

**TEACHING TO ACHIEVE DEEP LEARNING IN THE AGE OF
TECHNOLOGICAL DETERMINISM**

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TEACHING TO ACHIEVE DEEP LEARNING IN THE AGE OF TECHNOLOGICAL
DETERMINISM

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Abstract

As a post-secondary instructor, I wondered what elements constitute effective university teaching and whether they were being employed within the Integrated Management Experience (IME) program. In addition, I was aware of the impact of technology at a societal level and wanted to examine its influence on adult students' abilities to successfully transition into the 21st century workforce. The review of literature revealed that the teaching strategies linked with helping students deeply learn promoted conceptual understanding, critical thinking, experiential learning, and internalization. I then reviewed data from the IME program to assess the degree to which each teaching strategy was implemented. Each was found to be embedded within the IME program. Data revealed that students believed they were prepared for work experiences they may face once they left the program, and to adapt to technological determinism's impact on their environment.

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CHAPTER ONE: INTRODUCTION

Teaching to Achieve Deep Learning in the Age of Technological Determinism

Technological determinism, a phrase coined by economist Thorstein Veblen in the nineteenth century (Papageorgiou & Michaelides, 2016), is based on the premise that technology will influence societal change, disrupting the patterns of how people will live their lives (Smith & Marx, 1994). Kotler, Armstrong, Valerie, and Cunningham (2014) indicated that technology “is perhaps the most dramatic force now shaping our destiny” (p. 88) with one socio-political implication of this change being that “the use of technology makes efficiency improvements possible without replacing employees whose jobs no longer exist” (Collins & Ryan, 2007, p. 29). These efficiencies have significant consequences: according to Frey and Osborne (2016), approximately half of the jobs in the U.S. marketplace are at risk of automation over the next 20 years. Thus, the labour force will be required to adapt to the demands of technological determinism. Clearly, the power of technology has significant implications for the workplace and for those whose lives are affected by it.

In what ways does this labour reality impact students preparing to enter the workforce? A variety of public school educators contend that current teaching in public schools is not fully developing students’ conceptual skills. Graduates are unable to adapt to an ever-changing marketplace. For example, Gini-Newman and Case (2015) stated that “for many decades, schools have not been appealing places for many students, and what we are teaching them has not resonated outside of school” (p. 5). Heller, Wolfe, and Steinberg (2017) stated, a “growing number of educators, policymakers, and researchers are steering discussions about school reform toward issues such as student motivation and

engagement, the social environment...the ability to apply knowledge and skills to real-world problems” (p. 4). In anticipation, then, of the consequences of technological determinism and the effect they will have on future generations, educators are developing learning strategies that enable students to deal with rapid technological change thereby providing future generation of workers with the capacity to think critically and to apply solutions to real-world challenges.

One pedagogical goal of educators to assist students as they respond to the many challenges brought about by technological determinism is known as deep learning. As defined by Fullan and Langworthy (2014), deep learning “develops the learning, creating and ‘doing’, dispositions that young people need to thrive now and in their futures” (p. 10). Reiterating the value of deep learning, Heller et al. (2017) stated: “In previous years it might have been possible to construe deeper learning as an optional supplement to the core work of schools, it is becoming hard to see it as anything less than the central imperative” (p. 14). Deep learning has the potential to equip students for rapidly changing workplaces of the 21st century in which technological determinism will influence societal needs and wants.

Purpose of the Project

This project originated in my curiosity about the quality of post-secondary teaching and the ways in which university teachers implement instructional strategies that may contribute to deep learning in students. As a post-secondary instructor, I wondered what elements constitute effective university teaching and whether they were being employed within the Integrated Management Experience in the Faculty of Management at the University of Lethbridge. As an instructor in this program, I favored particular

teaching strategies; however, I wanted to explore whether they reflected those identified in the literature as contributing to students' deep learning. In addition, I was aware of the impact of technology at a societal level and wanted to examine its level of influence on adult students' abilities to successfully transition into the 21st century workforce.

Accordingly, chapter one of this project will explore the conceptual foundations of adult student learning, deep learning, and technological determinism. Chapter two will consist of an examination of the evolution of post-secondary education in Canada leading up to the current environment Canadian students' encounter when they leave school to enter the work force. Lastly, chapter three will consider my perspective as an IME director and post-secondary educator. Each of the instructional strategies defined in the literature as contributing to deep learning will be analyzed and compared to my experiences within the IME program. This final chapter will also include student's perspective of the IME program and how it assisted them as they moved into the workforce.

Situating the Author in this Project

With over 28 years of teaching experience (eight in the public school system and 20 in the post-secondary sector), I sought to explore educational practice in the post-secondary field as I was interested in how these learning theories prepare adult learners for the challenges faced in the workplace due to the disruption caused by the advancement in technology. I believed these educational methods helped students adapt to their environment via deep learning. Each year Dhillon School of Business (DSB) educators are required to submit a Professional Activities Report (PAR) to our Dean. The last section of this report comprises of each educator's teaching philosophy. I would like

to share mine; currently, it states: my educational philosophy, is based on the premise of bringing words to life, giving them meaning outside the confines of four walls. Students should leave my class with greater insight regarding business content and application, and applying this insight in a socially responsible manner.

The automation wave society is currently experiencing has impacted my teaching philosophy. Technology is disrupting employment markets all over the world (Ford, 2016). Due to this disruption, traditional jobs in the marketplace are becoming redundant. Ford (2016) notes that based on the current pulse of the economy the old assumption that jobs will merely be replaced is no longer accurate. Ford (2016) supports this by indicating a deficit of over 9 million jobs becoming obsolete in the first decade of the twenty-first century, due to automation. He further indicates that in previous decades higher skilled jobs were created to offset the loss of routine entry-level positions, but unfortunately, this is no longer the case. These positions are obsolete with no alternative employment opportunities on the horizon.

After reflecting on the readings I have completed over the past twelve months in my graduate studies, my philosophy has evolved to include an added element. I believe it is imperative that educators expose students to situations that demand intellect but in a fashion that has them apply it to real-world situations, and be able to adapt to their environment based on the current rhythms of the economy influenced by technology.

Due to this exposure, my new PAR for 2018/19 will read: My educational philosophy is to bring words to life, giving them meaning outside the confines of four walls. Students should leave my class with greater insight regarding business content and application, and applying this insight in a socially responsible manner. Permitting

students to adapt to their environment, based on the current pulse of the economy via an educational experience that leads to deep learning.

As director of IME at the University of Lethbridge I am already putting into practice elements of what I believe to be an educational philosophy andragogical principles. As an example, students in the IME program have the opportunity to apply the theory they are learning by working as business consultants with nonprofit entities in the Lethbridge community. The program is set up to have students act as consultants, resolving internal business issues or problems by leveraging undergraduate course content. Students need to be able to think and apply the material in a fashion that will resolve problems or breathe life into opportunities. It is through applying the material they learn in a fashion that creates a deeper level of thinking and understanding. These skills also need to be applied in the second semester when they develop a proposal for how to increase awareness for the non-profit via a sponsorship event to be held in the community which not only increases awareness for the non-profit but also earns them money. Through this learning-focused partnership, since 2005, the IME program has raised over \$200,000.00 for nonprofits in the community.

A potential bias of this project is my professional belief that deep learning in students is an answer to the challenges presented to them by the imposition of the negative aspects of technological determinism. In the context of my classroom, I introduce and apply a variety of teaching methods, which I believe to be andragogical in focus and in keeping with my early assumptions of what leads to deep learning.

The goal, then, of this project is to shed light on instructional methods that encourage deep learning which enable students to respond (adapt) to the challenges of the

21st century resulting from technological determinism, and the ways in which the IME is/or is not addressing the instructional strategies that are indicated by literature as leading to deep learning.

Definition of Terms

Four key terms are used throughout this project. They include *andragogy*, *technological determinism*, *surface learning*, and *deep learning*.

Andragogy

Knowles (1970) defined andragogy as “the art and science of helping adults learn” (p. 38). He maintained there are four key differences between an adult and child learner. First, the adult’s self-concept is driven by oneself. By this, he means the student goes from being a dependent learner (reliant on the educator) to an independent learner (relying on oneself). Second, an adult acquires knowledge and uses it to help make decisions. This reservoir of knowledge is then accessible when required based on the adult’s life journey. Third, the adult’s role in society drives their learning. This orientation is often based on lifestyle and classification of work. Finally, an adult wants to immediately leverage the knowledge acquired, based on problems and opportunities presented through daily life. Based on the chronological age of most post-secondary students, it could be assumed that they might benefit from teachers’ increased awareness of Knowles’ theory, equipping them with the necessary tools to deal with the influence technological determinism will have on them over their lifetime.

Technological Determinism

A definition of technology is “the branch of knowledge that deals with the creation and use of technical means and their interrelation with life, society, and the

environment” (“Technology defined,” 2018). Technological determinism is a concept conceived during the industrial revolution by Thorstein Veblen, an economist who developed this model toward the end of the nineteenth century. Papageorgiou & Michaelides (2016) indicated that Veblen perceived that technology influenced institutional change, which, in turn, influenced societal norms and values:

In the Veblenian theoretical framework, the bearer of change is to be found, primarily, in technology. Veblen is concerned with socio-cultural evolution primarily as it relates to changes in the methods of dealing with the economy – the material means of life – and basically technology. (p. 7)

Dafoe (2015), augmenting Veblen’s view, stated technological determinism is the approach “that emphasizes (1) the autonomy of technological change and (2) the technological shaping of society” (p. 1052).

