EXPLORING ENTREPRENEURSHIP EDUCATION USING PROJECT-BASED LEARNING IN A BUSINESS MANAGEMENT PROGRAMME AT A CANADIAN COLLEGE.

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ABSTRACT

Entrepreneurship is a key driver of our Canadian economy. Statistics Canada states that almost 20% of all jobs in Canada are created by small businesses and self-employment. In order to ensure a steady supply of qualified entrepreneurs for our labour markets, educators must be able to provide support and resources to their students that will enable their new businesses to succeed and in turn boost our economy. This is where entrepreneurial education can play a powerful role in creating a continuous and competent supply of entrepreneurs supporting strong economic growth in the Canadian economy.

Attempting to ensure consistent entrepreneurial growth, the Alberta Provincial Government prompted changes in post-secondary education by mandating colleges to provide more effective entrepreneurial learning environments for their students. Olds College, a small rural college in central Alberta accepted the Alberta Provincial Governments challenge, opening the door for a research opportunity which would test the plausibility of a proposed programme change.

A formative research methodology was deemed the most appropriate methodology to use in this research opportunity which examined the plausibility of a change in teaching method within the business management programme at Olds College, in Alberta, Canada. This research study served two purposes:

1) To develop a learning model and decision matrix tool built upon existing literature to help better understand effective entrepreneurial teaching and learning.

2) To test the plausibility of successfully implementing a project-based teaching method into the business management diploma programme at Olds College.

The plausibility of successful implementation of this teaching method was tested through a pilot project which spanned over a three-year period, collecting data through semi-structured interviews, surveys, observations, and analysis of peer-reviewed research and other scholarly literature. The formative research method provided ongoing results that informed continuous improvement changes as the three iterations of the study were completed. The data gathered from the student, instructor and leadership surveys and interviews delivered valuable feedback that informed the decision-making process and provided the incentive to move forward with

business management programme changes. The implementation of a project-based Pedagogy for the Business Management diploma programme at Olds College, started in the 2017/2018 academic year providing an entrepreneurial focus for the business programme and ensuring a better fit within the organizations strategic plan.

KEYWORDS

Assessment, Bloom's, emergent learning, entrepreneur, teaching methods, formative research, Andragogy, Pedagogy, Heutagogy, Academagogy, project-based learning, SOLO

DEDICATION

I dedicate this thesis to my Mom, Dad, Sons, Grandchildren and partner Jeff. To all of my beloved family and friends who give me wings so I may fly.

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I want to express my sincere gratitude to my family and friends for their support during this demanding, but, fascinating period of my life.

Thank you to my family who understood when I needed to focus so much of my time on my work. Thank you to my colleague, Marnie DesJardins for your continuous words of encouragement and support. Thank you for your patience as I asked for just one more critique or discussion.

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Chapter 1 - Introduction

This research study explored the plausibility of making a major change to a business management programme at Olds College as mandated by college leadership and the provincial Government of Alberta. Olds College was established in 1913 as a small rural college located in Olds, Alberta Canada. On average, there are a total of 1400 students enrolled per year taking a variety of over 30 programme offerings. Olds College specializes in agriculture, horticulture and business with a focus on innovative and hands-on learning.

To fulfil the Provincial Government mandate to enhance entrepreneurship education on our college campus, the programme change intent was to develop a new business programme that would move from a traditional management education curriculum to a programme where the major focus would be on teaching and promoting entrepreneurship. Participating as both an instructor and researcher in this study, it was critical for me to understand the effect the change would have on all stakeholders and the success of this business programme change.

Many doctoral programs emphasise the creation of descriptive knowledge for education, however this DBA research appropriately deployed a formative research methodology by not focussing on "what is it" but rather on "how to do it" (Reigeluth & Frick, 1999, p.2). The contribution of this research is not only concerned with how to create sustainable change in this particular college programme, but also to offer knowledge to others, thereby sharing insight and information gained from our experience.

This thesis provides new insight and a practical perspective that assisted in the development of the business programme change by providing data and support for the decisions. This was accomplished through the examination of two main research study objectives: (1) to apply a formative research methodology to test the plausibility of making a successful programme change and (2) to develop an entrepreneurship learning model and decision matrix tool that would assist in the development of the test pilot, thus allowing for the testing of the plausibility of the programme change. The model and matrix would also help instructors choose a pedagogy, assessments and learning activities for the new programme.

The action research process began with the establishment of a framework based on a practical literature review. One of the first steps was an exploration of the current state of the business programme, including what content was being taught and what teaching methods were being used. The literature review structure was built upon the information gathered through the exploration of the current programme which inspired the research questions and the direction for this study.

The next process was the search and selection of an appropriate methodology which was directed by the research questions and the intent of the research study. After careful evaluation of methods, the selection and application of a qualitative research method as the primary method for gathering data was deemed to be the best fit for this study. A formative research methodology and design research structure allowed me to gather feedback from all change stakeholders including students, instructors and Olds College leadership. The information and knowledge gained as a result of the three-year pilot and the analysis was used in the development of the business programme change pilot study and ultimately in making the final programme change decision. Each of the three pilot iterations provided ongoing feedback that was utilized to make continuous improvements to the change plan as the study progressed.

The global increase in attention to entrepreneurship and entrepreneurship education has not gone unrecognised in Canada. The Government of Alberta has a strong interest in encouraging educational institutions to expand on their efforts in entrepreneurship education. Over the past five years, Letters of Expectation were issued to all public post-secondary institutions in Alberta, which contained mandates regarding specific outcomes and new accountability measures. The Letter of Expectation states that Olds College has agreed to support the specified goals, including providing sustainable post-secondary education in an environment that stimulates innovation, entrepreneurship, and collaboration.

The need for this research study stemmed from government and economic external pressures and from internal institutional pressures to conform to the college's strategic plan. The current business programmes do not meet this educational requirement as entrepreneurship education takes a different perspective as compared to traditional business, with more of a focus on self-directed learning, creativity and effective problem-solving. Traditional business management

programmes will need to adopt a more innovative approach to transition in order to effectively teach entrepreneurship (Gibb, 2004).

After an examination of our current business programme, it was apparent to our college that we needed to make extensive changes to our programme to address the entrepreneurial learner's different needs. The change would necessitate creating a unique entrepreneurship education programme that would be distinct from other intuitions' courses in order to make it competitive and marketable.

The following section details further the motivation to perform this research study.

1.1 Motivation to Perform the Research

Olds College is committed to creating an entrepreneurial culture and learning environment for their students, and to advancing entrepreneurship within and around their community. Close cooperation between the college and community stakeholders has enabled new ways of partnering and creating innovative paths for collaboration, both of which are important in creating an entrepreneurial organisational culture (Kariwo & Zindi, 2014, p.165). The value of entrepreneurship education not only concerns the college, but the economy as a whole.

Entrepreneurship can be defined as a basic human capability that can contribute to the economy's success and survival. Business does not exist merely to satisfy its own needs but rather it needs to meet long-term consumer demands, which in turn serves society as a whole (Casson & Casson, 2014, p.1224). Educational institutions play an important part in this economic development as they provide entrepreneurship education which can hold unlimited value and promise for the future, while helping to develop those individuals who can solve problems, create, innovate and communicate effectively (Helyer, 2011, p.102). The need for educational institutions to fulfil this functional purpose formed our college's mandate to provide a better entrepreneurial learning opportunity for our students.

Why this trend and need has developed in the field of education is debatable, although one reason may be the world and the global economy is changing. This is having an intense effect on today's educational systems, as a given country's innovative capacity is closely tied to its wealth and well-being (Stromquist & Monkman, 2014, p.6). There has been an impact on society, which

has changed from a manufacturing- to knowledge-based economy (Drucker, 1994, as cited by Scardamalia et al., 2012, p.232). Countries with low education levels are vulnerable as innovation levels usually match those of education. More support for the importance of entrepreneurial education is outlined in an argument made by David and Foray (2003, as cited by Scardamalia et al., 2012, p.232), who suggest that differences in a country's growth or productivity capabilities have less to do with natural resources and more to do with their capacity to innovate and create new knowledge.

Entrepreneurship has a significant impact on economic development and entrepreneurship education at all levels is an effective way of helping to increase the numbers of new entrepreneurship entrants (Draycott, Rae, & Vause, 2011, p.674; Robinson & Shumar, 2014, p.422). Public policy makers have identified entrepreneurship as an important part of the socio-economic infrastructure of a country; so much so that the European Commission of 2008 has suggested that entrepreneurship education be incorporated into university education as an integral aspect of their education programmes (Lorz, Mueller & Volery, 2013, p.124). Educational institutions should recognise the importance of entrepreneurship education by embedding it throughout their organisation and by making it part of the 'DNA' of the institution (Morris, Kuratko, & Pryor, 2014, p.46). In turn, government mandates, internal strategic direction pressures and the provision of valuable educational support of the economy makes it important for our college to develop an effective entrepreneurial learning environment and education programme.

Researching the value that entrepreneurship education can bring to a learner and to the overall economy was a critical first step in this study. The significance of transforming our traditional business management programme to one with an entrepreneurial focus finds support not only in government mandates but also in previous empirical research, particularly as the value of entrepreneurship education has shown positive results (Gorman, Hanlon & King, 1997, p.70). This research suggests that formal education can positively contribute to entrepreneurship by creating positive attitudes and increased awareness. Martin, McNally & Kay (2013, p.220) agree and provide results based on an examination of 42 independent samples which discovered meaningful relationships between entrepreneurship education and entrepreneurship attitudes, outcomes and intentions.

Along with government mandates to promote entrepreneurship come the new demands of industry for a skilled and knowledgeable workforce. Many employers are seeking employees who have more of what is termed 21st century skills, including technological and communication capabilities alongside the capacity to work effectively in a team and to deploy problem solving and critical-thinking abilities (Mitchell, Skinner, & White, 2010, p.44). These 21st century skills are not only important for students who will be hired by existing organizations, but are also essential for entrepreneurial success. Programme advisory boards confirm the industry trend towards the requirement for 21st century skills and talk about the gap they see in current business students coming out of college. From this we can conclude that traditional business programmes at our college are not satisfying industry needs in terms of creating more entrepreneurially-minded, self-directed potential employees who can solve problems and use critical-thinking skills. In this case, reform of current education systems is needed to ensure educators are addressing these changing needs while embedding 21st century skills within all courses and programmes (Kozma, 2009). Systemic educational reform of this kind requires changes not only to pedagogy but also to the curriculum, including new methods of assessment to address the unique measurement requirements best suited to assess 21st century skills. Developing this business programme change presented new challenges, as teaching contemporary skills as well as entrepreneurship education requires a more open, tailored or flexible approach to assessment as compared to what traditional methods can provide (Darling-Hammond, 2000, as cited by Scardamalia et al., 2012, p.233; Fadel, 2008, as cited by Scardamalia et al., 2012, p.233).

The need for more 21st century skills can be attributed to many organizations changing from more traditional bureaucratic systems to a flatter organisational structure. The latter structure has fewer levels of management, placing greater stress on individuals making decisions and problem-solving (Handel, 2013, p.98). With this increased accountably and responsibilities, employees are required to become more self-directed and proficient at critical-thinking. With a new reliance on contemporary skills, organizations will need to change the way they hire, as they abandon their pursuit of conventional skills based on predictable, repetitive tasks that can be automated easily (Kivunja, 2014, p.40; Scardamalia et al., 2012, p.243). If hiring practices are changing, so education must adapt in order to better prepare students for this new and challenging employment environment (Gore, 2012, p.9).

By taking on this challenge, educators can deploy pedagogical and andragogical methods that are not only effective, but useful in terms of motivating students to want to learn. It should be the objective of business schools to ensure that they use teaching methods that give students a '*zest*' for learning entrepreneurship, and that will readily enable the students to transfer their knowledge into practical application in the workplace (Whitehead, 1959, pp.192-205). Jones (2006, pp.336-337) suggests the adoption of a 'Gibbian' style approach to entrepreneurship education, a learner-centred and action-oriented teaching style, which may provide students with the impetus they require to learn effectively. Reflection on previous research such as presented here leads to the consideration and recognition of the importance of different pedagogical methods being employed when teaching entrepreneurship (Lorz, Mueller & Volery, 2013, p.124). The development of an entrepreneurship learning model and decision matrix will assist in ensuring the pilot for the programme change will address the need for a variety of teaching methods and activities.

Further justification for continued research stems from the opinion that post-secondary business schools are not providing students with the education they need to deal with real-life ambiguities, failing to prepare them to effectively translate analytical skills into real-life practice. Entrepreneurship education is intended to provide students with the knowledge to be able to effectively translate many of the skills they learn from theory into real-life, hands-on applications. This suggests that a curriculum should reflect integrated activities and content from multiple courses, to enable students to see the connections and reduce the knowledge silos. Any pedagogical method used to teach entrepreneurship and 21st century skills must allow students to develop their self-efficacy to enable the effective transfer of skills and knowledge into real-world practices (Aram & Noble, & Stephen et al., 1999, as cited by Ben-Zvi & Carton, 2007, p.11).

