing and remote video resources
• the development of LearnAlberta.ca digital content resources and multimedia learning objects
• the changing abilities and expectations of students, whose access to and familiarity with technology have increased.

Post-secondary educators are particularly impacted by:

• the increase in alternative delivery models, including online course management systems, videoconferencing, and a variety of synchronous and asynchronous learning tools

• competition for students in a global environment

• the changing abilities and expectations of students, who are familiar with technology tools, expect to use them in their working and learning environments, and want increased flexibility and control over their own learning.

These changes require educators to continually learn new skills, enhance existing skills, and stay informed about professional practices that integrate emerging educational technologies into changing learning contexts.

Educators need both technology skills and effective pedagogical strategies to use technology in a variety of learning and teaching environments. Currently, educators are positioned along a continuum that ranges from few basic skills and limited awareness of appropriate pedagogies to exemplary technology skills and a wide repertoire of effective teaching strategies. Attaining competency in both skills and pedagogies is a complex process that requires long-term commitment and support.

In-service and professional development strategies for practicing educators must be ongoing, integrated into curriculum, and informed by research. Effective models of professional development, and new alternatives for professional development through the use of technology, need to be widely shared.

Since educational leaders (K-12 principals, school district administrators, post-secondary deans and department heads) are fundamental to initiating and sustaining change processes such as technology integration, increasing the skills of these leaders will strengthen organizational capacity for implementation.

Faculty in pre-service programs need to model effective uses of technology in a variety of subject areas and learning environments. Close connections between faculty, pre-service teachers/instructors, experienced educators, and the educational research community will support a professional learning culture where research informs practice and practice informs research.

Outcomes

• educators are well prepared to use technologies effectively for teaching and learning

• educators have the capacity to make informed choices about the meaningful application of emerging technologies throughout their careers.

Potential New Actions

• work with teachers, parents, school authorities, and post-secondary education faculties to update the K-12 Teaching Quality Standard to better reflect teacher roles and competencies in the use of ICT for learning

• facilitate collaboration among teacher preparation programs to share models of best practice

• promote connections between pre-service, K-12, and post-secondary stakeholder groups involved in professional development for the integration of technology
• incorporate in-service plans into ministry initiatives that involve new technologies
for learning and teaching.

6. Learning Delivery

Policy Direction

The learning system will use a variety of learning delivery modes to provide flexible learning options for Albertans.

Rationale

Albertans have a diversity of learning needs and expectations of the learning system.

Alberta's Commission on Learning found that technology is an important mechanism for increasing access to learning programs and services, particularly for Albertans in rural and remote communities.

The growth of technology, the knowledge economy, and the imperative for lifelong learning have also contributed to the globalization of learning. Competition among learning providers is expanding, both domestically and internationally, as they seek access to new markets.

The Ministry, school jurisdictions, post-secondary institutions and industry need to have the flexibility to respond to these changing needs and expectations. The Alberta International Education Strategy addresses this need through the following vision:

Alberta will be internationally recognized as a leading provider of education, skill development and industry training, and Albertans will be well-prepared for their role in the global marketplace and as global citizens.

While learning providers will have different strengths and priorities, it is important to ensure that the learning system is balanced and equitable, and that excellence in learning is maintained. Some of the challenges that have emerged with the growth of technology and online learning include:

• learners now have access to a vast number of learning providers, programs and environments that may not be regulated in any jurisdiction, and in some instances, may be inappropriate or of poor quality
• Alberta learning providers are seeking ways to gain international profile and recognition for their strength in online learning
• attrition rates for some online learning courses, particularly those involving little interaction with the instructor or other learners, may be significantly higher than for face-to-face courses with similar content
• there is a perception that the achievement of learners enrolled in online learning programs delivered by some Alberta school authorities may not yet meet some Ministry-established standards
• the roles of the Alberta Distance Learning Centre (K-12) and Athabasca

University, which were originally designated as the Alberta learning system's distance learning providers, have become less distinct vis-à-vis other school jurisdictions and post-secondary institutions

• private sector interest and involvement in online learning is growing.

Outcomes

• learning excellence is promoted across all modes of delivery in the learning system

• diversity of choice within Alberta's learning system is maintained

• learners, parents, employers, and educators are able to identify and access online learning programs that are recognized and meet quality expectations

• Alberta is recognized as an international leader in online learning

• the integrity of government-owned curriculum and credentials is preserved.

Potential New Actions

• work with stakeholders to identify quality standards for online learning, informed by research and an appropriate professional development strategy

• work with K-12, post-secondary, and apprenticeship and industry training stakeholders to develop an Alberta-led online learning accreditation mechanism

• identify and promote best practices in online learning and other technology-based modes of learning delivery

• through the Alberta International Education Strategy, work with stakeholders to promote approved Alberta online learning programs in international markets

• review Ministry legislation and policies to address changing circumstances and practices brought about by the growth in online learning.

7. Learning Supports

Policy Direction

Learners, parents, educators, and employers will have the tools to identify, assess, and successfully participate in technology-enriched learning opportunities that meet their needs.

Rationale

All learners may benefit from some form of support in order to successfully use technology for learning.

In some instances, assistance with the learning process itself is required. Attrition rates for some online learning courses, particularly those involving little interaction with the instructor or other learners, may be much higher than for face-to-face courses with similar content. Some learners have indicated that certain concepts

(e.g. mathematics and science) may be more difficult to grasp in an online learning environment. Other learners find that the availability of online learning resources and periodic teleconferencing or exchange of e-mail with their instructor may be sufficient to support their learning needs.

The availability of library resources is often essential to the successful completion of course requirements. Technology offers learners and educators the potential to identify and access library resources in other locations. The availability of

electronic information resources can be particularly beneficial in extending library services to a greater number of learners on a timely basis. However, the cost to individual schools and post-secondary institutions to license some resources may be high.

For learners with special needs, technology may be both a barrier to participation in learning and a tool to overcome barriers to participation in learning. For instance, individuals with visual impairments and limited upper body mobility may require special voice recognition software in order to effectively use computer technology, but once this is available, their ability to fully participate in learning may increase.

Other software may support cognitive development and speech rehabilitation. In addition, online learning may be an effective option for learners requiring flexible learning arrangements due to health limitations.