Surface Learning

Surface learning is facilitated through educational strategies such as memorization and note-taking. These are instructional methods often used by educators as a means of disseminating information. As indicated by McParland, Noble, and Livingston (2004), “students who use ‘surface’ learning commonly learn by rote, with the aim of simply reproducing the material” (p. 860). As noted by Williams (1992): “Surface learning refers to more temporary learning” (p. 45). Bloom (1956) would consider this style of learning as either knowledge, comprehension or application based. Leveraging Bloom’s (1956) taxonomy, one would consider this type of learning involves lower levels of cognitive thought process, called concretization.

Deep Learning

Martinez and McGrath (2014) believed deep learning makes students “more independent, self-directed thinkers, better prepared to cope with the modern demands...[of] the workforce, and the world at large” (p. 4). Alliance for Excellent Education (2018) indicated that deep learning is “the process of preparing and empowering students to master essential academic content, think critically and solve complex problems, work collaboratively, communicate effectively, have an academic mindset, and be self-directed in their education” (p. 3). Loveless (2013) indicated deep learning constitutes an ability to “critically analyze...apply [knowledge] in real world context while solving real world problems” (para. 2). Farrington (2013) indicated the Hewlett Foundation created a framework, identifying the attributes of deeper learning which included: “master core academic content, leverage critical thinking and complex problem solving skills, working collaboratively while communicating effectively, and learning how to learn.” (p.2). A sixth element was added to these attributes which included “develop academic mindsets” (p. 3).

Fullan and Langworthy (2013) posited that incorporating a deep learning strategy in education means employing,

skills that prepare all learners to be life-long creative, connected and collaborative problem solvers...learning systems to encourage youth to develop their own visions about what it means to connect and flourish in their constantly emerging world, and equip them with the skills to pursue those visions. (p. 2)

Considering Bloom's (1956) taxonomy (see Figure 1), this style of learning should be considered as either analysis, synthesis or evaluation. One would consider this type of learning involves upper levels of cognitive thought process (abstraction).

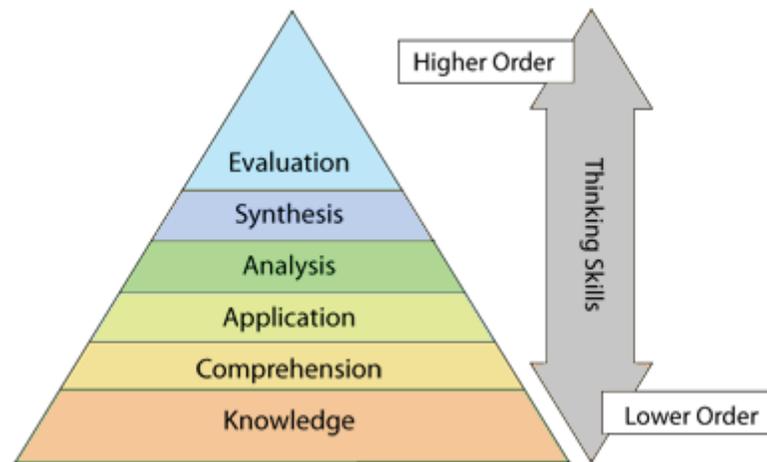


Figure 1. Bloom's Taxonomy

The Distinctiveness of Deep Learning

How is teaching for deep learning different from or perhaps similar to other teaching methods introduced over the twentieth and twenty-first century? Several methods are now presented situated within the literature.

Teaching for Conceptual Understanding

Kang and Howren (2004) identified teaching for conceptual understanding as organizing “facts and ideas into a meaningful concept” (p. 3). Jansen, Berk, and Meikle (2017) stated that this approach provides “students with opportunities to understand meanings underlying symbolic operations and procedures” (p. 227). Lastly, Hiebert and Grouws (2007) indicated that teaching for conceptual understanding helped students develop the ability to apply the skills and knowledge acquired in school to new contexts.

Teaching for Critical Thinking

Idol and Jones (1990) based their understanding of critical thinking on the scientific method. The formula in itself was a measure of critical thinking. The position of Idol and Jones (1990) was based on a belief that the scientific method starts with the identification of a problem and leads to the implementation of a solution. Ennis (1993), however, described critical thinking as a tool to be leveraged in a scholarly fashion describing reflective thinking which is a reasonable way of focusing on people, a belief, or task. Paul (1995) added another description of critical thinking as considering various viewpoints, reviewing alternative outcomes, coming to a conclusion based on reason and evidence but willing to revisit decisions based on new data.

Teaching for Experiential Learning

The Association for Experiential Education (2010) defined experiential education as “a philosophy and methodology in which educators purposefully engage with learners in direct experience and focused reflection in order to increase knowledge, develop skills and clarify values” (para. 2). Carpenter (2014) believed experiential education refers to the “process, grounded in an educational philosophy, and operationalized in specific pedagogical techniques” (p. 115). D. A. Kolb (2015) stated, “common usage of the term experiential learning defines it as a particular form of learning from life experience; often contrasted it with lecture and classroom learning” (p. xviii). D. A. Kolb (2015) developed a working definition of experiential learning, dropping the modifier experiential and created a “working definition of learning...the process whereby knowledge is created through the transformation of experience” (p. 49).

Teaching for Internalization

British Council (n.d.) defined internalization as “the process of learning something so that it can be used as the basis for production...[for example] a learner discovering for themselves what the meaning of a new word is by using context will internalize this information more deeply than a learner being told what the meaning is” (para. 3). Demetci et al. (2016) defined internalization as “correlates with cognitive autonomy, students’ perception of course content having high personal relevance” (p. 1). Vansteenkiste et al. (2018) indicated “the process of internalization requires that learners actively take in externally offered values, regulations, and guidelines and transform them into their own, such that they come to function as personally meaningful guideposts in the learners’ lives” (p. 33).

My experience as the Director of the IME Program lead me to believe that elements of each of these teaching methods are employed with our students. However, the question still remains are these the requisite elements that constitute teaching that will lead to deep learning? In the next section of this paper I will explore the history of post-secondary education in Canada and the various international influences that helped to shape its evolution. I will also address the ways in which deep learning is defined and actualized within the kindergarten to grade 12 school environment and then extrapolate to how deep learning is conceptualized at the post-secondary level.

CHAPTER TWO: LITERATURE REVIEW

Exploratory methods in adult education date back to Socrates (born in 470 BC) and his instructional technique known as the Socratic Method. Socrates would talk to anyone and engage in conversation by “interrogating the everyday views and popular opinions of those in his home city of Athens” (Ambury, 2017). Since the inception of the Socratic Method of instruction, educational practices have continued to evolve, shaping today’s educational landscape (Boyer, 1990; Pocklington & Tupper, 2002; Fahmy, 2004; Fullan & Langworthy, 2014).

As this project will explore the ways in which post-secondary teachers believe they are engaging their students in deep learning an overview of the origins of post-secondary education is necessary. Specifically, it is important to explore the historical significance of what were the grassroots of scholarly activity in Canada: Where did our post-secondary system originate? How did the system evolve over time? How will we know where to go if we do not reflect on where we have been?

Three countries have been identified as having had a major influence on the Canadian post-secondary system, namely, the United Kingdom (UK), Germany, and the United States of America (USA) (Hudson, 1969; Welton, 2013; Portman, 1978; Pocklington & Tupper, 2002). When reflecting on the impact of these three countries, the key contribution the American post-secondary system made was land granting titles. These land granted universities focused on educating adult students in the areas related to science, agriculture, military science and engineering via an experiential (practical) perspective (Welton, 2013; Portman, 1978). Aside from this, the US post-secondary educational system is basically a byproduct of the post-secondary models found in UK

and Germany. It should be noted, though, that the land granting titles originating in the US did play an integral part in the evolution of the post-secondary system in Western Canada (Welton, 2013; Portman, 1978). The land-granting system influenced the curriculum which was offered to post-secondary students in Western Canada, mirroring the program of study introduced via the land grant model in the US. Turning now to our timeline, a historical perspective will be provided, offering insight into the evolution of post-secondary education in Canada, based on the three influential countries noted and their educational systems.

Historical Perspective

11th to 16th Century

Oxford (founded sometime in the early part of the 11th century) and Cambridge (founded 1209) are recognized internationally as the first universities in the United Kingdom (UK) (Welton, 2013). The initial purpose of these ‘post-secondary’ institutions was based on religious studies for men, tasked to become religious leaders and practitioners for the church (Hudson, 1969; Welton, 2013).

Germany’s first University, the Heidelberg University, was established in 1386 and included four areas of concentration: Law, Philosophy, Religion, and Medicine ("History of Heidelberg University," 2014). The scope of study in Germany went beyond the training of religious leaders, meeting the secular needs of an adult society as well (Hudson, 1969; Welton, 2013). Reflecting societal needs of the time, curriculum was based on ways to improve the manufacturing process and enhance one’s lifestyle: adult educational practices were starting to evolve (Welton, 2013).

17th Century

The first ‘structured’ post-secondary curriculum in the UK (outside Cambridge and Oxford) occurred in the early 1690s by a group of men titled “the men’s mutual improvement societies” (Hudson, 1969, p. 27). The premise of this ‘improvement society’ (and others of the time) was to learn more about religion and shed a pagan lifestyle, accomplishing this through biblical studies. Adult men attending the post-secondary ‘societies’ were being taught to read so they themselves could access information from the bible without the aid of religious leaders (Hudson, 1969).