Current teaching practices and curriculum in the business management programme at our college are taught as separate courses that do not promote big picture thinking. A change to an education focussed on entrepreneurship has the potential to provide teaching opportunities for instructors to collaborate and integrate curriculum, thereby reducing the current trend of knowledge silos.

This section has discussed the need for and purpose of this research study. The mandate for a change to the current business management programme presented both an opportunity and

challenge to research an effective solution. The next section will discuss the overall relevance and significance of the research.

1.2 Practical Relevance and Significance of the Research

Knowledge may be considered relevant if it can affect how we perceive things and make decisions. If the information can influence a decision, or how it is made, no matter the result derived from that decision, the information should be considered relevant. This research studied a three-year case study using a pilot programme to test the implementation of a major change to a business management diploma programme at a small rural college in central Alberta, Canada. The College has a total of 1,400 students, and the research participants included two programme groups; second year business diploma students and third year applied degree agricultural science students. This is a small college with limited number of faculty, and therefore two, or in some years three, faculty members taught in these programmes and participated directly in the research study.

The major focus of this study used the current business management programme as the catalyst to examine the plausibility of creating a better entrepreneurial learning environment at the college.

This research study's findings are relevant for both the academic and business world and presents information that influenced changes within the entrepreneurial learning environment of our college and external industry partnerships. The research findings provided inspiration to our students, providing them with insight to assist them in developing a different perspective on entrepreneurship, or in better preparing them to make choices for the demands of today's workplace.

Research intent:

This thesis has developed and addressed three objectives:

1. A critical literature review of entrepreneurship, learning theories, teaching methods and assessments was conducted. This information was used as a foundation to build an entrepreneurship learning model and decision matrix tool that might assist in the

development of the pilot to test the plausibility of the programme change. This information also informed decision-making and assisted in the evaluation of the effectiveness of project-based teaching methods in promoting entrepreneurial learning;

2. This research applied a qualitative, formative-based methodology to test the plausibility of making a successful change to a project-focussed teaching method in the Business Management diploma programme;
3. This research study made an original contribution to knowledge through the development of a cyclical model for entrepreneurial learning and a decision matrix, and other institutions may find useful the college's experience of a programme change.

Research statement:

As a researcher, I adopt constructivism's epistemological stance which accepts that knowledge is created from the interactions between a person's ideas and their experiences; it is in this way that we construct our own understanding of the world we live in. Taking on a constructivist view provides a higher level of awareness regarding research participants' perceptions, as these perceptions will be accepted as their reality. In addition, I deploy a realist ontology by taking on the belief that the social world does not exist apart from human action and observation.

The purpose of a Doctor of Business Administration thesis is to contribute to the body of scientific knowledge and to improve professional practice in a discipline. This research study fulfilled this requirement and generated knowledge by offering information that supported entrepreneurship education through the development of a learning model and decision matrix. These tools supported the process of pedagogical selection and assessment choices, and provided theoretical knowledge from which the pilot was constructed that tested the implementation and change for the Business Management programme at Olds College. The main contribution is the sharing of knowledge gained from going through a business programme change and what we learned from this research and experience. This knowledge may be generalizable and used in

different contexts by other education institutions, as the pilot process and use of project-based learning could be applied in many different educational programs.

The overall intent of this research study was to test the plausibility of promoting entrepreneurial learning by changing our business management programme curriculum and to also to apply the new project-based learning teaching method. The logic of the formative research methodology is to create a model, test it, and then reflect on any weaknesses. To test the plausibility of making this programme change, this research study also examined the following sub problems by applying the measurement metrics of appeal, effectiveness and efficiency (Reigeluth, 1989). This included the:

1. Development of a decision matrix and learning model that can provide foundational support for building the pilot study process, and which can be generalised to assist instructors in making effective teaching method and assessment choices in the new programme;
2. To evaluate how effectively a project-based teaching method can meet entrepreneurial learners' requirements;
3. Examination of the plausibility of changing the teaching method to project-based learning in the Business Management programmes at Olds College, including studying how it would be accepted by students and faculty, and thereby assess how it could improve the entrepreneurial learning environment at the College.

The following section reviews the structure of the thesis and the process used to answer the research questions.

1.3 Structure of this Study

Phase 1 of the study was to recognize and identify the problem and to gain insight into understanding the role stakeholders would play in the programme change. As a practitioner and researcher, I welcomed the challenge of studying the possibilities there would be for the business programme change and became interested in further analysing the challenge through research.

Phase 2 of this study conducted a literature review to establish a theoretical framework and gain a clear understanding of the definition and characteristics of entrepreneurship, and the intentions of entrepreneurship education, learning theories, pedagogy and andragogy. This was completed through the identification of case studies, theories and models that assisted in the development of this study and informed my research topic. This literature review provided background information that informed me of current research, and conflicting information and gaps in the scholarly knowledge that my study may have the opportunity to address. The literature review also assisted in establishing my area of study and defining my topic, as the search started with a wide scope, then narrowed down to focus on topics relevant to this study. At the end of my research the assimilation of all the information helped me to reflect on the existing scholarship in relation to my own research findings.

Phase three of this research study included a three-year pilot project to test the plausibility of successfully implementing a major pedagogical and curriculum change in the Business Management Diploma programme at Olds College. In this phase of the research, I developed the programme change content and pilot process and then tested the proposed solution for the programme change. The formative research study validated the findings by combining a relevant and rigorous process of action research to improve the college's practice (Roth et al., 2008).

Over a three-year period from 2015 to 2017, this action research study collected, and analysed interview and survey data gathered from pilot project participants that included instructors and students. The data collection process continued into the third year, and was extended to gather additional data from students, instructors and the leadership group in order to explore how management influenced and supported the programme change. The analysis was again increased in 2017 to include an examination of the effect that the organisational culture of the college may have had on the success of the change.

The formative research methodology was designed to provide ongoing feedback and structure that will ensure continued process improvement not only for the three years of the study, but well into the future. The results from the formative research study provided valuable and thought-provoking information that was employed in the programme change decision-making process. The measurement metrics for testing plausibility of effectiveness, efficiency and appeal informed

decision-makers they were making the correct choices for the business programme change. The research results provided evidence that using project-based learning in the new programme would be effective and appealing to students and instructors.

1.4 Summary

This Introduction has discussed the intent, purpose, and practical relevance and significance of this research study. The next chapter reviews and discusses the relevant academic literature in order to better understand the research problems which have assisted in developing the research study's structure. Literature topics deemed relevant to this study include entrepreneurship, entrepreneurial learning and education, pedagogy, andragogy, heutagogy, academagogy, learning theories, assessment and organisational culture.

Chapter 2 – Literature Review

2.1 Introduction

The intention of this literature review is to provide a variety of theoretical perspectives on specific themes in order to inform the development and implementation of a required change to a business management diploma programme at Olds College, in Olds, Alberta. This literature review begins by exploring the history and definition of entrepreneurship, including the characteristics and skills required for success as an entrepreneur as well as theories and goals common to this type of education. Teaching methods and models best suited to support entrepreneurship learning are reviewed, with a focus on integrated curriculum-thematic learning, experiential and experimental learning.

This review includes a discussion of the theory of complex adaptive systems and organisational culture, as these were important in understanding potential challenges and their impact on the success of this change initiative. I recognise that my function as the researcher is to understand and assimilate the information explored during the literature review and, from that, to derive my own perceptions, insights and assumptions. Reflecting on existing and new knowledge has assisted in generating suggestions while also influencing the programme changes. This research study aimed to bring about an organisational awareness regarding the part each stakeholder played in the programme alteration. The study provided a guiding framework using a formative research methodology to facilitate the shift to an entrepreneurial-focused programme.

2.2 Defining Entrepreneurship

Demand is growing for more entrepreneurially-focussed education programmes in Canada. Consequently, Olds College needed to examine its current business programme to gain insight into changing what was a traditional business programme to a platform with a more entrepreneurial focus. In recent years a greater level of importance has been placed on entrepreneurship education due to the Government's recognition of its value for economic stimulation (Cooper, 2003; O'Connor, 2013).

To begin this discussion, an understanding and definition of entrepreneurship is in order. Arriving at a definition that everyone can agree on has proven challenging. Even today this

discipline is evolving and changing (Acs, Szerb, & Autio, 2016; Carland & Carland, 2015; Kobia & Sikalieh, 2010). The challenge in finding a common definition may not result from its relative newness as a discipline, but instead, stem from the uniqueness of each entrepreneurial endeavour. Cantillon was the 'original thinker' on entrepreneurship during the 18th century and defined the role of the entrepreneur as a person who is a risk taker pursuing the goal of earning a profit (Brown & Thornton, 2013, p.402). Others, such as Gartner (1990), described entrepreneurship as having two main clusters: the first focused on innovation, growth and uniqueness while the second concentrated on the outcomes of the situation, specifically on the concepts of value and profit.

Other terms such as the one suggested by Katz (1991, p.2), namely 'prairie populist', states that entrepreneurship is not a singular idea, but related to a collection of insights that may include many specialties such as free and private enterprise. Carlsson et al. (2013, p.914) developed yet another definition, viewing entrepreneurship as "an economic function carried out by individuals that may act independently or within an organisation in order to create or perceive new opportunities". They have also stated that opportunities are influenced by socioeconomic or environmental factors. This variation in descriptions and interpretations of an entrepreneur suggests that no one discipline can provide all the tools or knowledge required to generate entrepreneurial success. For the purposes of this study, I will consider and build on the definitions of previous scholars and suggest that an entrepreneur is defined as an individual who can recognise opportunity and utilise a wide scope of academic skills deploying creativity, innovation and critical-thinking to act upon those prospects. This definition will provide direction and act as a starting point for the literature review search.

2.2.1. Common Characteristics and Skills Required for Successful Entrepreneurship

Understanding the final product of a successful entrepreneurship education programme and what it is attempting to achieve starts with an examination of what we consider a successful entrepreneur to be. The word entrepreneur originally came from the French word meaning 'pioneer'; Brush (2008, pp.21-22) supports this by stating that "by definition, entrepreneurs are pioneers". Synonyms for entrepreneurs include words such as 'forerunner' and 'discoverer',

which reflect Brandstätter's (2011, pp.223-226) 'Big Five' model that considers essential entrepreneurial traits to include extraversion and openness to new experience. In addition, Frese's (2009, p.459) process model of entrepreneurship lists the essential personal characteristics of entrepreneurs as: self-efficacy, innovation, stress tolerance, risk taking and proactive personality; words that are once again linked to the phrase 'pioneer'. These are all considered to be entrepreneurial characteristics and skills for successful entrepreneurs and are identified as 'twenty-first century skills' (Boyles, 2012, p.42). The definition of entrepreneur, as well an exploration of the characteristics and skills common to entrepreneurs, offers foundational knowledge to determine what is important to a programme in this field. The next section examines the intentions of entrepreneurship education and its perceived importance.

2.3 The Importance and Intent of Entrepreneurship Education

Current literature and the increase in government funding provides evidence of the growing importance being placed on entrepreneurship education in Canada and other countries (Kozlinska, 2012; Masakure, 2015). However, the significance of entrepreneurship education and the value it brings to the student and to the economy is a current debate among scholars (Martin, McNally & Kay, 2013; Rauch & Hulsink, 2015). One of the major issues appears to stem from entrepreneurs having many unique traits while participating in a variety of industries, making it difficult to establish common learning objectives. Some feel that entrepreneurs must be born with the traits and characteristics required for entrepreneurial success, thereby placing little value on the importance of entrepreneurship education (Kozlinska, 2012, p.69). Others say that entrepreneurial skills such as innovation and creativity can be effectively taught (Drucker, 1994; Metcalfe, 2013). Skills such as innovation can be taught to a certain extent as there are processes to guide the development of critical-thinking, decision-making and innovation (Page & Thorsteinsson, 2017). Thus, using a tool such as design thinking can help foster these types of 21st century skills in students (Glen, Suciu, & Baughn, 2014; Coco, Calcagno, & Lusiani, 2016).

The intention of entrepreneurship education is to develop successful entrepreneurs or employees who demonstrate effective entrepreneurial traits (Bae et al., 2014). According to Hytti and O'Gorman (2004, p.13), there are three major goals for entrepreneurship education. The first is to allow learners to develop an understanding of the role of the entrepreneur and the part they

play in society. The second goal is to provide an environment where students can learn to become entrepreneurs, or 'learn by doing,' and the third goal is learning how to effectively start a business. Metcalfe (2013) argues that the start of a new enterprise is comparable to the creation of the universe. A new enterprise takes creativity, ambition and selling to ignite the explosion leading to new creation.