Timely access to technical support is critical to avoid disruption of the learning process. This may be a particular issue for learners at home and/or in remote areas, as well as school jurisdictions and large institutions with centralized services. The availability of online and telephone-based technical support services, using consultants who are familiar with the specific applications and technologies that are being used, could address many of the problems that may arise. There may be opportunities to achieve economies of scale through collaborative approaches.

Adult student financial assistance policies for online learning generally follow policies established for non-online learning programs. As a result, student financial assistance may not be available for some online learning programs, such as those programs with open-ended completion dates and many online learning programs originating outside of Canada. In addition, there is limited availability of student financial assistance for student acquisition (purchase, rent, lease, payment of technology fee) of computers, software, Internet access, and other technological expenses. Current loan ceilings may not accommodate the tuition costs of some online learning programs that are offered on a cost recovery basis.

Learners, parents, learning providers, and employers may be unfamiliar with the online learning opportunities available, and with the quality and reputability of some online programs, particularly those offered beyond their geographic region. This may limit their ability to determine whether a program or credential is appropriate to their needs. As a result, learners may choose programs that do not meet their expectations, their credentials may not be recognized for admission to higher education programs at other institutions, or they may not meet the knowledge or skill requirements of potential employers. In addition, they may incur financial losses should an online learning provider go out of business.

Outcomes

• learners have the necessary information, learning and technical supports to support their learning needs

• technology is not a barrier to learners with special needs
• expanded designation of quality online learning programs for student financial assistance purposes
• credentials obtained from quality online learning programs are recognized by learners, learning providers, employers, and professional organizations.

Potential New Actions

• work with The Alberta Library and learning stakeholders to enhance the availability of electronic library resources and services across the province
• develop information resources to assist learners, parents, learning providers, and employers to identify quality online learning programs that will meet their expectations and needs
• work with stakeholders to explore collaborative options to further support successful outcomes for learners (e.g. centralized help desk, tutorial support, expanded access to computers in the community)
• work with the federal government and other provincial/territorial jurisdictions to develop a pan-Canadian approach for the designation of online learning providers for student financial assistance
• work with the Alberta Council on Admissions and Transfer (ACAT), post-secondary institutions, and other provincial/territorial jurisdictions to expand transfer arrangements for online learning programs
• enhance the capacity of the International Qualifications Assessment Service (IQAS) to address online learning credentials
• promote prior learning assessment and recognition practices that accommodate learners who customize their learning by combining courses from several online learning providers/programs.

8. Technology Planning and Funding

Policy Direction

Funding for technology, supported by accountability measures, will be integrated into base funding for publicly-funded school jurisdictions and post-secondary institutions.

Rationale

The total cost of ownership of technology extends beyond initial expenditures for hardware and infrastructure to include the development and acquisition of learning resources, professional development, technology support, and ICT management and planning. Ongoing investment in all six categories is necessary to achieve and sustain successful outcomes.

Difficult choices may be required when other priorities, such as staffing, facility operations, student financial assistance, research, and print-based resources, compete with technology for a portion of Ministry and learning provider budgets. Accordingly, many stakeholders suggest that technology must demonstrate a 'return on investment' (e.g. enhancing learning outcomes or improving the efficiency of administrative practices).

In addition, there is a perception that current funding approaches may not fully address the unique needs and circumstances of some K-12 and post-secondary online learning providers.

Finally, a large number of stakeholder organizations and initiatives have emerged to advance and support learning and technology, many overlapping in mandate and/or seeking Ministry funding. Stakeholders have requested clarification of Ministry and stakeholder roles, and the circumstances in which the Ministry may consider investment in such stakeholder initiatives.

Outcomes

- the Ministry and learning system are accountable for investment in learning and technology
- publicly-funded school jurisdictions and post-secondary institutions have the flexibility to address technology needs within the context of local learning priorities
- funding for the delivery of online learning programs is equitable across the learning system
- Ministry investment in stakeholder learning and technology initiatives is needs-based, focuses on deliverable products and services, and involves fair and open business practices
- technology is viewed as an integrated component of the learning system
- the vision for the use of technology for learning is advanced across the learning system
- the coordination of learning and technology activity across the learning system is improved
- Ministry and stakeholder roles with respect to learning and technology are clarified.

Potential New Actions

- integrate funding for technology into base funding for publicly-funded school jurisdictions and post-secondary institutions
- work with stakeholders to develop strategies to address costs and issues associated with the implementation of system-wide priority initiatives
- work with stakeholders to develop strategies to ensure that learning system funding for online learning is equitable and supports the achievement of learning system objectives
- enhance mechanisms to exchange information with stakeholders on how they might support emerging learning system priorities/needs
- systematically identify technology needs and implications for all new Ministry and learning system initiatives
- ensure that an evaluation component is incorporated into all Ministry and learning system technology initiatives
- identify key performance indicators to measure the overall impact of technology on the achievement of learning system objectives and to measure progress toward system-wide technology integration

• review Ministry legislation, operational policies and regulations, as appropriate, for alignment with learning system objectives for the use of technology for learning.

9. Learning Information Systems

Policy Direction

Learning information systems and data collection will be efficient and effectively support learning system management.

Rationale

Quality learning system data is essential to effective learning system policy, planning and accountability. According to Alberta's Commission on Learning, the availability of "consistent, regular and timely" information about student achievement is particularly important to assess the performance of the learning system.

Within the Ministry and each school jurisdiction and post-secondary institution, there are numerous management information systems and databases for tracking learners, program operation, financial management and reporting. Some management information systems are cumbersome and costly to implement/maintain.

Current data collection requirements are extensive and increase administrative burden. There is evidence of duplication in some areas and some data that is currently collected may not be relevant to Ministry and stakeholder needs. Appropriate data products may not be available when needed. The ability to track learner movement and exchange data across the learning system is limited.

Outcomes

• learning information systems and data collection processes are efficient and coordinated

• administrative burden is reduced

• quality data is available, as appropriate, to inform planning and accountability across the learning system

• increased ability to exchange data across the learning system

• learner privacy is protected

• learning system data is secure.

Potential New Actions

• continue to work with stakeholders to implement the Data Collection and Alberta

Student Number initiatives

• develop and implement an integrated student information system for the learning system.