In Germany, post-secondary education was accessible to all classes of people during this century, not just ‘improvement societies’ as was the case in the UK. Lectures were secular in nature and included areas such as language, mechanical, labour, and apprenticeship. It’s interesting to note Germany’s ‘post-secondary’ educational system took root at least a hundred years sooner than England, especially from a secular perspective (Hudson, 1969).

During this century, development of ‘post-secondary’ education began to take place outside the UK and Germany: Canada and the US started to develop curriculum and systems for adults desirous of learning. In Canada, the first structured ‘post-secondary’ system was established in the early 1630s. At this time, there were approximately 100 Jesuit missionaries in New France, educating adults in religious studies, and also teaching them to read. Several decades after this religious educational initiative in New France, the first post-secondary institute was formally organized in 1663 and was called Séminaire de Québec (eventually known as the University of Laval). Initially, this institute mirrored

the original 'post-secondary' curriculum of Oxford and Cambridge in the eleventh and twelfth century, preparing males with skills needed to become ministers (Welton, 2013).

The first university in the US, established in 1638, was Harvard. This university also emulated early practices of Cambridge and Oxford as a religious institute, training males to become religious leaders (Hudson, 1969; Portman, 1978). Even though the university had a "Puritan atmosphere, from the beginning, the intent was to provide a full liberal education such as that offered at English universities, including the rudiments of mathematics and science ("natural philosophy") as well as classical literature and philosophy" (New World Encyclopedia, 2018).

18th Century

The earliest, rudimentary form of secular education in the UK dates back to the middle part of 1700's. There is evidence of male adults attending Welsh Circulating School as early as 1740 for the purpose of learning to read, with no religious agenda (Hudson, 1969). The latter part of the eighteenth century saw a maturation of andragogical practices that were more secular in nature. Though biblical studies remained a main component of post-secondary education, Hudson (1969) stated: "It is essential to the well-being of society, that associations for mental improvement should be fostered" (p. 26). His statement laid the foundation for the Mechanics Institutions in England, which could be argued, was the first form of a formal post-secondary institution in England for adults interested in studying secular works (Hudson, 1969).

The Mechanics Institution originated from a men's society known as the 'Sunday Society', which was formed by Sunday school teachers in 1789 with the objective to instruct "young men in writing and arithmetic" (Hudson, 1969, p. 29). Exposure to these

courses spurred an increased desire of intellectuals to continue their education with the addition of subjects like geography, book-keeping, and drawing. These subjects added both breadth and depth to the existing sparse curriculum. The Mechanics Institution continued to evolve in the UK and was characterized by groups of individuals who “formed a class for mutual improvements...for illustrating the principles of Mechanics, Hydrostatics, Electricity, Pneumatics, and Astronomy” (Hudson, 1969, p. 29). The class which was formed was offered to the adult working class, “especially those engaged in the foundries and manufactories” (Hudson, 1969, p. 29). This group created a library where a pool of resources could be accessed by scholars or the adult working class. In order to access this material, the cost was a cent per week. It was known as the first Artisans’ library and was formed in 1795 (Hudson, 1969).

During this time, Dr. John Anderson, who had worked at the University of Glasgow, saw the need for an institute that would enable adult students desirous of learning science and commerce. Dr. Anderson willed his personal assets to a foundation to be known as Anderson University. This institution was “incorporated and formed into a body-politic charter” (Hudson, 1969, p. 32) in June of 1796. This institute offered studies in four areas which included arts, medicine, law, and theology. Hudson (1969) argued that this institute was the first official university in the UK to offer andragogical practices in such a large scale and scope. This learning structure enabled students by creating self-learners and helped adults understand their societal role, thereby resulting in an increased ability to take control of their lives (Knowles, 1970).

In Canada, the first English speaking university was established in 1785 in Fredericton New Brunswick (UNB), and in fact, was the “oldest public university in

North America” (Good University Ranking Guide, n.d.). This university was controlled by the Church of England until 1859 at which time the secular mandate of the community was recognized. Shortly after UNB was established, a second post-secondary institute was established in Halifax in 1789 and known as King’s College. It was the first university in Canada to be granted a charter in 1802 (Roper, 2017). Toward the end of 1789, in Eastern Canada, the ‘post-secondary’ landscape continued to evolve, taking root with the formation of agricultural societies. “Government elites created a Society for Promoting Agriculture in Nova Scotia” (Welton, 2013, p. 36). Welton (2013) indicated these societies were formed to improve the farming practices of that era. Welton (2013) observed that adult Canadians had an incredible desire to learn and it was satisfied via rudimentary forms of instruction about agriculture and religion. Additional areas of study were soon to follow in the form of Mechanics’ Institutions that served to support the two original pillars of Canada’s post-secondary system.

During this colonial era in the US, a number of institutions were also formed; some of the more notable included: College of New Jersey (to be known later as Princeton), King’s College (to be known later as Columbia College), Rhode Island College (to be known later as Brown’s University), The Academy of Pennsylvania (to be known later as University of Pennsylvania). It should be noted that the University of Pennsylvania (1749) was the first secular post-secondary institution in the US, while other post-secondary institutions formed at this time carried a religious conscience (Portman, 1978).

19th Century

In England, in the early 1800s (1802 to 1807), the educational community saw the rise of Philomath Institutions, known to be the “earliest of the Literary and Scientific Associations established for the mental cultivation of the middle class” (Hudson, 1969, p. 166). This could be considered a rudimentary form of the Mechanics’ Institutes which followed shortly thereafter.

In 1821, the first Mechanics Institution was formed in Edinburgh Scotland (The Edinburgh School of Arts). The institute first offered courses in Mechanical Philosophy and Chemistry and had almost 500 students both of wealthy and of a “humbler class” (Hudson, 1969). Even though there were additional people wanting to attend, the school was unable to accommodate any further applicants due to limitations in its physical size (Hudson, 1969).

Mechanics Institutions were not established in Germany until the mid-1800s. This was due to a sound educational system already in place (Hudson, 1969). Mechanics’ Institutions were not a sought commodity, they were, in fact, redundant due to the progressive nature of the adult education system the government had already established a century earlier (Hudson, 1969). The first Mechanic Institution in Germany was created in Hamburg, Germany, in 1848 (Hudson, 1969).

During this time, Mechanics Institutions also started operating in Canada (in 1828) with an institution being opened in Montreal, followed by another opened in Ontario (in 1830) called the York Mechanics' Institute (Gaffield, 2012). In the eastern part of Canada, the first Mechanics Institute was established in Halifax in 1831 with an

additional thirty institutes being established in the maritime provinces between 1831 and 1859 (Welton, 2013).

Although Oxford and Cambridge had the word University in their title, their progress in the development of adult educational curriculum was lackluster, at best. Intellectuals of the era felt “the two ancient English universities had become a social and intellectual backwater...the great new stream of life which flowed...passed them by” (Kelly, 1992). Recognizing this (albeit after the educational revolution had already started to occur), religious groups in England began modifying their curriculum. There were several congregations in England that joined together to form the Church of England Institutes. Hudson (1969) observed: “The plan and arrangement of these societies so closely resembled the Mechanics Institution” (Hudson, 1969, p. 202). Thus, they started to create their own mechanicals’ institutions as the church concluded, “these institutions had become formidable and enduring means of moral instruction” (Hudson, 1969, p. 202) and realized it needed to compete with alternative sources of andragogical practice based on ‘consumer’ demand. In order to entice more students to attend Oxford and Cambridge, these institutes modified their curriculum to meet the needs of the adult student of the era (Hudson, 1969).

Legislative bodies of the early 1840s, hoping to improve the structure of the UK’s adult educational system, granted several institutions a ‘University Extension’, recognizing these institutes as “facilities for full-time university education” (Kelly, 1992, p. 216). Secular educational theory, originating in Mechanicals’ Institutions at the beginning of this century, continued to evolve. The Universities of Cambridge, London,

and Oxford offered approximately 460 courses in areas including history, political economy, literature, art, architecture, natural science and philosophy (Kelly, 1992).

While university extensions were being granted in the UK, universities in Germany were well past this stage of formalization and were developing andragogical practices based on the notion of research. At the forefront of this evolution was Heidelberg University:

Heidelberg was widely celebrated for its high level of research, its liberality, and commitment to democratic ideals and its openness to new ideas. This combination attracted a large number of foreign students. This second flowering was marked by extraordinary research efforts across all faculties and was punctuated by such names as Robert Bunsen, Hermann Helmholtz, Gustav Kirchhoff and Max Weber. (Redaktion, 2017)

In North America, the formal development of adult education originated in the eastern part of the US and was heavily influenced by religion. Portman (1978) stated, “The early American college owed its expansion largely to the support of various religious denominations” (p. 5) with the content of coursework at this time dedicated to educating men to be ministers. In the late 1840s this curriculum started to be challenged based on the ideology of presidents Jefferson and Jackson. Portman (1978) observed that “central to the rise of the state university was its curricular reformation along more practical lines. Higher education...must be brought into harmony with the needs of a practical, growing people” (Portman, 1978, p. 7). The needs of society at this time in the US seemed to mirror the needs of people in the early part of the nineteenth century in the UK (Portman, 1978; Hudson, 1969). There was a shift from the studies of religion to

other areas influenced by growing technological developments born of the industrial revolution: “The classics and humanities should be supplemented by subjects that would lift the farmer and agricultural progress, subjects that would lift the farmer and mechanic out of their old limitations” (Portman, 1978, p. 7). In addition, the passing of the land grant act in 1862 can be seen as a major factor in the modernization of adult education in the US. This act played a “major role in the reforming of American higher education” (Portman, 1978, p. 8) by prompting a philosophical shift in the post-secondary curriculum “where the leading object shall be, without excluding other scientific or classical studies, to teach such branches of learning as are related to agriculture and the mechanic arts” (Portman, 1978, p. 8).