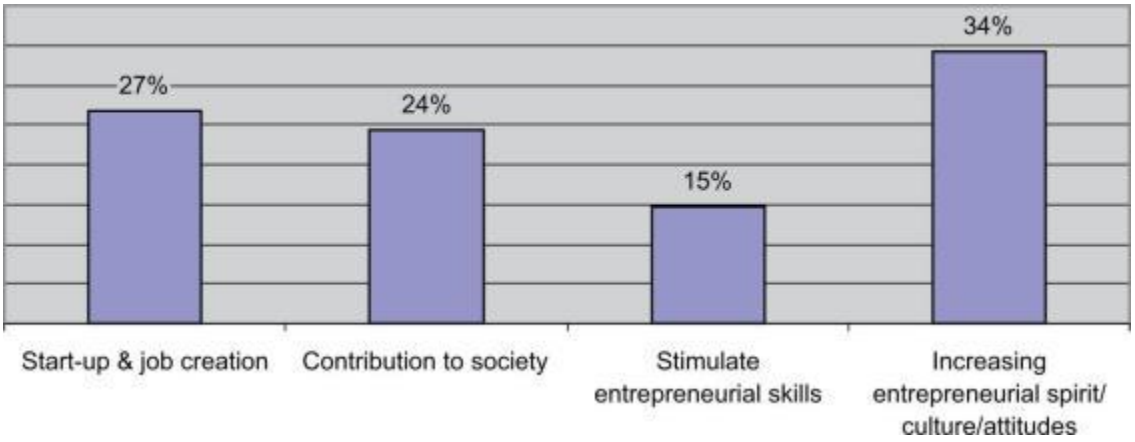

Figure 1. General objectives of entrepreneurship education

(Mwasalwiba, 2010, p.26)

As discussed in the literature, entrepreneurship learning objectives vary and include acquiring knowledge germane to entrepreneurship, developing the skills necessary to analyse business situations, and formulating business plans. Some commentators list the behavioural aspect of entrepreneurship learning and suggest learning objectives which include developing empathy and having an attitude open to change. The varied perspectives summarised in Figure 1 illustrate that there are both differences and commonalities regarding which learning objectives are the most important in entrepreneurship education (Thomas & Barra, 1994, p.5; Mwasalwiba, 2010, p.26). The heterogeneous perspectives of college faculty, leadership and students regarding what they believed should be taught were important factors in the research and programme change process. While entrepreneurship education does not always result in students establishing a new business, it may assist in their ability to facilitate or promote change within an existing organisation (Brophy & Kiely, 2002, p.167; Hytti & O'Gorman, 2004, p.11; Haase & Lautenschläger, 2011,

p.146; Chang & Rieple, 2013; Morris, Kuratko, & Pryor, 2014). Adopting a wider approach to entrepreneurship education is as important as being an entrepreneur while owning a business is so much more than simply learning how to start a business (Hytti & O'Gorman, 2004). Keeping a business sustainable over the long run as well as being able to apply entrepreneurial skills as an employee are also significant objectives of entrepreneurial education (Brophy & Kiely, 2002). Integrating entrepreneurship mind sets throughout all courses encourages the 'big picture' thinking that students require to fully understand course content at a deep level. Entrepreneurship education programmes must take a wide view and consider the learning needs of students who may not become business owners but rather employees who need to develop entrepreneurial mind sets preparing them to be intrapreneurs (Weber et al., 2014, p.280).

The development of a new entrepreneurship focused business programme will require confidence in knowing what and how to make the programme change meet the needs of entrepreneurship education and learners. Currently the Olds College business management programme has a strong inclination to teach formal skills such as accounting, marketing and finance. Much of the existing research agrees that the teaching of formal skills is not where the major focus of entrepreneurship education should lie, but instead it should concentrate on the soft skills essential for successful entrepreneurship (Robinson & Stubberud, 2014; Solesvik, 2013). The development of soft skills and entrepreneurial behaviours and attitudes plays a key role in the formation and success of a new business, which suggests placing more emphasis on them to achieve an effective entrepreneurship education programme (Fayolle & Gailly, n.d.; Linan, Rodriguez-Cohard, & Rudeda-Cantuche, 2011; Potter, 2008; Peterman & Kennedy, 2003; Zhang, Duysters, & Cloodt, 2014). This emphasis can assist in developing programme content and pedagogies to accommodate these requirements (Linan, Rodriguez-Cohard, & Rudeda-Cantuche, 2011, pp.208-211).

The business programme change will need to provide students with a suitable environment to learn both formal and soft skills by offering them the opportunity to participate in learning at a deep level. Learning about the deep cognitive structures of expert entrepreneurs may provide support for novice entrepreneurs and assist in the development of education programmes by placing the educational focus on elements proven to be effective in the real world (Krueger, 2007, p.123). Using mentors and other subject experts as part of the learning process in the pilot

project at Olds College will provide this focus while supporting learners to better understand the content at higher cognition levels. Gaining a deeper understanding encourages students to use the knowledge in innovative and creative ways, which assists in the development of their entrepreneurial expertise over time (Rae & Carswell, 2000, p.225).

Entrepreneurship education has a diverse mix of requirements which may best be learned by taking a thematic approach fully integrating all courses within the students' entrepreneurship education programme. Cross-disciplinary, collaborative learning such as offered through the use of project and problem-based learning can supply entrepreneurship education with the desired mixture of learning opportunities as it ties theory to practice in real-world settings (Sroufe & Ramos, 2015, p.156). Planning an effective change to the business programme needs to consider the curriculum integration of all courses as part of the preparation and planning strategy.

This section explored some of the current research on the intention of entrepreneurship education and its perceived value, as well as discussing some of the general objectives of entrepreneurship education. What should be taught will now be followed with a discussion regarding how to teach entrepreneurship education.

2.4 Which Learning Theories and Teaching Methods Best Support Enterprise and Entrepreneurship Learning?

The above section on the intent of entrepreneurship education discussed the heterogeneous requirements of entrepreneurship education. The diverse and varied demands of an entrepreneurship education programme present both content and teaching method challenges. In addition, approaching these challenges implies considering the constructivist philosophy, which takes the view that learners will construct knowledge from their own experiences. It also states that instructors need to play the role of facilitator rather than teacher with the learner taking a more active role in their own learning (Glaserfeld, 1989).

Constructivists use many active and experiential teaching methods such as case studies, problem-based learning, and real-life projects to encourage the learner to be an active participant in the construction of their own knowledge. Constructivism is based on two major concepts: accommodation and assimilation. Assimilation is the action of the learner understanding

information at the level whereby they incorporate their new experiences into older ones to develop new knowledge. Learners will piece new information together in novel ways as prior knowledge helps build new knowledge (Baron, 2006, p.105; Baron & Ensley, 2006, p.1332). In turn, accommodation is a process requiring learners to modify existing knowledge to include new information, which changes their perception to create alignment (Reinkling, Labbo, & McKenna, 2000, p.111).

As a researcher I follow the constructivist philosophy of learning, basing my work on the perspective that learners produce and develop knowledge shaped by their own experiences through accommodation and assimilation. Taking the perspective that constructivism is not a theory or a description of teaching but is a theory of learning can assist in the choice of appropriate pedagogy and andragogy (Fosnot & Perry, 1996).

The importance of the choice of pedagogy has been a source of debate as some researchers argue that if students are truly self-directed learners, learning will take place no matter what teaching method is employed. Other scholars and educators disagree and argue that the teaching method does make a difference to a student's learning (Renkl, 2008; Schelfhout et al., 2006; Loyens & Rikers, 2011, as cited by Baeten, Struyven, & Dochy, 2013, p.14). Taking a "wide angle view" from both an ontological and pedagogical perspective when making pedagogical choices is crucial as entrepreneurship learning objectives are diverse and complex, requiring a variety of teaching methods to accommodate student learning (Fayolle & Gailly, 2008, p.586).

Understanding how students construct their own knowledge as active participants in their learning will influence pedagogical choices and should also prompt the use of teaching methods that will encourage self-organisation in students which is essential to this building process. Pedagogical choices are a challenge as there is no widely accepted standard teaching model for entrepreneurship education and, in the end, entrepreneurship teaching methods may be more of a craft than a science (Fayolle & Gailly, 2008, p.571). However, providing learners with a constructivist learning platform will support students in redefining their views on entrepreneurship, thereby enabling them to create and develop a more entrepreneurial mind set.

The revised Olds College business management programme has adopted both an enterprise and an entrepreneurship education perspective. In the context of enterprise education, we attempt to

equip our students with the capacity to generate new ideas and encourage skills such as the critical-thinking and innovation that can bring these ideas to life. The new business programme also provides students with professional knowledge, skills and capabilities to set up their own business or to behave in an entrepreneurial manner within an existing business. These programme changes have recognized the need for educational institutions to provide the resources and learning environment that encourages learners to engage in their own knowledge creation through cognitive processing (Piaget, 1952; Vygotsky, 1968). This learning environment can be inspired by selecting the appropriate teaching and learning philosophies for entrepreneurship education. Pedagogy, andragogy, heutagogy and academagogy are all alternative learning philosophies that could prove a good fit for entrepreneurship learning, depending on the level of knowledge and experience of the student and the desired learning outcomes. A review of the description of each approach assisted in better understanding which philosophy best suited the needs for the new business programme which traditionally applied a pedagogical teaching philosophy.

One of the major characteristics of pedagogy is that the learning is controlled by the instructor, with the educator determining what, how, and when the learning occurs (McAuliffe & Winter, 2013). Andragogy is similar to pedagogy but is focused on self-directed learning and the teaching of adults. Heutagogy considers learning to be student driven as the latter takes a very active part in their learning by determining their own learning path through self-motivation and self-directedness. Academagogy is a model that meshes all of these philosophies into one (Winter et al., 2009, as cited by McAuliffe & Winter, 2013, p.83). This 'mesh' of models creates a flexible learning environment and opens up choices for both learner and instructor to use multiple teaching methods, thus applying what works for them in a variety of contexts. Academagogy acknowledges the need for entrepreneurship education teaching and learning to be flexible to suit the context, acknowledging that a one-size-fits-all approach may not be effective.

The term pedagogy is most commonly used in all contexts of teaching at Olds College, although it is recognised that it may not always be the most correct philosophical term to use. This research study has shared with faculty the differences in philosophies, leaving the choice open for the instructor to choose the term they think best suits the situation. Considering constructivism and academagogy, the choice of teaching models that would effectively

accommodate entrepreneurship education were supported through an exploration of several learning theories. In turn, Lee's experiential learning mind map in Figure 2 (Lee et al., 2010, as cited by Kozlinska, 2011, p.209) illustrates classifications of experiential learning methods and visualises the different modal characteristics of this type of learning. The diagram demonstrates how experiential learning methods such as problem-based learning can bridge the gap between academics and industry by utilizing group- and peer-based learning, the community, and by focusing on the development of soft skills. This model illustrates how taking the philosophical approach of academagogy would be effective for entrepreneurship education.