10. Innovation

Policy Direction:

ICT will be used to enhance collaboration and innovation in Alberta's research community.

Rationale:

Innovation and knowledge creation are essential to the prosperity of all Albertans. The growth of knowledge-intensive industries, including the ICT industry, depends largely on Albertans' capacity for innovation. Typically, innovation is a product of years of collaboration that involves exchanging knowledge among researchers and between the research community and end users. The availability of ICT offers great opportunities to enhance the speed with which knowledge is exchanged and thus contributes to increased competitiveness through innovation. Technology also facilitates the analysis of data. Many research advances have been a direct result of the enhanced ability to apply sophisticated data analysis methods to vast quantities of data. Further, technology enables researchers to develop models and test hypotheses that might be otherwise impossible to achieve in a non-virtual environment.

Continued international competitiveness in research, however, may be limited by the ability of Alberta's broadband research networks to meet this growing need. While

Alberta SuperNet will have sufficient capacity to support the use of advanced learning technologies for learning, it may not have the capability to fully support such complex research activity.

In addition, research on new information and communication technologies, applications, and processes can be both a source of revenue, as well as an important contributor to the enhancement of the use of technology in Alberta's learning system.

Outcomes

• research capability is enhanced
• collaboration within the research community is improved
• new technologies, products, processes, services and learning delivery mechanisms enhance the quality of Alberta's learning system and, where appropriate, may be commercialized.

Potential New Actions

• work with Alberta Innovation and Science, the Netera Alliance, CANARIE and other stakeholders to facilitate the development of advanced research networks to effectively support the activities of Alberta's research community
• work with the Alberta research community and the private sector to identify technological solutions to address learning system needs
• work with the Alberta research community, private sector technology and learnware developers, Alberta Economic Development, Alberta Innovation and Science, and Industry Canada to identify opportunities to promote Alberta innovation in technology in international markets.

Conclusion

Alberta is recognized internationally for the excellence of its learning system – its high quality curriculum and learning programs, teaching excellence, diversity of choice, learner achievement, collaborative relationships with stakeholders, innovative practices, and strong post-secondary research community. Used appropriately, technology can build on these strengths and enhance the learning system's ability to respond to changing learner needs and expectations. The Ministry and the learning community have a shared responsibility to ensure that investment in technology advances learning system priorities and yields the greatest benefits to learners. Alberta Learning will continue to work with stakeholders, within the context and direction established by the Learning and Technology Policy Framework, to ensure that their expertise and views inform learning system activities in this rapidly evolving area.

APPENDIX J: ANALYSIS - LEARNING AND TECHNOLOGY POLICY FRAMEWORK, ALBERTA EDUCATION

In the summer of 2004, Alberta Learning, which at the time included K-12 and the post-secondary system, released The Learning and Technology Policy Framework with the strategic intention to "provide direction and coordination for the infusion of technology across Alberta's learning system" (Alberta Education, 2004, p. 2). The framework, like Alberta Education's Business Plan, includes a vision, principles and goals for learning and technology in Alberta's education sector. Unlike the Business Plan, the framework was developed through consultation with various technology leaders and stakeholder groups. Although the framework identifies 10 technology and learning dimensions and indicates direction through outcomes, examples of current initiatives and potential new actions, specific performance measures are not included.

Since the framework encompasses a broad cross-section of the technology and learning sector in Alberta, the analysis is contained to the portions most relevant to the K-12 system. The five prominent discourses emerging from the analysis reflect the influence of three contextual factors. First, although Alberta Learning (Education) had actively pursued provincial technology programs and projects since 1975, the agenda seemed to drift with political interests and technology trends. The framework reflects an attempt to capture the status of various initiatives and present a coherent, systemic direction for decision-making

in technology and education. The framework also attempts to respond to the 8 technology-specific recommendations in the Alberta Commission on Learning report released a year prior. In addition, the framework reflects an interest in capitalizing on the potential opportunities resulting from the convergence of the K-12 and post-secondary systems in 1999 such as the growth and coordination of online learning programs. Throughout the document the potential to increase collaboration and innovation and share knowledge to realize greater efficiencies and enhance learning is emphasized.

However the framework, perhaps in an attempt to straddle the differences, in the purpose, governance and mandate, between public education and the post-secondary system, deemphasizes factors potentially limiting implementation. For example, the framework expresses interest in maintaining student choice, centralized funding (base funding) and local decision-making with respect to the allocation of resources. These factors have different implications in the K-12 and post-secondary systems and could work at cross-purposes to notions of collaboration and cooperation. The tensions created by bringing the two systems together within one framework are evident in the key assumptions related to technology and education. The prominent discourses effectively communicate an interest in realizing the benefits of technology while maintaining a focus on student learning, curriculum and shifts in the economy.

Five prominent discourses, in the table below, are evident in the Learning and Technology Policy Framework: 1) access, 2) change and the new economy,

3) accountability, 4) curriculum and practice-based and 5) critical technology literacy.

Prominent Discourses	**Existential**	**Prepositional**	**Value**
Access	Whether it is used to enhance classroom learning, to provide skilled trades training to apprentices and journeymen at their place of work, or to expand the range of learning options for non-traditional learners and people living in remote geographic locations, information and communication technology (ICT) is an important tool for extending the reach and increasing the flexibility and responsiveness of Alberta's lifelong learning System (3)	Technology can provide greater access to resources, expose students to real-world problems and authentic contexts for learning, and provide alternative methods of representing and communicating their knowledge. (9)	diversity of choice within Alberta's learning system is maintained (320)
	provide access to interactive educational resources (33)	Albertans will have the opportunity to participate in lifelong learning supported by a learning system in which learning providers collaborate to deliver quality and innovative learning opportunities – where and when Albertans need them – to enhance their social, cultural, and economic well being. (22)	Used appropriately, technology can build on these strengths and enhance the learning system's ability to respond to changing learner needs and expectations. (556)
Change and the new economy	Information and communication technology supports Alberta's globally recognized learning community by enhancing learning delivery, knowledge and skill acquisition, learning system management, and innovation. (75)	Alberta will be recognized as an international leader in online learning. In addition, innovative technologies, applications, and resources will enhance Alberta's presence in international markets. (135)	new technologies, products, processes, services and learning delivery mechanisms enhance the quality of Alberta's learning system and, where appropriate, may be commercialized. (537)
	the acquisition of ICT	The ICT skills of	Innovation and