Agriculture was on the minds of a fledgling nation north of the US border, as well. Welton (2013) speaks of a young man named John Young, an immigrant who came to Nova Scotia and published letters in the *Acadian Recorder*, challenging the processes used by the farming community in Nova Scotia of the time. John Young wanted a number of farmers to meet together with the objective of sharing and discussing best practices for farming. Welton (2013) stated Young was frustrated by the lack of desire to improve farming processes in Nova Scotia. And wanted “agricultural societies to be revived to serve as the appropriate pedagogical form” (p. 35). Welton (2013) stated: Mr. Young “lashed out at Nova Scotian farmers due to their lack of knowledge and skill in the science of farming” (p. 35).

Change on the agricultural front in North America was not the only educational shift, however. In 1850, there was a transformation in adult education that would impact scholarly duties of the educator for decades to come: “In 1852 Henry Tappan assumed

the presidency of the University of Michigan and declared that German institutions could serve as models for a new American university” (Portman, 1978). Using the German post-secondary as a model, university professors in the US would now include research as a component of their scholarly duties.

During this time, with a curriculum dedicated to religion, numerous Canadian universities were established. These included Saint Mary’s University in 1802, McGill University in 1821, The University of Toronto 1827, Queen’s University 1841, The University of Manitoba 1877, and, The University of Western Ontario (Anisef & Axelrod, 2012).

20th Century

The stage was set. By the turn of the 20th century Canada had established its own post-secondary presence, primarily informed by three countries: the United Kingdom, Germany, and the United States. Overall, Canadian curriculum reflected a focus on religion, agriculture, and Mechanics’ Institutes with scholarly duties including both teaching and research (Pocklington & Tupper, 2002; Portman, 1978; Hudson, 1969; Welton, 2013).

The UK influenced Canadian post-secondary curriculum and scholarly duties in several ways. From a religious perspective, Pocklington and Tupper (2002) wrote that universities in the Maritimes, Quebec, and Ontario were “under the influence of Anglican, Baptist, Methodist, Presbyterian, and Roman Catholic Churches” (p. 23). In addition to religion, Canadian Universities were also shaped by Oxford and Cambridge and the educational values of these institutions that were based on a “greater understanding of the human condition” (Pocklington & Tupper, 2002, p. 21). Study

during this time included philosophy, language, and history with a clear focus on teaching; however, not all institutions in the United Kingdom held a view similar to that of Oxford and Cambridge. The University of Edinburgh felt research was an acceptable practice and the study of science was a significant contributing factor to the workings of a post-secondary institution. Moreover, there was an established belief that university study be made available, not only to the privileged, but also to the commoner. In fact, Edinburgh permitted students to attend their institution regardless of their “social standing or wealth” (Pocklington & Tupper, 2002, p. 22).

Canadian universities were also shaped, fundamentally, by the practice of German universities to engage in research. Pocklington and Tupper (2002) observed: “The major universities...saw scientific research as the essence of university life” (Pocklington & Tupper, 2002, p. 23) and included graduate studies, culminating in doctorate degrees, as part of their curriculum. The influence of German post-secondary programming on Canadian universities was twofold: first, professors were expected to engage in scholarly research and second, scientific research was viewed as central to a great university (Pocklington & Tupper, 2002, p. 23).

Universities in the US also influenced Canadian structures and system via “The passing of the Morrill Act in 1862, which provided for the transfer of public lands to educational institutions” (Pocklington & Tupper, 2002, p. 22). Not only did the Morrill Act transfer land deeds, it’s practical (experiential) curriculum in agriculture and engineering “shaped the universities of Alberta, British Columbia and Saskatchewan....[since these provinces] grew up in a physical proximity to American

land-grant universities...inspired by American thinking” (Pocklington & Tupper, 2002, p. 23).

Impact of UK, German, and USA Curricula on Canadian Universities

Overall, the three curricular areas of religion, agriculture, and mechanical institutes influenced post-secondary curriculum in Canada; however, each part of the country reflected its unique regional perspective. For example, in the eastern part of Canada, post-secondary curriculum included the three foundational elements while in central Canada, the main tenants of the curriculum were religion and mechanical institutes (Welton, 2013; Pocklington & Tupper. 2003).

By the beginning of the 1900s, a majority of the Mechanical Institutes had dissolved or been transmuted into libraries; however, Welton (2013) observed they had “provided universities and colleges with the first organized opportunity to relate the thinking and the research going on with the universities to the problems of the community they served” (p. 5).

In the western part of Canada, universities were established based on the land granting model developed in the US (Pocklington & Tupper, 2002). The University of Saskatchewan’s roots matched those of the University of Pennsylvania, a secular school from its origin. In 1907, Welton (2013) stated an “agricultural education had to be central to its mission it had to fuse culture and utility, and it had to serve the people” (p. 103). Along with agriculture, this secular school also incorporated business management and engineering into its curriculum (Pocklington & Tupper, 2002, p. 22). Though the University of Alberta would eventually duplicate the curriculum Saskatchewan established, initially it mirrored the focus of eastern Canadian institutions by including a

religious curriculum. When the University of Alberta opened its doors in 1908, Dr. Henry Tory, in his first convocation address, stated that the university “would carry its ideals of refinement and culture into their lives and its latent spiritual and moral power into their minds in hearts” (Yule, 1963, p. 12).

21 Century: The State of Post-Secondary Education

Canadian post-secondary curriculum, shaped by institutions of the UK, Germany, and the US, developed according to three foundational pillars: religion, agriculture, and technology (Hudson, 1969; Welton, 2003; Portman, 1978; Pocklington and Tupper, 2002). However, based on these foundational pillars, in what ways has the role of post-secondary educators evolved?

Up until the middle part of the twentieth century, teaching had been the most important element in a post-secondary educator’s duties (Chen, 2015; Miller, 1978). By the end of the 20th century Gibbs and Locke (1989) found a shift had occurred and research was deemed the most important facet of a post-secondary educator’s duties. This shift precipitated concern within the profession that educators would not be able (or willing) to dedicate the time needed to refine their teaching skills as research would be the primary focus of educators at the post-secondary level (Boyer, 1990; Smith, 1991; Pocklington & Tupper, 2002). If research became the primary responsibility of an educator’s practice, what impact would this have on their teaching? One consequence of this shift was identified by Pocklington and Tupper (2002): “Universities [would] no longer provide effective, high-quality undergraduate education” (p. 3) and further commented that, currently, “much of the teaching...ranges from indifferent to abysmal” (p. 67).

Over the past several decades there have been numerous calls for curriculum reform at the post-secondary level (Boyer, 1990; Seldin, 1995; Cranton, 1998; Pocklington & Tupper, 2002). Fahmy (2004) indicated there was “a needed change in our teaching methods and the design of new applied teaching methods to explain the processes resulting in the development of technology in the real world” (p. 53). Heller et al. (2017) supported this by indicating a “growing number of educators, policymakers, and researchers are steering discussions about school reform toward issues such as student motivation and engagement, the social environment of schools and...the ability to apply knowledge and skills to real-world problems” (p. 4). The evolution of teaching practices has not kept up with the demand of research, which may, in post-secondary institutions, impact the quality of education (Heller et al, 2017; Pocklington & Tupper, 2002; Fahmy, 2004).

If reform of educational practice is required, what would it entail? Fullan and Langworthy (2014) indicated teaching practices aren't going to be substantially modified: “Most instructional elements of the new pedagogies are not ‘new’ teaching strategies” (p. 2). They are, in fact, practices that have taken place in the classroom for some time now; rather, “this ‘new pedagogies’ education model is geared towards fundamentally different aims for learning; aims more relevant to this era. We and others have begun to call these new goals deep learning” (p. 1). Ironically, this scenario mirrors what Cambridge and Oxford were confronted with in the ninetieth century: they had to adapt their teaching practices to create a learning environment that was of value to the adult learner of that time and modify curriculum so that adult learners would feel like they could respond to societal opportunities and challenges. Is this not the same crossroads we face today? To

meet the needs of students in the 21st century public school educators are shifting their pedagogical practices by including deep-learning. Is this practice taking place in post-secondary education as well?

Deep Learning across the Canadian Elementary and Secondary School System

Post-secondary education is not the only place where teaching practices are being questioned or reconsidered. Reform is happening in public school systems, as well. Gini-Newman and Case (2015), researchers and public school teachers from Ontario, are calling on changes to pedagogical practices in Canada. They stated that “for many decades, schools have not been appealing places for many students, and what we are teaching them has not resonated outside of school” (p. 5) and observed that stakeholders (educators, employers, and parents) are desirous of change.

Alberta Education (2016) has developed a document titled, “*The Guiding Framework for the Design and Development of Kindergarten to Grade 12 Provincial Curriculum (Programs of Study) (The Guiding Framework)*”. This document outlines eight foundational competencies: critical thinking; communication; problem-solving; collaboration; culture and global citizenship; managing information; creativity and innovation; and personal growth and well-being.