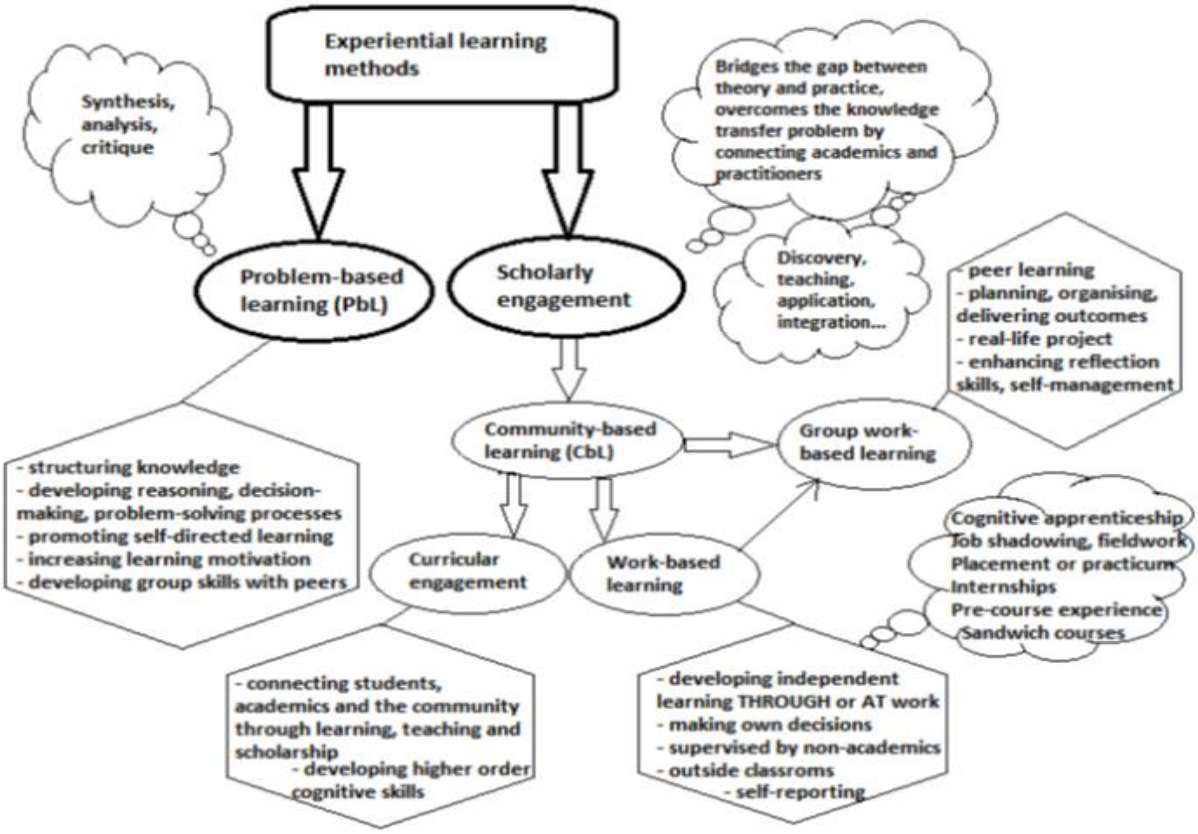

Figure 2. Experiential learning methods.

(Based on Lee et al. 2010, as cited by Kozlinska, 2011, p.209)

Constructivism and academagogy fit with the emergent learning model shown in Figure 3 (Williams, Mackness, & Gumtau, 2012), which presents a topographical footprint diagram

exhibiting a cross section view of what (Williams, Mackness, & Gumtau, 2012) suggest is the appropriate balance between prescribed and emergent learning. The model diagram indicates that prescribed learning is low risk, fail/safe, and highly structured in an instructor-controlled learning environment, whereas the emergent learning phase is student led with safe/fail flexible learning. Scaffolding is shown as a temporary support to assist students with understanding and facilitating access to meaning, which is gradually removed as the student develops adequate understanding of the concept. Vygotsky's (1978, p.87) zone of proximal development further explains the construct that is critical for scaffolding instruction. This model is supportive of constructivism as it demonstrates how students begin to construct their own knowledge by starting the process in a safe environment where it is acceptable to make and learn from their mistakes, then progressing further to become more self-directed. Prescribed learning, scaffolding and emergent learning all require unique pedagogical approaches at different times in the learning process supporting academagogy.

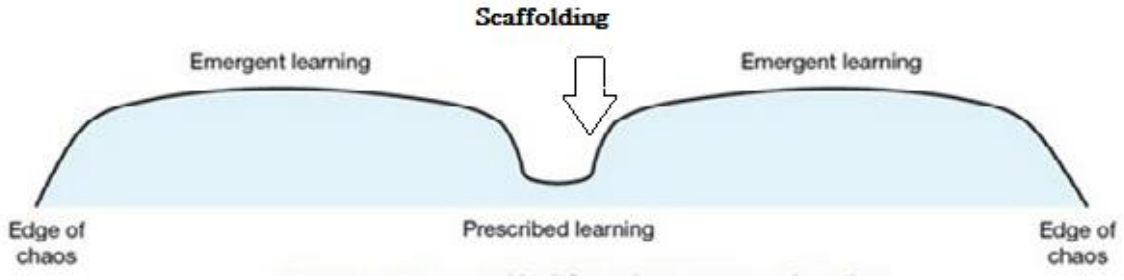

Figure 3. Topographical footprint, cross section view

Adapted from Williams, Mackness and Gumtau (2012)

Overall, there must be an appropriate balance between prescribed learning, scaffolding and emergent learning for effective entrepreneurial learning (Williams, Mackness, & Gumtau, 2012). The appropriate balance choice can be supported by taking a holistic look at the learning process to ensure that the 'learning scape' is appropriate for the context and the learners. This holistic or 'big picture' view chimes with Rae's (2005) triadic model of entrepreneurial learning which

suggests effective learning requires the appropriate mix of social emergence, the negotiated enterprise, and contextual learning. In turn, a review of these learning models assisted in planning the business programme change which needed to consider stakeholder needs, learning objectives and goals, the learning audience, and the unique requirements for entrepreneurship education (Fayolle & Gailly, 2008, p.575).

Adopting a constructivist philosophy and student-centred approach as opposed to a teacher-centred one may be unfamiliar to some teachers, resulting in their reluctance to use unknown or new models. The hesitance to change teaching methods has been cited as one of the possible root causes of ineffective teaching in entrepreneurship education. Discovering the reasoning behind teaching choices will enable solutions to be formulated to encourage instructors to try new methods, resulting in a change in the quality of teaching in this discipline (Balan & Metcalfe, 2012). Encouraging instructors to support the philosophy of academagogy may decrease their opposition to follow one-size-fits-all standardized teaching practices which are unsuitable for entrepreneurial learning (Honig, 2004, p.264).

Entrepreneurship education must provide the flexibility to deal with radical change mimicking the true entrepreneurial environment which bears little resemblance to the perfectly structured, linear way business and management education is currently being presented. Business management education has been based on the use of historical information which attempts to transfer large amounts of explicit knowledge to the learner. Teaching methods employed in entrepreneurship education must be closely matched with the entrepreneurial environment and reflect reality by focusing on future events, changing environments and trends instead of concentrating on the past (Gibb, 1987, as cited by Henry, Hill, & Leitch, 2005, p.106). Classrooms must move away from an environment where the student is highly dependent on expert validation to reflecting the real world which encourages the learner to exhibit critical-thinking, problem-solving and self-direction (Gibb, 1987, as cited by Henry, Hill, & Leitch, 2005, p.106).

Developing the learner's ability to deal with real world situations requires fostering more 21st century skills, namely communication, problem-solving and decision-making. Providing a flexible learning environment for entrepreneurial learning will include a safe environment where

students are allowed to learn from their mistakes. Traditional business management classrooms struggle to facilitate this learning opportunity as they take a fail/safe management approach that ensures compliance and predictable outcomes. Entrepreneurship education requires a learning environment that allows for taking the risk for safe/fail experiments to inspire self-organisation and enable emergence in students (Snowden & Boone, 2007, as cited by Williams, Karousou, & Mackness, 2011, pp.46-47). This emergence must be managed by creating a system of negative constraints, focusing on resilience rather than robustness with a method for quick intervention when the acceptable level of risk for a learning phase has been surpassed (Williams, Karousou, & Mackness, 2011).

Experiential learning and learning from mistakes is essential for entrepreneurship learners as they tend to place more stress on experience-based learning and networking than traditional teaching methods such as lectures. To accommodate learning preferences, any teaching method employed must align with and link the learner to the real world. Students may also need to be flexible and adapt to a change in their learning preferences as they participate in a more experiential learning environment where instructors are no longer the 'sage on the stage' but are instead a facilitator of learning (Thomas & Barra, 1994, p.11). This change of learning environment presents a new challenge for instructors who, in the past, had the luxury of being able to pre-plan and prepare course content using target-oriented frameworks. Pre-set lesson planning and the use of teaching methods that have been tried and tested offer a high level of comfort in the classroom for instructors, a security which is not extended to entrepreneurial education as the latter is rapidly and constantly changing (Penaluna & Penaluna, 2009).

Providing the students with the optimal learning environment can offer a level of diversity and relevance to the learner and ensure the effective assimilation of new knowledge (Schilling et al., 2003, as cited by Holcomb et al., 2009, p.175) yet it will also present organisational challenges for leadership. There must be consideration of the need for new resources, flexible work scheduling and training options to accommodate instructor requirements to ensure an effective transition into the new business programme.

This section identified numerous constructivist and experiential learning theories focusing on student-centred methods. The effectiveness of any teaching method depends on several factors,

including context, student and instructor attitude and experience. The next section will discuss how integrating the curriculum in the revised business programme could benefit entrepreneurial learning.

2.4.1 Integrated Curriculum-Thematic Learning

The concept of thematic learning or the integrated curriculum is essential for entrepreneurship education as individual subjects should not be taught in isolation but rather presented as related topics and themes in order to more closely mimic the entrepreneur's real world. This melding of content encourages the development of 21st century skills and the holistic thinking important for the successful entrepreneur. An interdisciplinary and integrated curriculum promotes higher-level thinking skills such as creativity as found in the top level of the Bloom's (1948) taxonomy Holistic thinking allows the learner to adopt multiple perspectives, opening their minds to look at things differently, which help them move past difficult threshold concepts by seeing challenges in a new light. An integrated view increases the level of understanding of how things are interrelated, thereby improving students' ability to transfer and transition their knowledge and skills from the academic realm to the real world (Watson, 2007).

Incorporating curriculum integration into the new business management programme required reflection on how that process would look as there are several characteristics are necessary for good curriculum integration Steinberg (1997).

1. Instruction centres on a common problem or project;
2. The learning environment should allow the students to explore a set of topics over several disciplines that will be connected by a unifying concept. It should allow students to see how these concepts are not only interconnected but also how they can be applied to real life;
3. The concepts being taught and explored will bring together the curriculum in a meaningful way.

The six A's identified by Adria Steinberg (1997) as important components of successful curriculum integration can also help structure curriculum:

1. Academic and technical rigour – projects are designed to address key learning standards identified by the school or programme;
2. Authenticity – Projects use a real-world context, i.e. a community problem;
3. Applied learning – Projects engage students in solving problems calling for competencies expected in high performance work organizations, i.e. teamwork, problems solving, communications;
4. Active exploration – Projects extend beyond the classroom by connecting to internships or community explorations;
5. Adult connections – Projects connect students with adult mentors from the wider community;
6. Assessment practices – Projects involve students in regular, performance-based exhibitions and assessments of their work. Real world standards of performance are used.

A successful change to a more entrepreneurially-focused programme will address or include a focus on the following factors:

1. Commitment to the common goal and focus by instructors;
2. Strong support by administration;
3. Continuous cooperation and teamwork among faculty;
4. Accountability and responsibility for planning and implementation by instructors;
5. Agreement on core learning goals between instructors;
6. Instructor and schedule flexibility.

The majority of research available on thematic and integrated learning has focused on the "how to" issue, such as the work of Steinberg (1997), leaving a gap in the areas of how such a change would affect the instructor and student transitioning from a traditional classroom structure to an integrated learning environment. Both instructors and students will need to reshape their roles as they move into the integrated curriculum environment (Hopkins, 2014). In turn, this transition will require more than just a curriculum change; specific structural and systemic changes will be vital to support the change management process for both instructor and students. Transitioning to an integrated curriculum is similar to moving to a foreign country, in that it is like leaving home;

all that was familiar is now strange and unknown. A successful integration will require cultural and structural adjustments to the current learning environment (Hopkins, 2014, ii).

The next section addresses the needs of entrepreneurship learners as related to experiential and experimental learning.

2.4.2. Experiential and Experimental Learning

Experiential learning is considered more than a philosophy of education, it is also a "theory of experience" (Dewey, 1938). Experiential learning is considered to be the transformation of knowledge from experience (Kolb & Kolb, 2005) (see Figure 4). It is suggested that pedagogies for experimental and experiential learning produce deep learning and a high level of transferable skills, thus making it beneficial for entrepreneurial learners. It has been observed that, 'Entrepreneurs learn in the real world through "adaptive" learning' and learning by doing which embraces learning from mistakes and 'trial and error' (Deakins and Freel, 1998, as cited by Collins, Smith, & Hannon, 2006, p.193; Gibb, 1995, as cited by Collins, Smith, & Hannon, 2006, p.193).