Prominent Discourses	Existential	Prepositional	Value
	skills is fundamental to participation in the knowledge- based economy, and to the ability to discern and fully benefit from the technologies available in today's society (14)	Albertans will be improved to ensure their competitiveness in a knowledge economy, and to enable them to use technology to address other interests and needs. (120)	knowledge creation are essential to the prosperity of all Albertans. (514)
	The growth of knowledge-intensive industries, including the ICT industry, depends largely on Albertans' capacity for innovation. (515)	The availability of ICT offers great opportunities to enhance the speed with which knowledge is exchanged and thus contributes to increased competitiveness through innovation. (518)	
	Alberta is recognized internationally for the excellence of its learning system (553)		
	It fosters innovation, facilitates dialogue and offers potential for developing new practices among the education and research communities. (11)		
	The Alberta Commission on Learning, in its October 2003 report, recognizes the transformational impact of technology on learning and the need to integrate technology fully into Alberta's learning system (26)		
Accountability	ensuring that investment in technology is consistent with learning system objectives/priorities and optimizes benefits to learners (48)	ICT will be used to improve learner participation, achievement, and satisfaction with the learning process. (113)	individualize the tracking and recording of learning progress (35)
	It enhances the learning process. (149)	Learning information systems and quality data will inform Ministry and learning provider decisions. (125)	Therefore, ICT learning outcomes can no longer be viewed as separate from other content area and process outcomes (161)

Prominent Discourses	Existential	Prepositional	Value
		decisions are based on learning system/government priorities and the enhancement of learning outcomes, and are evaluated using established performance criteria. (86)	technology must demonstrate a 'return on investment' (e.g. enhancing learning outcomes or improving the efficiency of administrative practices). (433)
		identify key performance indicators to measure the overall impact of technology on the achievement of learning system objectives and to measure progress (472)	
		ensure that an evaluation component is incorporated into all Ministry and learning system technology initiatives (470)	
Curriculum and practice-based	Attaining competency in both skills and pedagogies is a complex process that requires long-term commitment and support. (249)	Educator expertise in pedagogy and facilitating learner success will be recognized. (117)	Technology is best learned within the context of applications. (160)
	Teachers, faculty and instructors are critical in ensuring effective use of technology in learning. (213)	Educators need both technology skills and effective pedagogical strategies to use technology in a variety of learning and teaching environments. (245)	educators have the capacity to make informed choices about the meaningful application of emerging technologies throughout their careers. (266)
		Since educational leaders (K-12 principals, school district administrators, post- secondary deans and department heads) are fundamental to initiating and sustaining change processes such as technology integration, increasing the skills of these leaders will strengthen organizational	Therefore, ICT learning outcomes can no longer be viewed as separate from other content area and process outcomes. (161)

Prominent Discourses	Existential	Prepositional	Value
		capacity for implementation. (255)	
		increase the flexibility of educators to address individual needs and preferences. (89)	
		adapt teaching to different learning styles, preferences and paces (31)	
Critical technology literacy	Technology is significantly enhancing and altering human activity, enabling individuals to live, work, learn and play in different ways. (144)	They need to understand the impact of technology on everyday lives, and need to be able to use computers and other technologies flexibly, creatively, and purposefully to support their learning. (153)	They must be prepared to understand, use and apply ICT in effective, efficient and ethical ways. (155)
		learners will develop skills and competencies in the use of ICT and an understanding of the role of ICT in society (and) learners will be critical and informed users of ICT (186)	Mastering isolated ICT skills is insufficient as an end goal – students must be able to recognize what they need to accomplish, determine which technologies (if any) will assist them, and be able to apply various ICT skills in accomplishing meaningful tasks as part of the learning process. (157)

APPENDIX K: BUSINESS PLAN 2008 – 2011, ALBERTA EDUCATION – PRIMARY DOCUMENT

ACCOUNTABILITY STATEMENT

The business plan for the three years commencing April 1, 2008 was prepared under my direction in accordance with the Government Accountability Act and the government's accounting policies. All of the government's policy decisions as of March 18, 2008 with material economic or fiscal implications of which I am aware have been considered in preparing the business plan.

The Ministry's priorities outlined in the business plan were developed in the context of the government's business and fiscal plans. I am committed to achieving the planned results laid out in this business plan.

original signed by

Dave Hancock, Q.C. Minister of Education

April 4, 2008

THE MINISTRY

The Ministry of Education consists of the Department of Education and the Alberta School Foundation Fund. The success of every student is our highest priority.

The Department of Education works in collaboration with students, parents, educators and the school community at large to provide opportunities for Alberta children and youth to develop the skills they need to be capable, contributing members of society. This 2008-11 business plan sets the course for the education system in Alberta over the next three years.

The Department of Education:

• develops and supports implementation of policies, programs and standards,

• promotes continuous improvement of student learning through assessing and reporting results,

• certificates teachers and conducts workforce planning for the education sector,

• provides funding to school authorities on an equitable basis and monitors the financial management of school jurisdictions, and

• provides leadership and inspiration to the 21st century classroom and learning centre to support student achievement and maintain its world-class education system.

Education

VISION

The best Kindergarten to Grade 12 education system in the world.

MISSION

The Ministry of Education, through its leadership, partnerships and work with the public – including stakeholders – inspires, motivates and provides the necessary tools and opportunities for every child to attain the knowledge, skills and attributes required for lifelong learning, self-sufficiency, work and citizenship. The Ministry of Education is defined through its vision, mission, values and principles. The Ministry's vision is its view of the future. The mission describes the Ministry's purpose and reason for existence. The Alberta Public Service values demonstrate the beliefs or traits that guide Ministry actions, and the principles identify the Ministry's method of operating.

ALBERTA PUBLIC SERVICE VALUES

Respect We foster an environment in which each individual is valued and heard.

Integrity We behave ethically and are open, honest and fair.

Accountability We are responsible for our actions and for contributing to the effectiveness of the public service.

Excellence We use innovation and continuous improvement to achieve excellence.

PRINCIPLES

Student Centred The highest priority of the education system is the success of each student.

Leadership Alberta is a leader in academic excellence so that all students can find their passions and achieve their potential.