In Ontario and Manitoba, there is yet to be an ‘official’ collective shift from either provincial government but in both provinces there are jurisdictions and schools altering pedagogical practices. For example, change is starting to happen in the Avon Maitland District School Board (2016), part of 13 school board pilot comprising 67 elementary schools and 16 high schools. Schools in this district are incorporating deep learning as part of their curriculum.

In British Columbia, the provincial government has designed a new curriculum which will be implemented in all schools (K to 12) by 2020. The curriculum has three foundational elements which include communication, thinking, and personal and social competency. British Columbia Education (2018) provides this rationale for their new curriculum:

We are living in a state of constant change. It is a technology-rich world, where communication is instant and information is immediately accessible. The way we interact with each other personally, socially, and at work has changed forever. Knowledge is growing and information is changing extremely quickly, creating new possibilities. This is the world our students are entering....the curriculum must be student-centered and flexible, and maintain a focus on literacy and numeracy, while supporting deeper learning. (para. 1)

It is important to realize if pedagogical modification is taking place in the public school system then post-secondary educators must be cognizant of this. Post-secondary educators should consider incorporating deep learning strategies into their teaching practice to create an effective classroom environment that ensures students are able to adapt to change due to technological determinism and be assured of the best possible educational experience. Kirst and Venezia (2001) supported this viewpoint by asserting that “the lack of coordination between the public K-12 and postsecondary sectors impedes successful transitions between the systems and diminishes educational opportunity for many students” (p. 93). Additionally, Boyer (1983) stated: “Colleges and universities must plan to work with those they trained in previous years in order to bring about profound improvement in secondary education” (p. 261). To ensure students are

ready to face the challenges of the 21st century, post-secondary educators need to be aware of the pedagogical practices occurring in public school education.

Effective Teaching in Post-Secondary Education

Effective teaching resulting in deep learning opportunities is not structured with a specific set of practices in mind. Hanna and McGill (1985) stated: “It is difficult to state exactly what constitutes effective teaching” (p. 177). Rather, it depends on the educator’s definition of effective teaching, what point they are in their career, and, their desire for effective learning to be integrated into the classroom environment. Further, McKeachie (1997) stated:

What is critical depends upon the individual teacher, and the stage of development of the teacher is a major factor in determining what is *most* critical. Moreover, appropriate methods of training may also vary for different teachers at different stages of development. (p. 68)

He also indicated: “A good deal of research has demonstrated that...student-centered teaching is more effective than teaching centered around presentations by the instructor” (p. 461).

Allington (2010) felt skills such as “collaboration, digital literacy, critical thinking and problem-solving...are skills that schools need to teach to help students thrive in today’s world” (p. 1). Boyer (1990) indicated: “To prepare adequately the coming generation of scholars, we must ensure the quality of both their undergraduate and graduate education...tomorrow’s scholars...must think creatively, communicate effectively, and have the capacity and the inclination to place ideas in a larger context” (p. 65). He went on to observe that “great teachers create a common ground of

intellectual commitment. They stimulate active, not passive, learning and encourage students to be critical, creative thinkers, with the capacity to go on learning after their college days are over” (p. 24). He also indicated educators have a duty to, not just transmit knowledge, but transform and extend it as well.

Additional characteristics of effective pedagogy include the value of reflection, a knowledge of subject matter, and a focus on real-world challenges. Hanna and McGill (1985) defined an effective teaching environment as a reflective exercise, looking to “their students (as well as themselves) for clues as to what steps need to be taken to improve students’ understanding of subject matter” (p. 177). This implies the educator must first reflect upon the current circumstance, from both a macro and micro environmental perspective. Seldin (1995) felt effective teaching includes “a deep knowledge of the subject, an ability to communicate with and motivate students, enthusiasm for the subject and for teaching, clarity of presentation, and fairness” (p. 5). Finally, Hanna and McGill (1985) indicated the end goal of effective teaching is developing students capable of doing quality work in their chosen field once their post-secondary education is complete.

From these authors’ perspectives, several themes arise indicating an effective teaching environment in post-secondary institutions:

- Analytical or critical thinking;
- Student-centered teaching;
- Teachers cognizant of learning style differences;
- Individualized content (customized);
- Work that engages students;

- Creative thinking; and
- Cultivating a broad perspective - How does the work impact society outside this classroom?

Though the design of the post-secondary system seems to provide opportunity for deep learning to occur (Hanna & McGill, 1985; Seldin, 1995; Boyer, 1990; Allington, 2010; Mann et. al. 1970; McKeachie, 1997), what role does this structure play in enabling effective teaching resulting in a deep learning environment? Having discussed what an effective teaching environment would look like, this next section of the paper will analyze a number of variables to be considered in constructing a framework for implementing andragogical practice that leads to deep student learning.

Critical thinking. Deep Learning is not the same as thinking critically. Philosophy.hku (2018) defines critical thinking as “the ability to think clearly and rationally about what to do or what to believe. It includes the ability to engage in reflective and independent thinking” (para. 1). "Critical Thinking Defined" (2018) defines critical thinking as “disciplined thinking that is clear, rational, open-minded, and informed by evidence” (para. 1). The key difference between critical thinking and deep learning is the application or the transfer of knowledge. Thinking critically reviews but does not engage in the application of knowledge; deep learning builds on a concept then applies or transfers it to real-world situations (Hall, Ramsey & Raven, 2004; Martinez, 2015).

Learning styles. Sternberg (1990) indicated if educators understand the theory behind learning styles the “educational process...will benefit all students” (p. 371). Gardner (1983) developed a learning style model which included seven forms of

intelligence: (a) verbal-linguistic, (b) logical-mathematical, (c) bodily-kinesthetic, (d) visual-spatial, (e) musical, (f) intrapersonal and (g) interpersonal. Later he added an additional intelligence which he titled 'naturalist'. Gardner (1983) posited that individuals possess all of these traits but, typically, one is more dominant and if identified and targeted by educators, students will be more receptive and the learning experience will be fuller and deeper.

Dunn, Dunn, and Price (1984) developed a three-stem learning model to assist educators to respond to student learning style: visual, auditory and kinesthetic (VAK). The premise behind this model is that each student has an individual preference for how they learn, and by using a differentiated approach through various methods of pedagogical or andragogical practice a more effective learning environment will be created thereby ensuring deep learning opportunities for every individual.

The ability of these learning style models to impact the learning environment has been questioned by scholars. For example, Constantinidou and Baker (2002) found that if pictures were used to engage visual learners the pictures were actually just as beneficial for the other two types of learners, regardless of their learning style preference. Supporting this position, Coffield, Moseley, Hall, and Ecclestone (2004) indicated that relying on a learning style model to enhance the learning environment for students, based on student preferred learning style, does not actually lead to any improvements in student learning outcomes.

It can be argued then that incorporating a bimodal approach may be beneficial when developing pedagogical or andragogical curriculum. Geake (2008) stated:

Much good pedagogy in the early years of schooling is based on coincident bimodal information processing, especially sight and sound, or sight and speech, as demonstrated by every early years teacher pointing to the words of the story as she reads them aloud. (p. 130)

Based on the work of Geake (2008), perhaps the integration of bimodal approach ensures comprehension of curriculum. This increases the chances that the student acquires the concept due to the variety of ways the student is exposed to the material. One could argue this provides instructors with an opportunity to leverage higher-level cognitive practices, creating effective environments for deep learning opportunities.

Cognitive processing models. Based on evidence regarding effective teaching at the post-secondary level, cognitive modeling is understood to contribute to the construction of broad perspectives, to creative thinking, and to student engagement. Vermunt and Vermetten (2004) identified cognitive processes as:

those thinking activities that students use to process subject matter. They directly lead to learning outcomes in terms of knowledge, understanding, and skill.

Typical examples of these activities are looking for relations among parts of the subject matter...and looking for applications. (p. 361)

Based on teaching effectiveness and deep learning, one can hypothesize that a high level of cognitive analysis is greater than simply note-taking and rote learning (Hanna and McGill, 1985; Mann et al., 1970; Allington, 2010; Boyer, 1990; Martinez, 2015). A question which arises from this literature review is what level of cognitive processing needs to take place in the post-secondary classroom to foster an environment of effective teaching resulting in deep learning opportunities?

From a post-secondary perspective, the model developed by Biggs (2003) identified a range of cognitive processes starting with the lowest level process which included memorizing and note-taking. For Biggs higher level cognitive functioning included (ascending order): describing, explaining, relating, applying, and, theorizing. Similarly, the model developed by Vermunt and Vermetten (2004) included: (a) a deep processing strategy, which combines the learning activities “relating,” “structuring,” and “critical processing”; (b) a stepwise processing strategy, consisting of the learning activities “analyzing” and “memorizing”; and (c) a concrete processing strategy with “concretizing” and “applying” as major learning activities (p. 362). Jean-François (2013) observed that components (a) and (c) in Vermunt and Vermetten’s model would be considered higher-level or ‘deep learning’ while component (b) would be considered lower level or ‘surface learning’ (p 37).

Though initially developed for the public education system, Bloom Taxonomy and Anderson’s revision of Bloom’s model are two foundational cognitive processing models worthy of consideration. Bloom’s model is divided into six parts (ascending order): knowledge; comprehension; application; analysis; synthesis; and evaluation. A revision to Bloom’s model was developed approximately twenty years ago to better meet the needs of students. Krathwohl (2002) reviewed the modifications he and Lorin Anderson made to Bloom’s Taxonomy and stated: “In the “revision, the 19 specific cognitive processes within the six cognitive process categories receive the major emphasis” (p. 214). The categories in ascending order include: (a) remember, (b) understand, (c) apply, (d) analyze, (e) evaluate, and (f) create. This updated model focuses more closely on the cognitive process of application (Hanna and McGill, 1985;

Mann et al., 1970; Allington, 2010; Boyer, 1990; Martinez, 2015). Again, the first two levels provide lower level (surface level) learning outcomes while the last four ascend into deeper learning. As with previous models presented, this revised model is built on a hierarchical structure; that is, lower level processes evolve into higher level cognitive processes which, when targeted by educators, support deep learning environments.