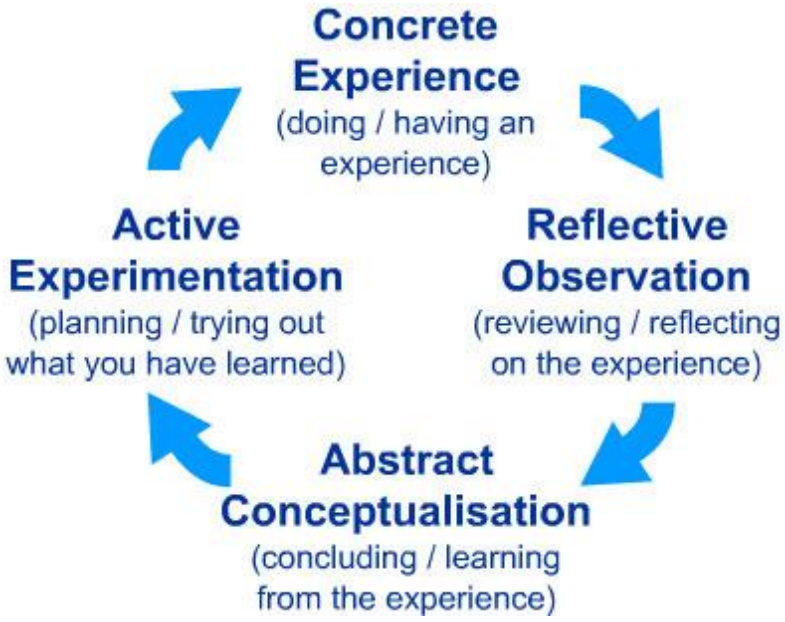

Figure 4. The cycle of experiential learning - Kolb & Kolb (2009, p.44)

The first stage in experiential learning is the student experience. In the second stage the learner attempts to better understand their experience by trying to make sense of it. In the third stage of experiential learning, the learner will reflect on the experience and transform that experience into new knowledge. The final and fourth stage of the learning process is active experimentation as the student attempts to apply what they have learned in the real world (Dhital et al., 2015, p.2).

Experiential learning in andragogy allows the student to 'learn-by-doing' by discovering what it is they need to know and where to find the required information. If experiential learning provides the student with the opportunity to take a new experience, organize and then make sense of that knowledge, it is an effective bridge or link between education, learning, work and a student's personal development (Kolb, 1984, pp.3-5).

Two teaching methods that apply the experiential learning philosophy are problem-and project-based learning. The next section will discuss two of these, specifically the problem- and project-based learning teaching methods. These two methods are appropriate to incorporate into the business management programme's entrepreneurial focus change.

2.4.3. Problem and Project-Based Learning

The change of a traditional business programme to one with an entrepreneurship focus requires both a transformation to the curriculum as well as to the way in which the programme is taught. Instructor-focused lectures are less effective in the entrepreneurship classroom (Edelman et al., 2008, p.63) and do not provide the flexibility or the student-focused learning environment essential for entrepreneurial education.

Experiential and active learning strategies such as project- and problem-based learning are student-centred and facilitate the student's transfer of academic knowledge and skills into real world applications. Considered as both pedagogy and process, problem-based learning centres on the analysis of a complex problem for which there is no definitive or correct answer. Providing students with poorly-structured, real world problems requires them to use a combination of knowledge and skills such as research, critical-thinking and problem-solving abilities to formulate solutions and recommendations. Students are challenged by the fact that there will not always be a clear right or wrong response, therefore their focus is placed on the learning process

itself and not on the destination goal implied by a correct response (Hemelo-Silver, 2004, as cited in Savery, 2006, p.12).

The objectives of problem-based learning as stated by Barrows (1996, pp.5-7) are designed to help students:

1) Construct an extensive and flexible knowledge base;

2) Develop effective problem-solving skills;

3) Develop self-directed, lifelong learning skills;

4) Become effective collaborators; and

5) Become intrinsically motivated to learn.

There are several differences between traditional business curriculums and entrepreneurship education as traditional business is based on theory and case study methods of learning while entrepreneurship education is more hands-on and experientially focused. Therefore, changing to an entrepreneurially-focused programme will require more bridging and stronger connections between the academic and real-world than the traditional business programme. Teaching and learning methods such as project-based learning are active and experiential while providing an effective learning environment to facilitate the bridging of knowledge between the academic and real world (Savery, 2006, p.12). This pedagogy fits well into the constructionist philosophy of learning as it encourages learners to create new knowledge by building on existing knowledge as they gain valuable hands-on experience through their project work (Savery, 2006, pp.12-13).

Project-based learning offers students learning opportunities for vertical learning through the accumulation of subject matter knowledge, and horizontal learning for common soft skills such as problem-solving and project management (Helle, Tynjälä, & Olkinuora, 2006, p.292). This integration of learning highlights the importance of project selection and effective implementation as poorly-designed projects can affect how students integrate prior knowledge (Hung, 2011, p.539). Inadequately designed projects have the potential to distort the effectiveness of project-based learning which can be reflected in the quality and success of

student learning outcomes. In addition, project work provides the flexibility and diversity to support and encourage efforts in innovation and creativity (Tan & Ng, 2006, pp.423-424).

The diversity and variety of the project work can create inconsistencies in learning outcomes, thereby making it difficult to assess and attracting criticism for taking such an entrepreneurial approach to learning. One of the values of a discovery- or experiential-based pedagogy is its flexibility to tailor the learning opportunity to the learner, which makes this a good choice for teaching entrepreneurship education. This diversity encourages students to utilize resources and learn from different sources, such as learning from mistakes, learning by doing, and learning through experimentation (Tan & Ng, 2006, pp.423-425). Learning from mistakes or 'productive failures' allows learners to explore and generate solutions to problems before they receive any instruction encouraging higher levels of self-direction. Learners will not all respond to this encouragement in the same way, so it cannot be assumed that using project-based learning will automatically motivate every student to become more self-directed. The effectiveness rests with how the project is implemented and the student's characteristics. Challenges arise through the presence of students' ritualistic behaviours and how these engrained behaviours affect learning when participating in project-based learning. Students who are accustomed to lecture-based teaching look for a high level of assistance and specific instruction, defeating the instructional objectives of self-direction and problem-solving.

Project-based learning takes a broad view of learning, looking beyond the classroom and into the community, providing students with both an in- and out-of-school experience which facilitates essential 'funds of knowledge' for entrepreneurial learning. Problem- and project-based learning can be considered a 'threshold philosophy' as the roles of both learner and teacher change in this pedagogical shift, thus creating a state of disjunction (Savin-Baden, 2006, p.162). Learning using the unique pedagogy of project-based learning can be new and also foreign to many students, so it would be natural for them to want to reject it or retreat to a more familiar way of learning. It also requires much more energy and motivation on the part of the learner, unlike lectures where students play a passive part in the learning process. Treating the pedagogy as a threshold concept requiring a scaffolding process will make the transition to this type of learning smoother, thereby encouraging learners to move towards a deeper level of learning.

Instructors need to introduce project-based learning as the first concept presented in the learning cycle, which would encourage students to actively engage in dealing with this threshold concept. This section has examined the concepts of problem- and project-based learning pedagogies which will now be compared to the needs of the entrepreneurial learner.

2.4.4. Entrepreneurship Learning

This section builds on the concepts presented in the prior sections, and will compare several learning models and theories that consider the uniqueness of the entrepreneurial learner. The comparison between the needs of entrepreneurship learning and the characteristics of project-based teaching methods revealed commonalities relevant to development of the entrepreneurship learning model and decision matrix used to construct the pilot process.

Ulrich (2009, p.98) suggests that entrepreneurially-minded students have different learning preferences compared to traditional business and management students; namely a preference for more active, hands-on education. Common psychological characteristics of entrepreneurs include a high need for achievement, an ability to deal with ambiguity, an internal locus of control and a strong desire to receive feedback on how well the established goals have been accomplished. It is important that entrepreneurship teaching addresses these unique learning preferences; as Kolb and Kolb (2005) suggest, learning style preferences do have an impact on how well the teaching method will facilitate the learning. Active pedagogical strategies are superior for complex learning as they promote and develop the higher educational outcomes found in the upper levels of Bloom's taxonomy, namely 'apply' and 'create' (Ulrich, 2009, p.98).

A review of several teaching philosophies has assisted this study in determining an andragogical approach would be effective for teaching entrepreneurship education. This approach would encourage learners to become more actively involved in planning their own learning (McAuliffe, Hargreaves, Winter, & Chadwick, 2009, pp.2-3). The ultimate goal of increasing a student's capacity to become self-directed is to develop their ability for self-determination and to take control of their learning. The role of the instructor in andragogy is to encourage and support the student in this development through the use of experiential teaching methods such as problem- or project-based learning (McAuliffe et al., 2008). Project-based learning also promotes double-loop learning and self-reflection where the learner will consider a problem, act on it, and then

reflect on the problem-solving process and how it influences their beliefs and assumptions (Argyris & Schön, 1978, as cited in Hase, 2009, pp.45-46).

While andragogy has a goal of students becoming more self-directed in their learning, heutagogy as described by Blaschke (2012) focusses on self-determined learning as directed and controlled by the learner themselves. In line with the intention of self-determined learning, heutogogy supports the acquisition of capabilities and competencies (Hase & Kenyon, 2007). A competency is a proven ability in acquiring knowledge or a skill, whereas a capability is the learners' confidence in their competency, resulting in their ability to apply that skill or knowledge to problem solve or to take effective action (Blaschke, 2012, p.60).

In addition, the design of an entrepreneurship education programme must consider the desirability of a flexible learning environment which allows students to function at different levels, thus accommodating diverse learning needs. One student could be working at the level of andragogy and be more self-directed, allowing for a student-centred approach, while another might function at a lower level with little experience and knowledge that would require a pedagogical, instructor-led and structured approach (Kenyon & Hase, 2010). It may be that the best way to view the differences between the three teaching philosophies is not specifically to measure the student's age but rather their level of maturity and the amount of control each can exert over their own learning.

Learners are constantly constructing knowledge by adding new information to their existing knowledge base or 'cognitive structures'. This notion is supported by Piaget (1968) who views learning as an adaptive process where the learner goes through a series of stages, adding and constructing new knowledge as they pass through each one. These stages allow students to recognise opportunities and apply creative solutions to problems as part of their learning process.

In line with this, course design elements need to deploy an approach that will transition learners from a pedagogical to an andragogical approach to learning in order to increase self-direction, later supporting the evolution to a heutagogical approach as students mature and develop their learning capabilities and capacity. This supports the suggestion that a student's learning progresses to higher levels of cognition as they mature and gain experience, which recalls Piaget's (1968) theory of cognitive development. Piaget's theory suggests that learning is a

progressive reorganization of mental processes that is a result of biological maturation and the learner's environmental experiences. The theory, formulated in the 1950s, has been criticised for not explaining how or why a learner would develop and move from one learning stage to the next while not recognizing the differences between individual learners (Lourenço, 2016, p.124). Piaget's theory of cognitive development has been accepted as a valid theory and, in part, might be useful in explaining how entrepreneurship students learn as it supports the practice of the adaptation of instruction to the learner's developmental level.

The triadic model of entrepreneurial learning (Rae, 2004) is another theory relevant to the business programme change design. This model depicts entrepreneurial learning with three main focuses, namely contextual learning, negotiated enterprise and personal and social emergence. Rae (2005) suggests that entrepreneurship and learning are integrated as well as constructivist processes as Fig. 4 depicts. The model also proposes that entrepreneurial learning develops through social emergence, as a result of interactions with other entrepreneurs and the environment.

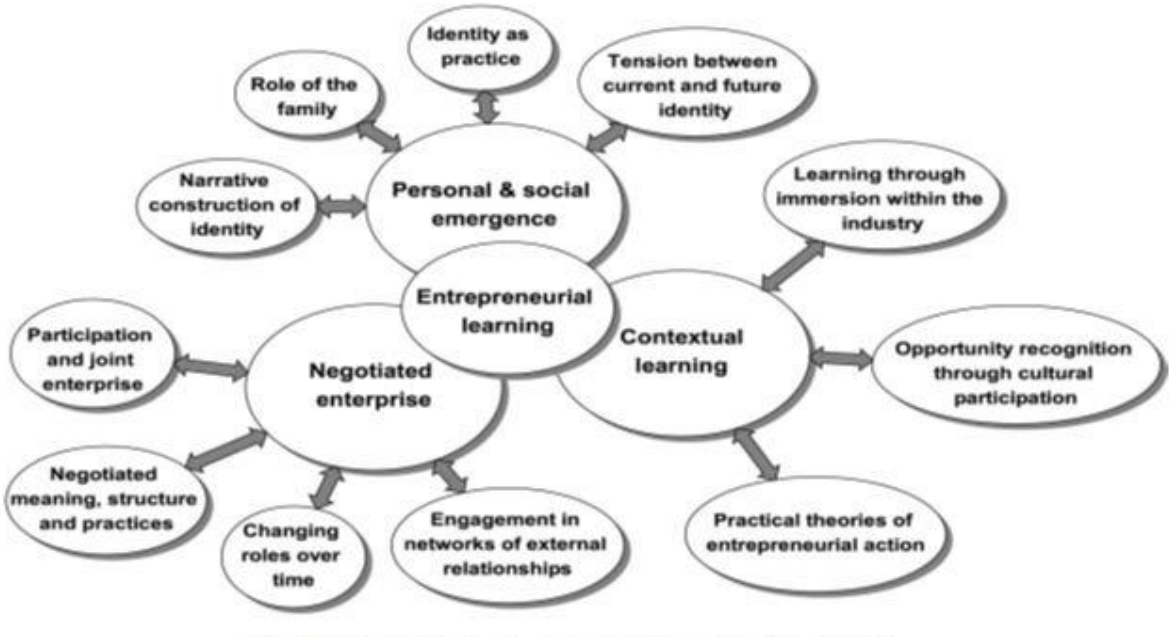

Figure 5. The triadic model of entrepreneurial learning

(Rae, 2004)

Entrepreneurship education should not be designed as a linear process as depicted in Rae's (2004) triadic model, as any or all phases might be involved in the process at any one time. In addition, Rae's model of entrepreneurial learning demonstrates how relationships play an important part in the development of intuition and opportunity recognition, suggesting that contextual learning happens when people create shared meaning through social participation. Building on Wenger's (1998) social theory of learning, Rae's model maps the relationships people develop through community and industry participation and interactions. Education programmes can support the building of negotiated meaning and contextual learning by using teaching methods that require students to work in teams and network with businesses and industry on projects in the community.