Accessible Every student in Alberta has the right of access to a quality basic education consistent with the student's needs and abilities.

Responsive The education system is flexible, anticipates student needs and provides opportunities for parent and student choice.

Innovative The education system demonstrates leading-edge innovation in support of improved student learning outcomes.

Collaborative The foundation for lifelong learning best occurs when partners and stakeholders work together to provide a holistic approach and a supportive environment.

Equitable All students have equitable access to quality learning opportunities.

Accountable All those involved in the education system are accountable to Albertans for quality results, system sustainability and fiscal responsibility.

LINK TO THE GOVERNMENT OF ALBERTA STRATEGIC BUSINESS PLAN

The Ministry of Education ensures that its business plan is directly aligned with and supports the goals and priorities of the 2008-11 Government of Alberta Strategic Business Plan.

Link to Goals in the Government of Alberta 3-Year Business Plan

• Goal 2: Albertans will be well prepared for lifelong learning. Quality basic education enables children and youth to develop into responsible, caring, creative, self-reliant and contributing members of society. The education system helps

them develop the skills they need to achieve their aspirations and maximize their potential.

SIGNIFICANT OPPORTUNITIES AND CHALLENGES

The following environmental factors have been identified as having significant potential to influence the Ministry of Education's direction. The Ministry has considered these factors in the context of identifying strategic priorities and strategies that will ensure high quality learning opportunities, excellent student outcomes and Ministry support for continuous improvements to the education system.

Learning in the 21st Century

The beginning of the 21st century has brought about significant changes to society. These changes – diversity of student population, new and emerging occupations and careers, shifts in family structures, what we now know about how students learn, and increased use of technology – have all impacted teaching and learning. These shifts need to be acknowledged in Alberta Education's approach to teaching and learning if we wish to remain a leader in education, nationally and internationally.

Advancing Alberta's place in a new knowledge-based economy necessitates the development of essential skills such as critical thinking, problem solving, innovation, consensus building, collaboration and self-direction, which have always been and continue to be important. As well, students and teachers in Alberta need to be equipped to access and convert information into understanding in a meaningful way. The ability to synthesize and develop core understandings is key to responding to changes in the future. Alberta's students need to be able to respond and adapt to change, as well as develop, transfer and apply their knowledge and skills. They also need to have opportunities to develop self-reliance, to learn to support themselves and their families, and to contribute to their communities. A range of choices in careers should be available to them, so they feel fully engaged as active and responsible citizens, playing a role in Alberta's growth and future.

Accountability goes hand in hand with a strong education system. A central component of an effective accountability system is effective student assessment practices. Assessment of and for learning are integral components of learning in the 21st century. Assessment of learning confirms what students know and provides evidence of achievement to students, parents, teachers and the public. Assessment for learning occurs throughout the learning process and is designed to help teachers, students and parents plan for what they can do to foster success. Teachers, students and parents rely on teacher observation, review of student work and student self- reflection to help them plan for instruction and learning. Strong assessment of and for learning are critical to student success.

Public Expectations

Alberta has an outstanding education system, recognized nationally and internationally as one of the best in the world. International test results in 2006

from the Programme for International Student Assessment indicate that Alberta students continue to be among the top in the world, scoring second in science, and tying for third in reading and fifth in math.

The challenge is to maintain high levels of performance while working toward continuous improvement by finding ways to strengthen the education system at all levels, including school, school jurisdiction and department. The public expects an education system that is sustainable, fiscally responsible and accountable for results. The public anticipates that students will be well prepared for the future in an increasingly global environment. They expect to have an education system that is resourced to respond to diverse needs and to provide access to optimum learning opportunities for all children and youth throughout their school years. Albertans also recognize that a world-class education requires cooperation and collaboration. Everyone, from parents to students, teachers and administrators, government and the community, has an important role to play in building and maintaining a strong education system.

Government of Alberta Priorities

• Work with Advanced Education and Technology to enhance value-added activity, increase innovation, and build a skilled workforce to improve the long-run sustainability of Alberta's economy.

• Work with Justice to promote strong and vibrant communities and reduce crime so Albertans feel safe.

Changing Demographics and Economics

Alberta's vibrant economy is presenting unique opportunities and challenges for the education system. The strong economy is generating significant in-migration, while a younger-than-average population is reflected in increased fertility rates. Rapid population growth is creating a need for increased education infrastructure in some areas, as well as additional English as a Second Language programming. At the same time, declining populations in many rural areas present challenges in providing access to a broad range of programs for students. Urbanization creates increasing challenges in attracting and retaining teachers in rural and remote areas. Many children and youth are facing health and social challenges from poverty, family breakdown, substance abuse and gambling, to eating disorders and obesity, physical, mental or emotional problems, bullying, and personal safety and security issues. There must be effective supports within the education system and successful collaboration and community partnerships, including appropriate health and service providers and support organizations. These efforts ensure that students and their families are supported and that all students have the opportunity for safe and healthy development.

Technology in Education

Technology is prevalent in all aspects of society and culture and is an integral part of the lives of most children and youth. Devices such as computers, portable multimedia players and cell phones are a part of their daily lives. The Internet allows them to find information, connect with others, and add their own content.

Students are using these technologies with ease and applying them in fundamentally different ways than many adults using the same tools. Educators face the challenge of integrating technology effectively throughout all areas of curriculum and classroom practices.

Technology provides tremendous opportunities for education, including:

• Assistive technology in the classroom to make learning accessible for all students;

• Technologies that provide greater learning and teaching opportunities, such as electronic whiteboards and mobile computing devices;

• Video conferencing to open a window to an expanded view of the world and experiences as global citizens, as well as to increase access to programming, support second-language instruction, enhance programs and experiences for teachers, and facilitate sharing of content expertise; and

• Flexible and innovative learning opportunities for students – any time, any place.

Education Sector Workforce

The strength of Alberta's education system depends in large part on highly skilled and dedicated teachers and administrators with support from teacher assistants and aides, counsellors, and health, community and family service providers. However, consistent with Alberta's population as a whole, the education sector workforce is aging. The largest age group of educators is between 45 and 60 years of age. At the same time, Alberta's school-age population is expected to exceed all previous historical peaks within the next ten years. Attraction and retention of skilled, proficient, child-centred teachers is crucial. Appropriate support for the classroom teacher and schools is vital.