Deep Learning Environments

Hall, Ramsay, and Raven (2004) wrote: “High-quality learning outcomes, such as analytical and conceptual thinking skills, may not be achieved unless students are encouraged to adopt deep approaches to learning” (p. 490). Similarly, Beattie, Collins, and McInnes (1997) indicated there needs to be a move “towards a more conceptual form of learning...it is necessary to assist students to achieve ‘deep’ rather than ‘surface’ learning. Deep learning refers to learning with understanding, while surface learning refers to more temporary learning” (p. 2). Biggs (1987) argued “the motive of students with a deep approach is an intrinsic interest and appropriate engagement in the task, which is accompanied with seeking for meaning as learning strategy” (p. 244). Interestingly, these authors indicated educators need to create an environment which results in a shift of student mindset, from a rudimentary form of learning (surface), to a more in-depth (deep) learning environment resulting in higher level cognitive process development.

Challenges with Deep Learning

From a post-secondary perspective, there seems to be a desire for change in educational practice and that technology is one of the forces influencing this change (Boyer, 1990; Cranston, 1998; Pocklington & Tupper, 2002; Fullan, 2014; Collins &

Ryan, 2007). One must be cautious, however, as stated by Fullan and Langworthy (2014):

Achieving real gains in deep learning is not easy. Professional teaching capacity must be built for the new pedagogies to be effective. At the heart of these developments is the need for teachers and students to become excellent life-long learners, individually and collectively. (p. ii)

Moreover, when new curriculum is considered, it is important to recognize that educators face numerous challenges: “The introduction of a new curriculum poses a range of challenges to teachers with regards to the underlying assumptions and goals, the subject demarcations, the content, the teaching approach and the methods of assessment” (Bennie and Newstead (1999)

Deep Learning in the 21st Century

The impact of technology during the industrial revolution of the nineteenth and twentieth centuries was different than the current impact of technology on today’s marketplace. Noble (1995) observed that people during the industrial revolution of the nineteenth and twentieth centuries were both resistance and resilient, creating a labour movement to protect jobs; however, the current technological revolution is significantly different and indicated “we are paralyzed by our inherited ideas” (p. xiii). He believed that technology would actually create prosperity via competition and a variety of additional benefits. This is not the case: unemployment rates have risen over the past several decades and the main reason is due to the increased use of technology in the workplace (Noble, 1995; Collins & Ryan, 2007; Bresnahan, Brynjolfsson & Hitt, 2002). How does society respond to these challenges?

Fullan and Langworthy (2014) argued that modification of educational practices are one of the most important priorities:

[These are the] changes we desperately need. A generation of youth is facing daunting challenges. Unemployment rates among young people are at an all-time high. Far too many students find their schooling boring and irrelevant, and don't consider it a predictable route to a good job and life. (p. i)

In both K-12 and post-secondary settings educators are being prompted to employ instructional practices that will cause outcomes needed by citizens living in the twenty-first century. If educators can create effective classroom environments leveraging higher-level cognitive process via a variety of learning styles, a deep learning in students could be realized. Encouraging students to build the capacity to think and to adapt to environmental challenges created by technology will offer civilization a means of flourishing in the age of technological determinism.

Influencers of Deep Learning in the 21st Century

Incorporating the work of several authors (Knowles, 1990; Papageorgiou & Michaelides, 2016; Martinez & McGrath, 2014), a model (see Figure 2) has been developed to delineate the influential factors of Deep Learning in the Age of Technological Determinism.

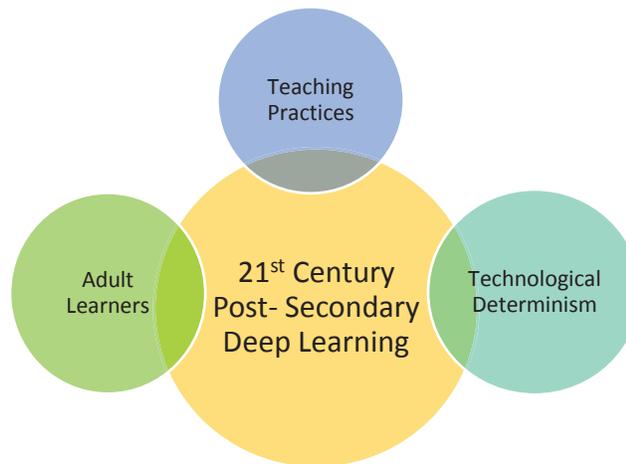


Figure 2. 21st Century Post-Secondary Deep Learning

Knowles (1990) developed a learning model that included six parts. Based on his work, the model he created could describe either a child or an adult learner. Within the six components, however, Knowles (1990) assumed there were differences between the two demographics.

Pedagogy. Employs six learner assumptions:

- The need to know – students are exposed to the material the teacher selects, students must learn this material for promotion, they do not need to know how (or if) it will be used in their lives.
- The learner’s self-concept – teacher assumes the learner is dependent upon the educator, creating an environment where the learner believes they are dependent upon the educator.
- The role of experience – learning environment is based on the teacher’s experience which is leveraged via “transmittal techniques”(Knowles,

1990, p. 56). The student's experience has no consequence on the learning environment.

- Readiness to learn – students will only engage in learning once they know they have to learn in order to pass or to be promoted.
- Orientation to learning – students believe learning is based on acquiring content presented by the teacher; resulting in learning experiences based on that content.
- Motivation – motivation comes in the form of disapproval or approval of factors which include parent, grades and teacher's favour.

Andragogy. Also employs six learner assumptions:

- The need to know – students want to know why they need to learn something prior to exposure to the material and how will be used in their lives to enhance or improve themselves in their environment.
- The learner's self-concept –the learner believes they are responsible for their own decisions. They desire “self-direction” (Knowles, 1990, p. 58). Adult learners will challenge an environment where others are imposing their ideology. This causes conflict within the adult learner as they were trained as children to rely on the teacher. The educator should be developing a strategy for students to no longer be reliant but rather self-directed.
- The role of experience – due to the range of experiences, the educator needs to consider employing a plethora of learning strategies based on the knowledge the adult learner possesses. The methods employed should not

be transmittal in nature, rather they should include simulations, cases, and problem-solving scenarios. These experiences can have negative connotations, however, as students may have a bias to new learning, concepts or ideas based on their exposure to life events after they have left public education. Lastly, the adult learner may withdraw if their life experiences are not considered or acknowledged as this is part of who they are. This could result in a pedagogical classroom environment.

- Readiness to learn – adults ‘come to the table’ ready to learn as it will aid them in being able to deal effectively with their environment.
- Orientation to learning – adults are considered “life-centered” (Knowles, 1990, p. 61) learners. Adults are eager to learn since they believe the exposure to the material will help them deal with situations they are exposed to.
- Motivation – what seems to motivate adults the most relates to their “internal needs” (Knowles, 1990, p. 61) such as enhanced quality of life, self-worth, and happiness at work.

From the analysis presented by Knowles (1990), a key difference between the two learner types is that pedagogical learners are told what they need to learn based on the teacher and his or her expectations while adult learners are desirous of learning that will enhance their life. In short, these students expect the classroom experience to help them in their day to day life struggles and opportunities. Thus, there is a shift in whose expectations are being considered. Pedagogical learners do not know how or if the learning they acquire will be of benefit to them in the future while andragogical learners

insist the learning must enhance their environment, otherwise the learning is neither beneficial nor useful. Knowles (1990) work identified a number of similarities between a pedagogical and andragogical perspective of the learner and the learning environment. These include: first, both learner types require an educator that facilitates a learning environment with age-appropriate resources to acquire knowledge. Second, each type of learner still needs to be exposed to material and content that will enable them to be productive when they leave school. Finally, each group needs skills that will support the solving of problems and the realizing of opportunities thereby enhancing their contributions to society.

Teaching practices. There are several vital practices that are illustrative of helping students to achieve deep learning. These include experiential, inquiry-based, and constructivist learning. A. Y. Kolb and Kolb (2005) stated that experiential learning comprises of:

Immediate or concrete experiences are the basis for observations and reflections. These reflections are assimilated and distilled into abstract concepts from which new implications for action can be drawn. These implications can be actively tested and serve as guides in creating new experiences. (p. 194)

Considering inquiry-based learning, Savery (2006) indicated that John Dewey believed education begins with the curiosity of the learner. Inquiry based learning is a student-centered, active learning approach focused on question, critical thinking, and problem solving. Inquiry based learning activities begin with a question followed by investigation of solutions, creating new knowledge as information is gathered and

understood, discussing discoveries and experiences, and reflecting on new-found knowledge (p. 11).

Considering a constructivist perspective relating to teaching practices', McLeod (2018) indicated "Vygotsky states cognitive development stems from social interactions from guided learning within the zone of proximal development as children and their partner's co-construct knowledge" (para. 10). McLeod (2018) went on to say "Vygotsky, therefore, sees cognitive functions, even those carried out alone, as affected by the beliefs, values, and tools of intellectual adaptation of the culture in which a person develops and therefore socio-culturally determined" (para. 22).