This model encourages adopting a holistic approach to entrepreneurial learning, showing the interdependencies of each theme and how learning can develop knowledge through an emergent social process of exploration. This learning exploration includes a process of reflection on what worked and what didn't work, encouraging students to learn from their mistakes (Rae, 2004). In turn, the exploration of Rae's model provided a better understanding of the design requirements for the business programme change as it supports taking a holistic view of the needs of the entrepreneurial learner while demonstrating the interconnections between entrepreneurial learning's themes. It also supports the application of a mix of learning philosophies such as pedagogy, andragogy and heutagogy within the business programme to accommodate different levels and phases of learning.

This section has examined several entrepreneurial learning theories and the current literature relevant to the development of an entrepreneurship education programme. The next section builds on our understanding of the entrepreneurial learner by introducing complexity theory and emergent learning.

2.4.5 Complex Adaptive Systems, Emergence and Entrepreneurial Learning

Two of the most important and common characteristics of successful entrepreneurs are creativity and the ability to be innovative. These two characteristics are complex, while how they develop and emerge within the learning process are difficult to understand. A deeper appreciation of the

interactions between a learner and their environment through an examination of complex adaptive systems may help to explain the effect these interactions have on learning.

The theory of complex adaptive systems shadows the thinking of Weick (1979) who suggested that learning is a social process where knowledge is constructed through the interaction of agents. This statement is consistent with the view of social constructivism and chimes with Englehardt and Simmons (2002) who suggest that an understanding of complex adaptive systems theory may provide guidance in creating effective learning environments. Also, "a complex adaptive system is composed of a diversity of agents that interact with each other, who mutually affect each other and in so doing, generate behaviour for the system as a whole" (Lewin and Regine, 1998, p.342).

The most important characteristics of complex adaptive systems are non-linearity, dynamic behaviour, emergence and self-organisation, which are similar to the characteristics of an entrepreneurial learner and emergent learning. Dynamic behaviour is open and dissipative, while not following any predictable path such as a closed system would. In addition, it has the tendency to move between a state of order and chaos (Waldrop, 1993, pp.11-14).

An excellent analogy of the concept of emergence is the game of chess, where the rules are defined, however, the outcomes of the game depend on the response of each player and their personal strategies. The outcomes are both unpredictable and complex as the results emerge from the bottom-up in a self-organizing manner (Harkema, 2003, p.343). This analogy could also be applied to project-based and entrepreneurial learning, as both can produce inconsistent results and different learning outcomes depending on the students' actions and how each project is implemented (Hung, 2011). Through adaptation, learners have the opportunity to influence their environments while through feedback the environment may influence the learner (Welter & Gartner, 2016, p.97). This co-evolutionary process is path-dependent, leading to different and unique outcomes other than the norm or what is expected at given times. Path-dependency may either constrain the adaption process or act as an enabler (p.98). Entrepreneurs are pioneers and path creators as they purposefully deviate from existing structures, taking the unknown path (Garud et al., 2010, as cited by Welter & Gartner, 2016, p.98).

These suppositions show commonalities between complexity theory and entrepreneurship as entrepreneurs are path makers that will both be influenced by, and exert influence over, their environments. Entrepreneurs change their roads and adjust as they receive feedback, adapting and co-evolving as they lead the way to creativity and innovation. Furthermore, entrepreneurs are in essence change agents for the economy by their introduction of new behaviours (Metcalfe et al., 2000, as cited by Welter & Gartner, 2016, p.97).

Entrepreneurship education programmes need to provide interactive learning opportunities and feedback for encouraging and influencing adaptation. These adaptation opportunities may lead to innovations and creativity, producing unique and different results for each learner. In turn, entrepreneurship is a non-linear and complex process that produces unique and creative products (Lichtenstein et al., 2002, p44) which for entrepreneurship education means more than traditional methods of assessment are required. The next section will review different assessment methods that might be appropriate for learning with diverse outcomes.

2.5 Assessment and Evaluation

Assessment has a powerful impact on student learning and may have a negative effect if the correct assessment method has not been selected. Derek Rowntree (1987) has stated that "if we wish to discover the truth about an educational system, we must first look to its assessment procedures" (as cited by Gibbs & Simpson, 2004, p.2). This section explores methods of assessment and evaluation that may be suitable for the unique and diverse needs of entrepreneurship education. Assessment may be defined as a process of judging student's achievement of learning objectives. Evaluation is applied to the context of making decisions and judgments about programmes and if that programme has achieved its goals and objectives.

The focus of assessment should be placed on its intent and purpose by asking the following questions:

1. What are instructors trying to measure?
2. How will this information be used and what impact will it have on stakeholders such as students and industry?

3. How valid, reliable and relevant is the information and how effectively are the resources being used in the assessment effort? (Anderson, 2005, pp.108-109; Harlen, 2007, pp.16-20)

Instructors and instructional designers must look to the value assessment will bring to the learner, keeping in mind the resources required to perform that assessment. It is possible that if assessment efforts take too much time and/or resources the instructors will not use them. The change to the Olds College business programme pedagogy and curriculum asked the questions suggested by Anderson (2005) and Harlen (2007) and considered the resources new assessment methods would require. Traditional pedagogies like lectures may be matched with traditional assessment methods such as multiple choice and quizzes. Experiential learning methods such as project-based learning, require a more flexible and individualized method to match learners' diversity.

To be effective, the assessment of entrepreneurship education must move the focus the assessment away from the final learning outcome while placing it on the measurement of the process of learning and the achievement of soft skills. These assessment methods present challenges and are more difficult to apply, therefore at times this can make accreditation efforts difficult (Gibb, 1998, p.38; Pittaway & Edwards, 2012, p.780). Accreditation efforts prefer standard and set processes, while experiential and entrepreneurial learning require a diverse range of assessment methods, ones that may be new or even untested. The discussion on assessment in regard to the needs of entrepreneurship education has shown that assessment plays a vital role in the experiential learning process, underlining that a flexible teaching method will require a flexible assessment method (Burns, Gentry, & Wolfe, 1990).

There is a virtual 'cornucopia of considerations' when making assessment decisions, particularly in relation to entrepreneurial learning and education (Burns, Gentry, & Wolfe, 1990). Adding to this complexity is the fact that assessment must consider not only how it will assist in student learning, but also how other stakeholders will use the subsequent information. For example, from an instructors' point of view, the assessment will consider the impact on student learning, whereas from a political accreditation system perspective, the emphasis will be outcome-based with a preference for formative assessment (Pittaway et al., 2009; Cassidy, 2006, as cited by Pittaway et al., 2009). In turn, an assessment method must ensure valid, reliable meaning with a

high level of consistency alongside evidence of what it is intended to assess. In entrepreneurship education, soft skills and practical experience are a critical part of learning as the students must be able to relate what they learn in the academic world and apply it in a real-world context (Mueller, 2012, pp.103-105).

Assessing knowledge transfer and its application will shift the assessment focus from learning outcomes to the learning process itself as it is preferred by entrepreneurial learners (Mueller, 2012, pp.154-155). Assessment of the learning process in place of final outcomes recognizes the need to allow students to learn from mistakes and does not penalise the learner for failures. In fact, research suggests that 'entrepreneurs learn more from failures than from success' (Petkova, 2009, p.350). Mistakes can act as a warning, alerting entrepreneurs they have made incorrect assumptions, which may prompt them to reflect on the error, re-evaluate, and then develop new ideas and paths (Daft & Weick, 1984, as cited in Petkova, 2009, p.350). New path development after experiencing failure echoes complexity theory as this trial and error approach to change is a result of the interactions of individual agents acting within a larger system. Welter and Gartner (2016) state that 'there is a paradox that entrepreneurs are embedded in path dependency but also break out of these structures and act entrepreneurially by becoming path creators' (p.98).

In addition, the start of a new business is not a linear process, but more a chaotic context where change is the norm. Even the smallest change may result in completely different outcomes than originally planned. A good analogy is the butterfly effect which suggests 'small causes can have large effects' (Tsai & Lan, 2006, p.18). Entrepreneurship students must learn not only to accept, but embrace chaos and learn to deal with and adapt to ever-changing conditions. As a new order emerges, yet another change will present new challenges and there will be yet another threshold to conquer or adapt to. Teaching methods utilized in entrepreneurship education must have the flexibility to provide students with the opportunity to break away from traditional thought patterns and structures, helping to behave in an entrepreneurial fashion by creating new and unique paths.

Making effective assessment decisions in terms of entrepreneurship education will take more thought and reflection as any method chosen will need the ability to deal with chaos. Summative assessment will always be a necessity for accreditation reasons; however, a shift in focus from

summative, instructor-led methods to formative student self-assessment variants would prove beneficial for entrepreneurship education (Andrade & Valtcheva, 2009, p.16). Self-assessment will promote self-directed learning and may improve students' motivation. However, instructors will be challenged to stay alert to their students' learning phases in order to provide effective mentorship and scaffolding at the appropriate time. Teaching students how to correctly self-assess is important as the accuracy of this method of assessment depends on the student's ability and maturity (Boud & Falchikov, 1989, p. 54). Two commonly used tools were reviewed to assess their fit for the business programme change. Bloom's taxonomy and the Structure of the Observed Learning Outcomes (SOLO) taxonomies have proven effective in assisting the alignment between learning and assessment outcomes (Hassan, 2011; Imrie, 1995). The classifications in these taxonomies help instructors assess the quality of the students' learning without placing the focus on final learning outcomes.

This section of the literature review has explored the value of assessment choice and alignment with learning needs, with a focus on those styles that best support entrepreneurship learning. It also discussed the significance of understanding complexity theory regarding developing effective assessment for entrepreneurship education. The following section will examine the characteristics of three specific methods of assessment: informal, knowledge-based, and performance, as well as the respective value they bring to entrepreneurship education.

2.5.1 Informal or Formative, Knowledge-Based and Performance Assessment

Three specific types of assessment, namely formative, knowledge-based and performance assessment were examined to determine which methods would be most appropriate for the Olds College business programme change. The first method – referred to as informal or formative assessment – is content and performance driven, and is applied on an ongoing basis. Examples of informal assessment can include interviews, journals, self-assessment and rubrics which can be used throughout the learning process. The purpose of formative assessment methods is to determine if students are learning the material and, if not, to signal to the instructor to adjust instruction on an ongoing basis (Moersch, 2011). The value of formative assessments lies in this continuous supply of feedback, allowing both learners and instructors to make adjustments throughout the learning process.

The second method reviewed, knowledge-based assessment, provides a platform for students to self-assess their own work. Knowledge-based assessment methods such as student surveys are commonly used in active learning pedagogies and can increase the student's awareness of their own learning strengths and weaknesses. With adequate student training, self-assessment methods can accommodate learning at all levels of the revised Bloom's taxonomy categories of remember, understand, apply, analyse, evaluate and create (Clauss and Geedey, 2010).

The third type of assessment reviewed was performance assessment which, as suggested by Wren (2009), can be effectively used to evaluate higher-order thinking skills such as 21st century workplace skills. This type of student-centred assessment asks students to perform a task such as researching or participating in real-life situations, thereby making it a good fit for assessing entrepreneurial learning.

Matching the business programme changes and entrepreneurship learning requirements with what each of the three assessment methods can offer provided insight into how student assessment should be developed in the new programme. Each approach has something different and unique to provide the learning process and offers the instructor valuable feedback on student learning progress. This examination of assessment methods created the awareness that, as in the case of teaching methods for entrepreneurship education, a variety and diversity of assessments is required.

This section defined and examined different assessment methods and the benefits they would bring to entrepreneurship education and the business programme change at Olds College. The next section will look specifically at the challenges of teaching and assessing 21st century skills for successful entrepreneurship education.