1. Participation and Completion Rates

Linkage: Goals 1 and 2

Increase student participation and completion rates in health, math, science and career and technology studies courses to grow the technology and science sectors. The Ministry will focus its efforts at all grade levels to address this priority. Recognizing that an estimated 80 per cent of new jobs created will require some form of post- secondary education and that completing high school has far-reaching benefits both for individuals and for society as a whole, the Ministry will continue to work with the public, government partners, stakeholders and students to achieve a system where every student is inspired – and has the opportunity – to succeed, graduate and enroll in an appropriate form of post-secondary education or lifelong learning.

2. Success for All Students

Linkage: Goals 1, 2 and 3

The education system in Alberta comprises a rich and diverse student population. A key focus of the Ministry is to ensure that the education system continues to expand its capacity to remain adaptable, innovative and responsive to the current

and emerging needs of students. Effective transitions are needed throughout the system from early childhood through Kindergarten to Grade 1, elementary to junior high, junior high to senior high, and on to high school completion and into post-secondary / trades / apprenticeship programs or the world of work. The learning environment must acknowledge children's varied backgrounds and provide access to quality programs for all children, including children at risk. The Ministry is also committed to developing a comprehensive and collaborative approach to health, social and learning programs and services for children and youth to ensure that all students are well cared for, safe, healthy and successful at learning.

3. First Nations, Métis and Inuit Student Success

Linkages: Goals 1, 2 and 3

An ongoing priority for Education is to improve the educational attainment of First Nations, Métis and Inuit students in provincially funded schools. The Ministry is working with the education system, community and government partners to enhance Aboriginal learner success.

4. Strengthening the Education Sector Workforce

Linkage: Goals 1, 2, and 3

The Ministry recognizes that a strong and robust workforce is essential in meeting the needs of learners. To this end, the Ministry is taking a proactive approach to emerging pressures in the education sector workforce, ensuring a child and youth-centred workforce with the best people in the right places, at the right times, with the right skills to meet the needs of learners.

5. Enhancing Relationships

Linkage: Goal 3

A key focus of the Ministry of Education is to sustain and enhance relationships to ensure that the education system continues to expand its capacity to remain adaptable, innovative and responsive to the needs of Alberta students for today and tomorrow.

The Ministry is developing new opportunities and approaches to engage stakeholders and communities across the province. This will result in feedback from a range of perspectives on the needs of the 21st century learner, thereby ensuring our education system reflects the needs of the changing world in which we live.

CREATING AND PROTECTING OUR OPPORTUNITIES

STRATEGIC PRIORITIES 2008-11

Through the Ministry's review of environmental factors, the strategic priorities described below have been identified.

These are in addition to the important ongoing core activities of the Ministry.

6. Schools Where Students Live and Learn

Linkage: Goal 3

The Government of Alberta is committed to managing growth pressures resulting from the province's thriving economy. For the Ministry of Education, that means working in partnership with Infrastructure and Treasury Board to assess financing strategies for school construction to ensure schools are available where students live and learn. It also means exploring innovative and creative solutions to school infrastructure to ensure students are educated in safe and well-maintained facilities.

BUILDING OUR QUALITY OF LIFE

7. Access to Early Learning Opportunities and Intervention for At-Risk Children

Linkage:

Goals 1 and 2

Increase broad-based supports and early intervention initiatives for at-risk children to improve their learning outcomes. The Ministry will develop and encourage partnerships and provide resources that enable appropriate learning opportunities so at-risk children and youth can overcome barriers to success. All students should be inspired and have the opportunity to find their passions and to be successful. Many students within the system require additional supports in order to succeed. As the learning that occurs in a child's first few years has a profound influence on his or her success in school and future quality of life, the Ministry is enhancing its collaborative approach to early learning and care.

CORE BUSINESSES, GOALS, STRATEGIES & PERFORMANCE MEASURES

The Ministry of Education has identified one core business that is an ongoing key responsibility. The core business includes three goals with specific outcomes that describe the end results the Ministry wants to achieve in fulfilling its mission. The Ministry also has identified strategies for 2008-11 that support the Ministry goals and the Government of Alberta Strategic Business Plan.

Performance measures indicate the degree of Ministry success in achieving its goals and outcomes. In assessing progress, targets are considered met if the result is within five per cent of the target value, and targets are considered exceeded if the result is more than five per cent above the target value (except for provincial achievement tests).

GOAL ONE

Core Business One: Lead and Support the Education System So That All Students are Successful at Learning

The Ministry of Education provides high quality learning opportunities for students by:

- Setting policies and standards for program and resource development;
- Developing programs to meet the needs of all students;
- Providing support for program implementation, including in-servicing and professional development for teachers to achieve implementation;
- Providing funding for the education system; and

• Encouraging research, innovation and inspiration to ensure continuous improvement and leading-edge practices.

High quality learning opportunities for all include increased access to and participation in educational programs to enable successful learning for all students. The Ministry will continue to implement strategies that help in achieving this goal.

High quality learning opportunities for all

Strategies

1.1 Develop, acquire and implement programs of study and learning and teaching resources in English and French that are responsive to students' needs, that focus on essential skills including critical thinking, problem solving and creativity, and that maximize the impact of emerging technologies on improving education.

1.2 Enhance learning opportunities for students in the areas of humanities; second language acquisition; and cultural education, including art, music, drama and dance.

1.3 Expand opportunities for students to examine career options by exploring innovative career and technology studies delivery models, including regional centres of career and technology studies, which will support increased high school completion rates and growth in the technology and science sectors.

1.4 Enhance student opportunities to explore and pursue health care careers through development of work-related programs.

1.5 Work with other ministries and stakeholders to support the development of a comprehensive approach to learning and wellness for students.

1.6 Foster a safe and caring school environment and create a culture of understanding of, and respect for, differences.

1.7 Work with stakeholders to implement province-wide strategies, actions and community initiatives that will increase Alberta's five-year high school completion rate.

1.8 Implement the distributed learning strategy in collaboration with the education sector.

1.9 Enhance access to learning opportunities for students in small and rural schools.

1.10 Work with school authorities to promote innovative learning and teaching through increased access to classroom technologies.