The implications of teaching practices relating to deep learning. The teaching philosophies or approaches of experiential, inquiry-based, and constructivist learning provide a foundation for deep learning. These teaching practices have the potential to influence the environment due to their ability to make students leverage higher level cognitive thought process. Further, all three of these practices inform and develop new insight. Lastly, all these of these practices call for the student to apply what is being learned in a fashion that will create new knowledge. All three of these practices are used in a controlled environment by the educator. The educator decides on what variables to manipulate and then sees how the student responds. Even though deep learning is initially used in a controlled environment as well via a variety of practices (and methods) a key differentiator is that in a deep learning environment the students are required to act upon to real-world problem (or opportunities) that have not been orchestrated by the teacher. Students must adapt to the environment as the student no longer has the assistance of the

educator but rather leverage their previous knowledge in a fashion that will enable them to acclimatize to their environment without the aid of the controller (educator).

Technological determinism. As previously mentioned, Technological Determinism is based on the concept of technology influencing societal values, increasing the use of technology resulting in a more efficient society (Papageorgiou & Michaelides, 2016). The result of these efficiencies will, however, impact the workplace. Ford (2016) indicated “Labor experts are increasingly and justifiably worried that computers are becoming so adept at human capabilities that soon there will be no need for any human input at all” (p. x). Aoun (2017) indicated “these capacities are enabling computers to step into roles-and jobs-once held exclusively by members of our species” (p. x).

Aoun (2017) acknowledged that:

We live in a digital age, and students face a digital future in which robots, software and machines powered by artificial intelligence perform an increasing share of the work humans do now. Employment will less often involve the routine application of facts, so education should follow suit. To ensure that graduates are “robot-proof” in the workplace, institutions of higher learning will have to rebalance their curricula. (xvii)

What the project should provide is insight regarding teaching methods and practices being employed at the post-secondary level. In keeping with the ideas expressed by Aoun (2017) is a deep learning environment being ‘seeded’ in post-secondary education?

Learning

"Learning" 2018) defines learning as “knowledge or skill acquired by instruction or study” (para. 2). In the post-secondary context, elements of learning (instruction or study) are influenced by the style of learning and student engagement.

Style of learning. Gardner (1983) indicated that “individuals may learn through the exploration of linguistic codes, of kinesthetic or spatial demonstrations, or of interpersonal bonds (personal intelligence)” (p. 334). In its rudimentary form, linguistics could be defined as a mnemonic (word) or speaking (oral) (Gardner, 1983, p. 78).

Kinesthetic, which would include motor actions enabling the person to complete a task (from a student perspective, note taking) (Gardner, 1983, p. 212). Interpersonal bonds (personal intelligence) provide a person with the ability to “read the intentions and desires...of many other individuals and, potentially, to act upon this knowledge” (p. 239). Gardner (1983) went on to say that “these intelligences typically work in harmony” (p. 9). Therefore, in a learning situation, multiple elements may be employed at the same time.

Student engagement. Student engagement could include two factors comprising a physical and intellectual atmosphere. Considering the physical aspect, Hill and Epps (2010) reported that post-secondary students believed their learning was enhanced by an improvement in the physical layout and design of classroom space (p. 66). Further, incorporating higher-level cognitive processes in a classroom can affect the level of student engagement. Dunleavy and Milton (2016) indicated that intellectual engagement occurs “when students encounter work that is relevant, interesting, and connects with their aspirations and interests; when the work they do is authentic, challenging, deeply

conceptual, highly social, and collaborative” (para. 15). Thus, it is paramount that educators develop a learning environment that takes into account both physical and intellectual atmosphere.

Environment

"*Environment*" 2018) defines environment as “the aggregate of social and cultural conditions that influence the life of an individual or community” (para. 2). From a student’s post-secondary perspective, the context of environment will be reviewed both internally (inside the classroom) and externally (outside the classroom).

Internal. An element of the deep-learning environment the educator should consider relates to the types of andragogical practices occurring within the classroom. To develop deeper learning within the classroom setting educators could introduce simulations and cases. Vlachopoulos and Makri (2017) identified a simulation as “games modeled after natural or man-made systems or phenomena, in which players have to achieve pre-specified goals” (p. 3). Simulations are important as the student (player) “acquires important skills, such as interpersonal communication, teamwork, leadership, decision-making, task prioritizing and stress management” (Vlachopoulos & Makri, 2017, p. 4). In addition, simulations assist in “developing procedural skills and facilitating conceptual change” (p. 5). Cases can also enhance the educational environment. Penn, Currie, Hoad, and O’Brien (2016) defined cases as “a substantial problem based on a real-life example or designed to be similar to the types of problem that occur in real life” (p. 16). They indicated that cases can be used to develop critical thinking, and to develop higher-level cognitive process thereby providing a bridge between theory and real-world experience. This is supported by Svinicki and McKeachie

(2011) who stated: “Case methods are intended to develop student ability to solve problems using knowledge, concepts, and skills relevant to a course. Cases provide contextualized learning” (p. 205).

External. In the post-secondary classroom, students can be exposed to a deep learning environment via experiential learning opportunities. Aoun (2017) considered experiential learning as “something outside of an academic environment and you learn as you do it, you are engaged in experiential learning” (p. 81) further stating that “students engage in experiential learning through internships, co-ops, work-study jobs, global experiences, and original research opportunities” (p. 81). Svinicki and McKeachie (2011) observed that experimental learning permits students to leverage “real skills and activities that students will need to use someday. The more...involved with real problem solving, the greater the probability that they’ll be able to use what they learn after they graduate” (p. 203).

This literature review chapter has provided the background necessary to create a definition of deep learning and enable the proceeding chapter to explain how that definition will be addressed.

Author’s Contribution

As noted in the literature review, students are more engaged with the material when attributes of deep learning manifest in teaching practice (Hill & Epps, 2010; Dunleavy & Milton, 2016). This project provides a bridge, identifying methods of instruction which lead to a deep learning in students during the post-secondary education experience. The teaching methods identified should not be considered exhaustive, rather, the project will endeavor to confirm the use of said practices to foster deep learning. The

project will act as a link to teaching practices and deep learning opportunities, and provide a chance for additional research to be completed in the area of deep learning.

CHAPTER THREE: EFFECTIVE TEACHING IN THE IME PROGRAM

The literature review has revealed that the teaching strategies often associated with supporting deep learning in students are: conceptual understanding, critical thinking, experiential learning, and internalization. I will now turn my attention to looking closely at the IME Program and the teaching methods employed and determine the ways in which they support deep learning. Further, this final chapter will include student perspectives of the IME program and how its attempts at helping students become deep learner has assisted them in adapting to the influence of technology.

Teaching for Conceptual Understanding

Considering the definitions of several authors (Hiebert & Grouws, 2007; Howren, 2004; Kang & Jansen et al., 2017), conceptual understanding empowers students, resulting in the ability to make concepts relevant and applicable based on circumstance and context. Conceptual understanding is considered meaningful (Kang & Howren, 2004; Jansen et al., 2017) and can be applied in a contextual way (Hiebert & Grouws, 2007). The research of each of these authors relative to conceptual understanding is illustrated in the following example.

During the fall semester of the IME program, students are enrolled in a course titled Project Management (MGT 3920). In this course, students are exposed to many concepts, including topics such as project selection methods, project organization structures, estimates of project components, schedule planning tools, cost management and budgeting tactics, resource allocation strategies, monitoring, and controlling procedures, and contracting considerations. Exposure to this material is foundational to the project that students complete in the spring semester of IME. During the spring

semester, students will leverage the material acquired in MGT 3920 via a live fundraising project that students oversee. The project is completed for a nonprofit organization in the Lethbridge community.

The project starts with students proposing project concepts (organizing structures). Once a concept is selected (project selection methods) based on proposed budgets (budget tactics), a plan for the project is created (scheduled planning). Separate areas or departments are formed within the student collective (resource allocation) based on their areas of expertise (accounting, marketing, and logistics for example). Once the departments have been identified, the working groups then carry out the tasks to complete the project. As the project moves to its completion, students will monitor the progress (controlling procedures), ensuring the project is completed on time and budget.

Based on the definitions of authors mentioned in this section (Kang & Howren, 2004; Jansen et al., 2017; Hiebert & Grouws, 2007), teaching for conceptual understanding is leveraged in IME as students apply the material in a meaningful way that builds upon exposure to the course content. Concepts are useful as students can relate to how they will use these learned skills in a more significant context. Students are raising funds and awareness for a local non-profit organization based on the content students were exposed to in project management. Students learn how to use the concepts meaningfully, outside the classroom, in a real-world setting, with environmental forces lurking.

Teaching for Critical Thinking

Two studies (Idol & Jones, 1990; Paul, 1995) identified that, for critical thinking to occur, students had to incorporate a process known as the scientific method. Ennis

(1993), on the other hand, felt that critical thinking was a tool to help people focus on a task. From my point of view, both perspectives are ingredients of critical thinking as demonstrated by the following example.

At the beginning of the fall semester, IME students are exposed to a half-day lecture on how to analyse and write cases. Students learn that in order to examine and analyze a case and act on it, the scientific method of reasoning is necessary to resolve the inherent problem or opportunity. Shortly thereafter, students are given a case in which groups of three must implement a strategy that will resolve the issue or opportunity. Students also have to discuss how they would monitor this strategy (within the case) to ensure it works, incorporate a timeline regarding how long it would take for the problem to be addressed, and identify the action to be taken after implementation if the initial solution did not solve the problem or opportunity.