2.5.2 Emergent Assessment for Twenty-First Century Skills and Entrepreneurship Education

Twenty-first century skills have been defined as involving communication, critical-thinking, problem-solving, creativity and innovation, all of which are needed to transfer academic knowledge to the workplace (Tucker, 2014, p.167). These skills are an essential component to become a successful entrepreneur and are important to include in entrepreneurship education

programmes (Boyles, 2012, p.42). The research findings of Lemke et al. (2003, as cited by Boyles, 2012, p.43) contend that educators need to recognise the need to change their educational programmes to allow students to develop those 21st century skills needed to become successful business owners and managers. Integrating these soft skills into the learning objectives of the new entrepreneurship-focused business programme will ensure students are exposed to them during their learning process.

Assessing 21st century skills such as problem-solving and critical-thinking requires assessment that reaches beyond traditional and summative methods. These types of skills require assessment methods that have the capacity to measure not only outcomes, but the learning process itself, for example assessing how a student solves a problem. Student-centred approaches such as self-assessment can be tailored for individual programmes and a variety of learning processes and outcomes. Both self and team assessment methods are effective in assisting in knowledge-building at group- and individual-learning levels (Lee et al., 2006, as cited by Scardamalia et al., 2012, p.248).

Experiential and project-based learning provides students with the opportunity to learn 21st century skills through practical experience by working in industry with real business clients. Working with an external client provides the opportunity for students to receive feedback from unprejudiced sources. This may alert learners to problems they may be too close to, or personally involved in, thereby facilitating unbiased self-assessment. Effective assessment will have the ability to measure how well students are transferring their knowledge from the classroom to the real world. Effective assessment can include a 360-degree process providing feedback from multiple sources including self-assessment, peer, client and instructors' feedback.

The existing curricula and assessment in the business management programme will need to develop a new view of 21st century skills, learning to understand them as an integral part of the curricula and not just as an add-on. Assessment will be required to develop an emergent, flexible and adaptable approach when attempting to measure soft skills which present the challenges of subjectivity, diversity and vagueness. Application of emergent methods of assessment may encourage the unearthing of new goals and emergent learning development while generating challenges for implementation due to their high level of complexity. The success of this type of

assessment depends on several factors including learners and instructors' capabilities, available resources, and the learning environment.

Emergent knowledge creation and knowledge building are synonyms for 'constructivist learning' and comparable to active and project-based learning pedagogies (Wilson, 1996, as cited by Scardamalia et al., 2012, p.237). Making the assumption that learning is an emergent process may open the door to a better understanding of entrepreneurship education, which can lead to new and, in turn, more effective assessment methods. Traditional assessment may not allow emergence and change to develop in the learning process due to their inflexible structure that limits the student's ability to explore undefined content (Tosey, 2002). Wenger (1998) argues that a practice is something that develops over time by the participants who engage in it, while it also has a life of its own based on the negotiation of meaning. Assessment can be viewed as emergent and will only gain meaning through interaction and the people who use it. It is possible that assessment, like learning, may be impossible to control as each time it is used it is left open to interpretation. Instructors must acknowledge that they are not in control of the learning process, while students must be encouraged to own that responsibility. This will compel instructors to choose the appropriate method of assessment, thereby aligning it with each student's stage of learning.

This section has addressed the importance of 21st century skills for the entrepreneurial learner and the challenges faced in teaching and assessing these types of soft skills. This section also examined how we must allow both learning and assessment to be emergent by selecting the correct assessment in the right context. In turn, there are many stakeholders that will be affected by our business management programme change. Consideration must be given to how the change will affect them, and how they will affect the change in turn. The next section will discuss how organisational culture and leadership can have either a positive or negative effect on the success of any change initiative.

2.6 Organisational culture and leadership

An opportunity for a change was presented for the business management programme at Olds College when the Alberta Provincial Government mandated Alberta's educational institutions to improve their current entrepreneurial learning environments. Part of the change process required

an understanding of the effect that the organisational college culture and leadership would have on a programme change of this kind. Some suggest that leadership is the driving force behind change in any organisation including higher education institutions (Hess, 2007; Sharpe, 1989).

Leaders of education institutions are faced with managerial tasks similar to those undertaken by managers in private industry and are further challenged with unique demands based on criteria set by budgetary and community expectations. These higher education leaders are also influenced by legislative mandates which may place limits on the similarities between the requirements of industry business leaders and higher education leaders (Hörnqvist & Leffler, 2014).

In addition, several leadership models were discussed during conversations with the leadership group at Olds College. These models required further exploration to understand the effect that applying them within the college would have on the business programme change. The first model considered was transformational leadership, which is defined as "leadership for change" (Brown, 1991). This model targets different variables in the change process, thereby encouraging continuous growth and learning for the achievement of broad organisational goals (Hallinder, 2003, as cited by Onorato, 2013). A good example of a transformational leadership model is provided by Leithwood (1994), a framework which was developed for educational environments and built upon 'the four i's: individual consideration, intellectual stimulation, inspirational motivation and idealized influence. This model suggests that leaders must exhibit these types of appropriate leadership behaviours to facilitate effective performance in the change management process (Bass & Riggio, 2006, as cited by Carter et al., 2013, p.942). Challenges appear when there is a high turnover in leadership as frequent organisational change makes it difficult to maintain the relationships between faculty and leadership. If there is an absence of a relationship or a poor relationship structure, it can result in a disconnect between leadership and faculty, thus raising doubts about leadership's support and capabilities (Shaw et al., 2006, as cited by Carter et al., 2013, p.945). In turn, sustainable relationships are essential as change efforts experience a higher rate of success when employees work together with leadership that is trusted, engaged and facilitating (Higgs & Rowlad, 2011, as cited by Carter et al., 2013, p.952). One important factor in faculty engagement is senior-level institution leaders' verbal commitment to, and investment of resources for change initiatives (Evans, 2011). There is strong evidence to support the

argument that higher education institutions with innovative, open and supportive organisational cultures and clear goals have a better chance of success in the implementation of instructional innovations (Zhu & Engels, 2014, p.153; Martins & Terblanche, 2003).

Organisational culture is defined as shared values, beliefs, attitudes and norms built and developed by leadership (Lund, 2003, as cited by Zhu & Engels, 2014, p.137; Onorato, 2013). In addition, organisational culture can act as an enabler or a barrier to the creation of innovative and entrepreneurial attitudes (Crisp, 2010, as cited by Emil & Cress, 2014, p.532). Culture can, and does, affect the attitudes, values and beliefs of instructors and students, which in turn has an effect on teaching and learning (Marcoulides et al. 2005; Hofman et al., 2002, as cited by Zhu & Engels, 2014, p.137). As has been argued, 'Teaching is contextually grounded' and school culture does influence the process of learning by guiding the behaviours of teachers (Maslowski, 2006, as cited by Hörnqvist & Leffler, 2014; Hallinger & Heck, 1998). Other commentators such as Marzano, Waters and McNulty (2005) argue that culture and leadership have little to no identifiable effect on teaching while an examination of to what extent organisational culture and leadership affects the way instructors teach at Olds College provided insight into how the business management programme change would be influenced by these factors.

2.7 Summary of the Literature Review

After completing an extensive exploration and discussion of relevant literature, it is evident that the success of the programme change is affected by many factors. I looked to better understand these factors of environment and conditions that would affect the programme change and the characteristics of entrepreneurship and entrepreneurial learning. The literature review explored the unique challenges the business programme change would encounter, including the distinctive needs of the entrepreneurial learner and the effect of leadership and organisational culture on teaching and change. The knowledge gained through this examination ultimately led to developing the direction and structure for this research study.

Chapter 3 – Methodology

3.1 Introduction

This research study used a mixed method and qualitative research methodology known as formative research. This methodology was applied at the beginning and for the duration of the study. This research approach began the new programme development process by identifying and understanding the characteristics, needs and behaviours of the business programme change stakeholders. This study applied a mixed method approach utilizing both qualitative and quantitative tools to gather research data using interviews and surveys.

Choosing formative research methodology for this research study was appropriate because the intention of the research was to develop and/or improve instructional practices or processes (Reigeluth & Frick, 1999, p.1). Formative research can be effectively utilized to provide ongoing feedback throughout the duration of the study, which was important to support the continuous improvement process for the business programme change.

This chapter first discusses the methodology that was applied in this study, beginning with a definition and review of formative research. The discussion will present the rationale for the choice of formative methodology for this study. The final section of the methodology chapter will discuss the development of the cyclical learning model and decision matrix. They were the foundational tools used in the formulation of the business programme change pilot; the pilot played an important part in the research process and was the principal method of data collection for this study.

3.2 Research Methodology

The intent of this research study was to assist in the development and plausibility testing of a major change implementation to the business management diploma programme at Olds College. A developmental or design research project is usually concerned with the development or improvement of an instructional product or programme, and often uses a case study as the method to explore the nature of the change. As recommended by Richey et al. (2004, pp. 1104-1105) the entire design, development, and evaluation process of the programme change was

documented, and efforts made to determine the effectiveness or impact that those changes would have on instruction.

This research qualifies as a formative research study, as the intent was to develop a new entrepreneurship focused programme by building upon and improving the current content. Ongoing testing was employed to ensure the changes would be plausible (Richey et al., 2004, p. 1103). A linear three-year case study, supported by the development of a learning model and decision matrix assisted in the design, plausibility testing and implementation of the change, which took place over several stages. Defining what the desired programme would look like was a decision made by leadership and faculty, and directed by both internal and external pressures. With this vision in mind, the first step of the change was to understand the current state of the programme allowing for the identification of any gaps between the programme's current and desired states. In choosing the formative research methodology, I could begin with exploring the current state, attitudes and practices before the programme underwent a redesign, assisting me with gaining an understanding of the current state and what would need to be changed. This methodology was a good fit, as the intent of the pilot was to facilitate ongoing change over a three-year period. The underlying design principle was to identify and test the plausibility of a change to the business programme, in order to develop an effective method of teaching entrepreneurship. Formative research studies have a focus centred on the usability and practicality of the research product, with an emphasis on obtaining results that are useful in terms of practical, hands-on knowledge. This method of research did produce generalizable knowledge that addressed the measurements of effectiveness, efficiency and appeal of the programme change as seen through the eyes of the stakeholders; others may find this information useful in similar change initiatives (Reigeluth & Frick, 1999, p.2).

The logic behind formative research is to create a model, test it, and then reflect on any weaknesses that may be discovered to inform change and improvement (Reigeluth, 1989; Richey et al., 2004). The learning model and mapping matrix developed in this study assisted in the creation of a pilot that would test the plausibility of the business programme change at Olds College. This pilot followed an ongoing and continuous improvement process that began with the first iteration of the pilot project in 2015 and continued through each stage ending in 2017 when the programme change was fully implemented.

Additional justification for using formative research methodology for this study can be found in previous research where it has historically been successfully applied in educational improvement and change initiatives (Roma, 1990; Greeno, Collins, & Resnick, 1996; Lingam et al., 2014; Simmons, 1991). Knowing this method has been successfully used in this context by respected scholars adds support for my choice of methodology for this study.

The formative research methodology has also been labelled as 'usability testing' and prompts questions such as 'what is currently working?' and 'what still needs to be improved upon?' These are useful questions to ask about a major change to an education programme as knowing what we are currently doing well, and what improvements will be required, are essential to move forward. The methodology of formative research strives to guide future practice by testing new outcomes, and improving on past practices by taking a holistic view of the problem and how it affects all stakeholders. The case study approach was appropriate as it provides the desired holistic view and opportunity to test and reflect on the impact of the changes as three iterations of the pilot project were completed. Taking a case study approach to data collection is appropriate when answering "how' or "why" questions as in the case of design theory (Yin, 1984). Taking this approach provided results that led to a practical and usable solution for the business programme change.

To further reflect on and support my selection of the use of formative research methodology for my study, I prepared a comparison table that contrasts traditional empirical research methods with formative research (Table 1). This comparison shows the strengths of formative research and how it provides a good fit for this research study.

Formative and design-based research	Empirical research methods
• Does not test a hypothesis • Focuses on change and improvements	• Tests hypotheses
• Research takes place in a non-lab setting	• Controlled laboratory environment
• Based on social interaction	• Rarely condones social interaction
• Researcher is an active participant in the research process and looks for input from participants	• Researcher is separate from the research

Table 1. Comparison of formative and empirical research methods

This programme change took place in a non-lab setting, and was based on the social interaction of the stakeholders. As the researcher I was an active participant in the research and change process looking to other faculty, leadership and students for input. This research study also had a focus on change and improvement to the business management programme at Olds College and was not testing a hypothesis, but rather was looking to test the plausibility and acceptance of the change.