The following have been identified as Goal 1 outcomes:

• The education system meets the needs of all students, society and the economy.

• Schools provide a safe and caring environment.

• Children and youth at risk have their needs addressed through effective programs and supports.

• Students complete programs so that they are ready to attend post-secondary institutions and/or contribute as members of society and the economy.

GOAL TWO

The Ministry of Education supports the achievement of excellence in learning outcomes by providing flexible programming options designed to address the diversity of student needs.

Excellence in learning outcomes means that all students are well prepared for lifelong learning, work and citizenship, and have the skills and knowledge to be successful. Support is also provided through effective implementation of provincial and school-based student assessments.

The following have been identified as Goal 2 outcomes:

• Students demonstrate high standards in learner outcomes.

• Students are well prepared for lifelong learning.

• Students are well prepared for employment.

• Students model the characteristics of active citizenship.

Strategies

2.1 Support school jurisdictions in responding to classroom diversity and the evolving learning needs of all students, including immigrant; refugee; First Nations, Métis and Inuit; students needing English as a Second Language programming; and students with special needs.

2.2 Work with government partners, the community and stakeholders in developing a collaborative team-based approach to improve success for children and youth by enhancing early identification of student needs and providing support, assistance and intervention, and by fostering transitions from home and community to school and supporting transitions from elementary to junior high, junior high to high school and high school to post-secondary.

2.3 Work collaboratively with partners and stakeholders to ensure success for First Nations, Métis and Inuit students, including:

• Improving community and parental engagement; and

• Conducting a focused review of achievements under the First Nations, Métis and Inuit Education Policy Framework.

2.4 Integrate learnings from Alberta Initiative for School Improvement projects into policy and program considerations, communicate research findings widely, and promote and celebrate classroom, school and jurisdiction excellence.

2.5 Working with education stakeholders, identify ways to improve the assessment for learning of students.

2.6 Provide leadership at all levels for the improvement of student achievement.

2.a Percentages of students in Grades 3, 6 and 9 who achieved the acceptable standard and percentages who achieved the standard of excellence on provincial achievement tests

GOAL THREE

Highly responsive and responsible education system

Strategies

3.1 Provide Albertans with timely, accurate and relevant information about the benefits of the education system.

3.2 Implement the Ministry's public involvement framework, ensuring continued dialogue with stakeholders and expanded consultations with the public.
3.3 Provide leadership in the innovative development of school facilities through creative approaches to designing and building schools that meet the changing needs of students.
3.4 Strengthen the Ministry's capacity for evidence-based decision-making through a collaborative approach to research to inform the education system.
3.5 Address the emerging workforce challenges of the education sector.
3.6 Enhance capacity for continuous improvement of the education system through accountability and reporting.
3.7 Working collaboratively with stakeholders, strengthen the funding framework to ensure equitable distribution of funds to school authorities.
3.8 Work with stakeholders to develop strategies and action plans to implement the policy on technology in education.
3.9 Establish a Youth Advisory Initiative to create opportunities for Alberta youth to provide advice on the education system.
3.10 Implement a provincial approach that will increase efficiency, effectiveness and economies of scale in managing student information across the education system to deliver the right information to the right people at the right time.
3.11 Explore options for streamlining school board and administrative practices to achieve greater innovation and efficiency for the Ministry and school authorities.
3.12 Enhance relationships with territories and provinces to advance Alberta's collaborative arrangements and leadership in pan-Canadian initiatives with the Western and Northern Canadian Protocol and the Council of Ministers of Education, Canada.
3.13 Implement the priorities of Alberta's International Education Strategy to increase opportunities for students and educators to build international and intercultural knowledge.
The Ministry of Education provides leadership and support to ensure a highly responsive and responsible education system, working collaboratively and communicating effectively with partners, stakeholders and the public. The Ministry promotes the development of leadership resource capacity within the education sector. It also assists in the development and implementation of planning, reporting and financial accountability systems, and leads in the effective use of information systems and technology.
The following have been identified as Goal 3 outcomes:
• The education system at all levels demonstrates effective working relationships.
• The education system at all levels demonstrates leadership, innovation and continuous improvement.

APPENDIX L: ANALYSIS - 2008 – 2011 BUSINESS PLAN, ALBERTA EDUCATION

The Business Plan is a guiding document for the education system in Alberta. The Business Plan is produced by the Ministry of Education and aligned with the goals and priorities of the Alberta Government. The Business Plan sets direction by identifying priorities which become the rationale for new provincial initiatives and basis for the budget. The budgetary piece is politically important since Alberta Education assumed full financial control of education, formerly shared with the municipalities, through the reforms in 1995 (A. Taylor & Wishart Leard, D. and Shultz, L., 2005, p. 76). The Business Plan, through connections with accountability and budgeting, influences jurisdictional planning and reporting.

The Business Plan is a high-level policy document and some may argue it has little to do with what actually happens in classrooms around the province. In my experience, though, the language of the Business Plan does have influence first, it justifies budget decisions and second, it sets a tone for educational leaders and Ministry employees since aligning with provincial priorities becomes crucially important to advancing agendas. For example, because high school completion has been identified as a priority, initiatives or projects have been and will be shaped to demonstrate support in some way to secure relevance, support and funding. Through a call for proposals, jurisdictions focus planning and

resources to demonstrate how one-to-one laptops for example, contribute to the priority of improving high school completion. Given its influence and prominence, the Business Plan, by setting out provincial priorities, is a valuable piece of data through which to examine assumptions about technology and education.

The Business Plan also gathers data and predicts provincial incremental improvement using performance measures. The Business Plan lists performance measures and targets increases in each area for the 3-year term of the plan. For example, in 2006, 79.9% of grade three students attained an acceptable level of performance on the mathematics achievement exam. The Business Plan sets out a target goal to have 84% of grade three students attaining an acceptable standard in 2010. The targets and measures are used to chart continuous improvement.[21] This is one way Alberta Education evaluates the success of a particular initiative and therefore these measure can influence decisions regarding the use of technology.