Since the scientific method is used to address the scenario presented to students, it can be noted that Idol and Jones' (1990) and Paul's (1995) concept of critical thinking occurs. However, the work of Ennis (1993) has merit. In order to use the scientific method, it is essential that students "focus" (Ennis, 1993, p. 180) on identifying the problem (not a symptom) and also consider the various alternatives to resolve the scenario. Students must also make sure they choose the best option (which also requires focus), then implement and monitor the solution to ensure they see the results they were expecting (again needing focus). In this one instance, all three definitions of critical thinking are employed in IME.

Teaching for Experiential Learning

Incorporating learning that is transferred from content to experience is another aspect of deep learning. The Association for Experiential Education (2010) used the term “developed skills” (para. 2) when referring to content, and experiential as “direct experience” (para. 2). D. A. Kolb (2015) mentioned “lecture and classroom learning” (p. xviii) as the content, while “learning from life experience” (p. xviii) is the experiential element. Carpenter (2014) used the phrase the “specific pedagogical technique” (p. 115) of forming an image of content and “process” (p. 115) when referring to the experiential portion of this teaching method. All three refer to the acquisition of knowledge (content) and its application (experience) in some way after the fact. This type of deep learning is described in the following example.

During the first semester of IME, a business consultant is brought in to discuss proper protocol and etiquette in using social media platforms when interacting with clients. The consultant is an expert in this area and works for a variety of businesses in Western Canada, providing social media management services to an organization unable to complete such work themselves. The day following the presentation, IME students in their cohort groups (four to five students per group) are assigned a social media platform (Facebook, Instagram, LinkedIn, and YouTube) that they must manage on behalf of IME for the school year, using principles cited by the consultant from the previous class. Throughout the remainder of the school year, these student groups manage the platforms. Duties include answering enquires, posting updates, and any other tactic related to the management of the platform.

Students are exposed to content via the business consultant (in class) then implement the material in a transformational fashion (experiential) throughout the remainder of the first and second semester of the academic school year. They are responsible for managing the platforms as would an employee for an organization.

Teaching for Internalization

When considering internalization as an integral part of deep learning, some literature suggested engaging students in the process of collecting information, which would then be employed based on circumstance. Vansteenkiste et al. (2018) indicated that students “take in externally offered values, regulations, and guidelines” (p. 33). Further, the British Council (n.d.) stated a “process of learning” (para. 3), while Demetci et al. (2016) posited that internalization has an association “with cognitive autonomy” (p. 1). After being exposed to the course material, students could then use the information acquired in a way that resonates with them and has value. Demetci et al. (2016) indicated that, “students’ perception of course content having a high personal value” (p. 1). Vansteenkiste et al. (2018) stated that process of internalization “function as personally meaningful guideposts” while the British Council (n.d.) felt internalization would enable students to engage in a “basis of production” (para. 3).

Integrated Management Experience students are exposed to the teaching method internalization at various stages throughout the year. For example, in the first semester, students are enrolled in MGT 3050 (Human Resource Management). In this course, students gain insight related to Human Resource (HR) management. An example of the concept of internalization occurred when students, acting as business consultants, use the information they learned in MGT 3050 to write a new HR policy for the Young Women’s

Christian Association (YWCA) Harbour House. The board of directors asked IME students to come up with a new employee policy. This policy was to address how YWCA Harbour House managers should deal with employees who were caught under the influence of drugs or alcohol on the job. This would, of course, have to be vetted by the law firm that represents YWCA Harbour House, but the initial draft of the policy was to be crafted by the IME students. Over two months, student groups prepared proposed legislation and then presented the proposed legislation to the board of directors with YWCA Harbour House.

During this process, students were empowered, engaged in meaningful work, putting theory into practice, and provided value through the creation of new policies for a local non-profit organization. All these elements constitute internalization.

Supporting Evidence

The question to now address is what anecdotal support has been gathered to contend that these four teaching methods foster deep learning in the students participating in the IME program. This section of the project includes student testimonials supporting such circumstance.

Student Impact

The data from this section of the project includes three sources: data collected from a research project completed by Dr. Debra Basil's marketing research class from the Dhillon School of Business, testimonials from the IME web site, and reviews completed on the IME Facebook page.

Debra Basil's research class. From data collected, the most important reason students joined IME was the "development of skills" (Aye, Ficiur, & Ross, 2018, p. 1).

Further, students felt “the IME program was an ideal resource to use in order to improve interpersonal relationships often found within common professional workplaces” (Aye et al., 2018, p. 11). When considering benefits, IME graduates felt “employability and skill development” were the top two outcomes of the program (Aye et al., 2018, p. 13). Since skill development is somewhat ambiguous, Aye et al. (2018) asked students to identify the top three skills acquired in IME. The skills students acquired included working in teams (43.5%), public speaking (30%) and time management (18%) (Aye et al., 2018). Students indicated “the skills they developed are valuable to them in the job market” (Aye et al., 2018, p. 14). Almost 30% of the IME students surveyed felt a strength the program was the ability to “put theory into practice or gain valuable real-life experience” (Aye et al., 2018, p. 16).

Bowes, Hubbard, and García-Ortegón (2018) indicated “alumni on average found the live case to be the most valuable aspect [of the program as] they could apply [it] to their later work life” (p. 23). Bowes et al. (2018) went on to say that IME students felt the program “enhanced their employability” (p. 25).

Based on data from students, the IME program exposed students to situations that they would encounter within their workplace. These encounters in IME provided students with the ability to put theory into practice and adapt to life after school more readily due to being exposed to these situational factors in a controlled environment during their time in the IME program.

IME online testimonials. The following statements were drawn from the IME web site and Facebook page. Students from the IME program were asked to provide testimonials based on their experiences in IME and how they impacted them upon degree

completion and entry into the workforce. The selected comments here make reference to the concepts of deep learning based on the teaching methods of internalization (British Council, n.d.; Demetci et al., 2016; Vansteenkiste et al., 2018)), experiential learning (Association for Experiential Education, 2010; Carpenter, 2014; D. A. Kolb, 2015;), critical thinking (Ennis, 1993; Idol & Jones, 1990; Paul, 1995), and conceptual understanding (Kang & Howren, 2004; Jansen et al., 2017; Hiebert & Grouws, 2007).

IME web site.

- gave me the boldness to network and pursue creative solutions to hard, real-life business issues;
- gained confidence and relevant skills to make you seem like the best candidate in the interview;
- taught...professionalism and I can look back consistently and talk about my experiences and how they were relevant to what I am doing now;
- conflict management styles that I learned have also been very valuable to me through my work;
- taught me to come out of my shell and apply my classroom knowledge to practical experience;
- learned real skills that you are going to use every day such as leadership, problem solving, teamwork, and public speaking;
- provided me with my first opportunity to apply classroom taught business principles to real life scenarios in a collaborative team based environment;
- puts into practice what is learned in the classroom - my experience with IME pushed me to think outside the box, to take greater initiative...in my

community, and opened doors to new possibilities from numerous networking opportunities; and

- the course taught me skills in a more hands on way, which I felt was more practical in preparing me for the workforce ("Where has life taken the previous IME students," n.d.).

IME Facebook reviews. The following statements were drawn from the IME Facebook review page

- Great program for students to develop a deeper understanding of how businesses run;
- believe it to be an integral program that bridges the gap between theory & “the real world”;
- great hands on experience;
- it was an amazing opportunity to connect with a cohort of like-minded individuals while gaining real world experience; and
- bridged the gap between "theory" and the "real world!" Working with the community really brought everything together ("Facebook IME page," 2019).

Summary

In what ways and to what extent are post-secondary classrooms providing opportunities for the student to be able to think and adapt to environmental changes?

Over the past decades, several authors have called for changes to post-secondary education (Boyer, 1990; Pocklington & Tupper, 2002; Fahmy, 2004; Heller et. al, 2017).

While curricular and pedagogical changes that incorporate the concept of deep learning are occurring in the public system (Gini-Newman & Case, 2015; Martinez & McGrath;

Alberta Education, 2016; British Columbia Education, 2018), there is less evidence that the concept is being taken up at the post-secondary level. From a post-secondary perspective, Aoun (2017) stated:

To stay relevant in this new economic reality, higher education needs a dramatic realignment. Instead of educating college students for jobs that are about to disappear under the rising tide of technology, twenty-first-century universities should liberate them from outdated career models and give them ownership of their own futures...equip them with the literacies and skills they need to thrive in this new economy defined by technology. (p. xiii)

The IME program can be considered part of this “realignment” (Aoun, 2017, p. xiii). The IME program empowers and enables, it exposes students to real-world situations and macro environmental forces (such as technology), and provides students with the capacity to adapt to their circumstance based on their exposure to various teaching methods relating to deep learning. What was once considered to be an outdated Socratic method of instruction seems to be moving into twenty-first-century mainstream teaching. Once again, andragogical practices employed by Socrates are now gaining momentum. As Dewey (1897) stated over 100 years ago: “The only true education comes through the stimulation of the child's [student's] powers by the demands of the social situations in which he finds himself” (p. 540). Due to the exposure to conceptual understanding, critical thinking, experiential learning, and internalization resulting in deep learning, students in IME have the capacity to thrive in the environment influenced by the impacts of what has been defined as technological determinism. Will this hold true for all post-secondary graduates? Unless students are presented with opportunities for

deep learning to occur it may be more a means of survival rather than realizing one's full potential during their working career.

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