The Business Plan is a fairly succinct, text-light document at 14 pages. Primarily, it draws attention to priority areas and is not meant to capture all aspects of the education system. In my analysis of the business plan, I included

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[21] The term continuous improvement, borrowed from business and industry, is one component of quality management theory (Kaufman & Zahn, 1993). Continuous improvement is an ongoing process of improving products and services incrementally, often using benchmarking, based on customer feedback. Alberta Education uses the Accountability Pillar as a reporting mechanism for tracking continuous improvement by gathering feedback from parents, students and teachers and collecting statistical data such as provincial test results and high school completion numbers.

the assumptions most relevant to technology and highlight features of the text contributing to establishing a meaningful context for the assumptions. Overall, technology appeared to be strongly connected to notions of improved performance.

As the table below demonstrates, three prominent discourses emerged from the key assumptions identified in the Business Plan: 1) international standings, 2) change and the new economy and 3) access.

Prominent Discourses	**Existential**	**Prepositional**	**Value**
International standings	The education system is flexible, anticipates student needs and provides opportunities for parent and student choice. (57)	Encouraging research, innovation and inspiration to ensure continuous improvement and leading-edge practices. (267)	The challenge is to maintain high levels of performance while working toward continuous improvement by finding ways to strengthen the education system at all levels (116)
	provides leadership and inspiration to the 21st century classroom and learning centre to support student achievement and maintain its world-class education system. (29)	use innovation and continuous improvement to achieve excellence. (49)	These shifts need to be acknowledged in Alberta Education's approach to teaching and learning if we wish to remain a leader in education, nationally and internationally (88)
	Assessment of and for learning are integral components of learning in the 21st century. (102)	The education system demonstrates leading-edge innovation in support of improved student learning outcomes (59)	The public expects an education system that is sustainable, fiscally responsible and accountable for results. (118)
Change and the new economy	The beginning of the 21st century has brought about significant changes to society. These changes – diversity of student population, new and emerging occupations and careers, shifts in family structures, what we now know about how students learn, and increased use of	The education system continues to expand its capacity to remain adaptable, innovative and responsive to the needs of Alberta students for today and tomorrow. (217)	Advancing Alberta's place in a new knowledge-based economy necessitates the development of essential skills such as critical thinking, problem solving, innovation, consensus building, collaboration and self-direction, which have always been and continue

Prominent Discourses	Existential	Prepositional	Value
	technology – have all impacted teaching and learning. (82)		to be important. (88)
	The ability to synthesize and develop core understandings is key to responding to changes in the future. (92)	Expand opportunities for students to examine career options by exploring innovative career and technology studies delivery models, including regional centres of career and technology studies, which will support increased high school completion rates and growth in the technology and science sectors. (280)	The public anticipates that students will be well prepared for the future in an increasingly global environment. (119)
	Accountability goes hand in hand with a strong education system. A central component of an effective accountability system is effective student assessment practices. (100)	Increase student participation and completion rates in health, math, science and career and technology studies courses to grow the technology and science sectors. (178)	Alberta's students need to be able to respond and adapt to change, as well as develop, transfer and apply their knowledge and skills. (94)
	Assessment of and for learning are integral components of learning in the 21st century. Assessment of learning confirms what students know and provides evidence of achievement to students, parents, teachers and the public. (102)	Develop, acquire and implement programs of study and learning and teaching resources that focus on essential skills including critical thinking, problem solving and creativity, and that maximize the impact of emerging technologies on improving education. (274)	perspectives on the needs of the 21st century learner, thereby ensuring our education system reflects the needs of the changing world in which we live (221)
Access	Technology is prevalent in all aspects of society and culture and is an integral part of the lives of most children and youth. (150)	As well, students and teachers in Alberta need to be equipped to access and convert information into understanding in a meaningful way. (91)	Educators face the challenge of integrating technology effectively throughout all areas of curriculum and classroom practices. (156)

Prominent Discourses	Existential	Prepositional	Value
	Devices such as computers, portable multimedia players and cell phones are a part of their daily lives. The Internet allows them to find information, connect with others, and add their own content. (151)	Technologies that provide greater learning and teaching opportunities, such as electronic whiteboards and mobile computing devices; (160)	Flexible and innovative learning opportunities for students – any time, any place. (166)
	Students are using these technologies with ease and applying them in fundamentally different ways than many adults using the same tools (153)	Video conferencing to open a window to an expanded view of the world and experiences as global citizens, as well as to increase access to programming, support second-language instruction, enhance programs and experiences for teachers, and facilitate sharing of content expertise (162)	All students have equitable access to quality learning opportunities. (63)
	…declining populations in many rural areas present challenges in providing access to a broad range of programs for students. Urbanization creates increasing challenges in attracting and retaining teachers in rural and remote areas. (138)	Work with school authorities to promote innovative learning and teaching through increased access to classroom technologies. (294)	Every student in Alberta has the right of access to a quality basic education consistent with the student's needs and abilities. (55)
	Assistive technology in the classroom to make learning accessible for all students; (159)	Enhance access to learning opportunities for students in small and rural schools. (293)	
	Technology provides tremendous opportunities for education (158)		

APPENDIX M: SEMI-STRUCTURED INTERVIEW QUESTIONS

1. Career path – in terms of connection to provincial technology policy and initiatives:
2. Could you describe the scene provincially – around technology policy and politically too, what was happening in terms of reform?
3. Let's start at the beginning. The ICT program of studies was created in response to what? (needs, curricular gaps, external forces?)
4. What was the (organizational) response to the original document?
5. Let's move to the development of the Learning and technology policy framework. In your experience, has that document influenced decision-making in districts/schools?
6. What do you think were the assumptions behind that delivery model – assumptions about pedagogy and learning?
7. What does innovation mean?
8. When does technology improved or enhance student learning?
9. What do you believe were the hoped for outcomes of the provincial technology initiatives? And what were the actual outcomes? (SuperNet, VC, one:one)
10. Higher order thinking skills are often that is associated with 21st century learning and technology. How do you define 21st century learning?

11. As you know, the term ‘impact’ is often associated with technology in education. We’ve seen with Alberta Education’s grants for example. What does impact mean to you? What evidence would you gather to prove impact?
12. Let’s move to the development of the Learning and technology policy framework. In your experience, how has the teachers voice been included in the discussions and how have pedagogical considerations been part of the policy-making?
13. We have seen a move over the years from integration of technology to infusion, then transformation and most recently disruption. What does this me to teaching practice?
14. In summary then, what should technology policy contain to realize the potential of technology?