The next section will discuss the data collection strategy applying the design theory process suggested by Reigeluth and Frick (1999, pp. 6-7). This process was deemed suitable for this particular study, as the process of designing a new business programme would be required to fulfil the Alberta Provincial Government mandate and fit within the Olds College strategic plan.

Data collection strategy

This research used a pilot as a designed case study where the situation under investigation was manipulated by the researcher (Reigeluth & Frick, 1999, pp.6-7; Richey et al., 2004). Design theory was utilized to provide the foundational process followed in this study (Reigeluth and Frick, 1999, pp.6-7).

Select a design theory

For this case study, Olds College wanted to change the current structure of the Business Management diploma programme to develop a focus on entrepreneurship education. They also

wanted a programme that was different and unique from other college business programmes in Alberta.

Design an instance

The scope of the research included the development of a learning model and mapping matrix that would assist in the construction of a case study, based on the proposed changes to the business programme. After the completion of Step 1 and comparing the needs of entrepreneurial learners with the characteristics of project-based learning, the research showed that a project-based teaching method would be the most effective to teach entrepreneurship-related topics. The instance or pilot project was designed around the learning model and matrix concepts, with the intention of testing the plausibility of implementing new curriculum and project-based teaching methods into the business programme.

Collect and analyse formative data on the instance

This research study utilized a formative methodology to test the plausibility of a major revision to the Olds College business programme with the expectation that this information would: (a) assist in decision-making regarding implementation of the change; and (b) assist in ongoing and continuous improvement of the process of applying project-based learning in the business programme.

Data was gathered from students and instructors using surveys and interviews (see Appendices I-III). A total of eight instructors and fifty students participated in the pilot project in the winter of 2015. In the second pilot, which took place in the winter semester of 2016, a total of forty students participated, and in 2017 there were again forty students. The number of instructors who participated decreased to five in 2016, and down to two in 2017, as some faculty members retired. These instructors were replaced with short term contract instructors who were not qualified to participate in the project-based learning projects. To assist in the continuous improvement process, a lessons-learned meeting was held with instructors after completion of each of the three pilot sessions. These results and feedback were analysed to identify weaknesses and opportunities for programme improvement.

Revise the instance

Student and instructor surveys and lessons-learned meeting material were used to make revisions and updates after the conclusion of each pilot. The timely use of feedback was identified as important (Reigeluth & Frick, 1999); however, implementing change from the feedback was not immediately possible in all cases due to the constraints of the length of the school term and the instructor's availability. The lessons-learned meetings held at the end of each pilot, gathered and documented feedback that was utilized in the ongoing improvement process.

Repeat the data collection and revision cycle

This research study allowed time for three pilot iterations during the winter semesters of 2015, 2016, and 2017. Three years was deemed adequate time for the data collection cycle to provide revisions, verification, and confirmation of the research findings and results important to the formative research process (Reigeluth & Frick, 1999).

Fully develop and revise the tentative theory

The revisions and updates made to this type of programme must be ongoing and continuous. There will always be room for improvements as new research and theories become available or internal and external pressures will dictate new directions requiring current practices to be updated. Fulfilment of this step was evident as the information gathered in the 2015 and 2016 pilots provided findings that supported ongoing programme change into 2017.

3.3 Measuring Preferability

The word 'preferability' is defined as something being more desirable or worthy than something else, a concept which is a principle focus of design theory and was a main concern when testing the plausibility of the programme change (Reigeluth & Frick, 1999, p.2). This formative research study is concerned with the preferability of the business programme change to the curriculum and to a project-based teaching method. Using three consecutive pilot iterations the criteria of preferability was applied in evaluation and testing of the plausibility of the business programme change. Formative research and the testing of preferability have three main concerns: effectiveness, efficiency, and appeal (Reigeluth & Frick, 1999, pp.2-3). In order to reach a state

of preferability, all three of these measurement criteria must receive a high rating by both instructors and students. Achieving a high rating in all three areas presented some challenges as this type of learning will not fit all teaching or learning preferences.

Measuring Preferability

1. **Effectiveness:**

Effectiveness was the first measurement criteria applied to determine the level of preferability of the business programme change. The following question responses provided feedback for the measurement of effectiveness:

a) How dependable is the pilot for testing the programme change? Will there be consistency within results over several trials?
b) How effective was the model in predicting student learning behaviours and as support for the pilot structure?
c) How effective is Project-Based learning in achieving the desired learning outcomes and objectives?
d) What is the right mix between prescriptive learning, scaffolding and emergent learning?
e) How can we prevent instructors from slipping back into totally prescriptive or traditional teaching methods or heading towards the edge of chaos?

2. **Efficiency:**

The following question responses provided feedback for the second measurement criteria of efficiency:

a) How much ‘bang for your buck’ does using the PBL method provides in regard to resource use efficiency? Are you getting good value for the resources expended?
b) Are there extra resources and costs associated with this method? If so, does the benefit outweigh the cost?
c) How efficient is the matrix; does it help instructors save time or resources?

3. **Appeal:**

The third measurement criteria applied to gauge 'preferability' is appeal. The following questions provided data on how appealing the changes would be to stakeholders:

a) How enjoyable is the PBL design?
b) Do both students and instructors enjoy using this method of teaching and learning?
c) Does it appeal to most of the College's instructors and students, or only a few?

3.4 Data Collection

The pilot project process: 2015-2017

This section reviews the data collection methods that were employed in this research study. The learning model and decision matrix were used to better understand entrepreneurial and project-based learning and were used to build the pilot from which data was collected to examine the change to the business programme. Using the process of a formative research study provided information at the beginning, during and after the programme change which utilized information from several methods and data sources to ensure that the participants' different perspectives were gathered and considered in the change initiatives. The development of the pilot followed the formative research process. Reigeluth and Frick (1999, pp.6-7) suggest the following steps;

Step 1 - Create a case – Planning the pilot project

1) Defining the pilot objectives and steps in building the process:

a) The pilot objective was designed to test the plausibility of a proposed change to the Business Management programme to ensure a better strategic fit at Olds College;
b) The research process began with the challenge to find a better strategic fit for the business management programme at the college, providing the students with a unique – but effective – learning opportunity;
c) A literature review provided knowledge and inspiration to begin the development of a learning model, decision matrix, pilot and process for the proposed project-based teaching method change to the Business Management programme;

d) A review of the number of students and faculty in the business programme helped to define the pilot participants and the sample size;
e) A specific set of process and procedures was developed to direct the pilot.

Step 2 - Design an instance – Pilot preparation

a) Setting up projects and networks:

i) Establishing connections with small business owners;

ii) Establishing a plan for internal resources including other instructors and administrative support.

b) Establishing student documentation requirements to be completed for each project:

i) Letter of confidentiality;

ii) Memo of understanding (client/students);

iii) Final report and presentation requirements.

c) Scheduling external expert speakers and mentors to complement course learning objectives.

d) Developing course integration:

i) Work with other instructors to integrate all five courses in the winter semester into the project;

ii) Use the six A's process to guide the course integration.

e) Implementing the pilot:

i. Apply project-based learning and teaching method for the winter semester beginning in 2015;
ii. Collect feedback from students and pilot participants during and after the project participation;
iii. Meet weekly with students and instructors as part of the formative assessment and to gather research feedback;
iv. Collected and analysed formative data on the instance;

v. Complete project.

Step 3 - Collect data on the instance

a) Reviewing learning objectives and project-based teaching methods as employed in the project;

b) Conducting 'lessons-learned' meetings with instructors regarding the overall success and challenges experienced during the pilot;

c) Reviewing project-based learning assessment tools.

Data for pilot project revisions was collected through instructor and student interviews and surveys. The data looked at the three measurement metrics of plausibility: effectiveness, efficiency and appeal. Each year's data was used to make changes to the following year's pilot.

The results of instructor and student surveys and interviews, along with client interview responses, are presented in accordance with the method to test plausibility as discussed earlier in this chapter. These sources provided the following feedback:

a) Gauging Project Effectiveness

Effectiveness is the degree to which the method, in this case the change of teaching method, attained its goal of supporting students' learning. Measurements of effectiveness include student marks and self-assessment of learning, gathered through student surveys.

b) Gauging the Efficiency of the programme change and project-based learning

Efficiency can be defined both as achieving maximum productivity with minimum effort, and how effectively resources are being used. Instructors screened each client application to ensure projects would provide suitable learning opportunities and that student learning objectives could be achieved.

Data gathered from the lessons-learned meetings provided direction for improvement to the course integration and client selection process. The application forms developed for the first year pilot did not provide the depth of information required for students to make informed choices when selecting their projects. Efficiency was gained in the second year by requiring clients to

produce a ten-minute video detailing the background of the business and a disclosure of issues or problems. In the first year of the pilot, all students were required to travel to project site locations before making their selection, taking a full day of class time. Having the clients produce video presentations saved resource costs and class time in the project selection process.

Other efficiencies evolved in the processes of course integration and the mapping of learning objectives to project opportunities. Efficiencies were observed each year as instructors became more familiar and experienced with the integration and mapping process.

c) Gauging the Appeal of Project-based Learning

Appeal can be defined as evoking or attracting curiosity, interest or desire. In this research study, students and instructors were interviewed and surveyed asking how much they liked using project-based learning. Three students were interviewed in 2015, five in 2016 and ten in 2017. Eight instructors were interviewed in each of the first two years and nine in the third year. Only three of the instructors taught in the new programme, the remaining interviewed taught in the agricultural management or sports programme. It was important to gather their insights into what they felt about the change and observed as eventually it could affect programs other than business management. As the researcher I also made observations on how well students and instructors were adjusting to the programme change. These observations assisted in acknowledging new challenges the participants may be experiencing that I would have to address.

Step 4 - Repeat the data collection and revision cycle

The same process for data collection and improvement was repeated for each of the three pilot years.

Step 5 - Offer tentative revisions of the theory

The revisions to the programme change were an ongoing process where the research and analysis from each year supplied information for future changes. The major changes are documented in Table 11 presented in the findings section of this report.

Step 6 - Develop the tentative theory:

The intent of this project was to test the plausibility of a major change in a business programme. By looking at the metrics of effectiveness, efficiency, and appeal a process was established that could be applied and revised for future use.

3.5 Methodological Issues Using Qualitative and Formative Research

This formative research utilized the case study method as a vehicle to gather evidence and feedback. It has been argued that case studies at times lack validity, rigour and reliability when compared to quantitative methods of research (Gibbert, Ruigrok & Wicki, 2008; Johnston, Leach & Liu 1999; Mays & Pope, 1995). To address these challenges, four methodological issues were considered:

1. Construct validity

Establish correct operational measures for the concepts being studied. This was addressed using the indicators of effectiveness, efficiency and appeal from multiple sources of evidence. A chain of evidence was established to support and provide proof of findings (Yin, 1984) by maintaining the documentation of all data collected from participants during the research process. The data was stored electronically secured by a password and hard copy evidence was stored in a locked file.

2. Sound data collection and analysis

Major factors that influence the quality of research are the data's thoroughness, completeness, credibility and accuracy. In the case of formative research, data-collection is an 'emergent' process collected over the course of the case study (Reigeluth & Frick, 1999, p.647). In many cases, the full theory cannot be developed at the beginning of the study, but will emerge as the research study progresses. Application of a three-year pilot identified both strengths and weaknesses of the business programme change, and ensured continuous improvement throughout the pilot process.

3. Generalizability of the theory

Rigour in formative research can be enriched by how well the theory can be generalized (Wang & Hannafin, 2005). Situationally can be defined as looking for differences in a situation. If the pilot's iterations revealed different results, an exploration of the reason for any variations would be required. Recognizing situationally can assist in improving the generalizability of the theory or knowledge. Was it learning environment, variations in student characteristics or other factors that affected the research results (Reigeluth & Frick, 1999)? Three years of pilot iterations provided valuable support for the generalizability by providing longitudinal testing of ability of the new process and change to be successfully replicated.

4. Consideration of bias

Qualitative research is interpretative in nature and can lead to researcher bias (Creswell, 2003). In this research study, the researcher was the course facilitator and instructional designer who constructed and implemented the Business Management programme's pedagogical and programme change. A consideration of the researcher's personal bias and assumptions must be made in regard to any affect they may have on the design of the research study and the interpretation of its results. Multiple sources of feedback and data were applied to perform the data analysis to mitigate the risk of any bias and its effects. Continuous feedback from colleagues and my adviser helped me to reflect on and acknowledge my biases and how they may have affected this research study.

3.6 Designing the Pilot

The literature and research findings revealed strong connections between emergent learning, entrepreneurial learning requirements and project-based teaching methods. Understanding these connections assisted in the development of the learning model and decision matrix used to provide foundational knowledge for development of the pilot project. Reflection on the overall process of this study led to the decision to include the discussion of the development and use of the learning model and decision matrix in the methodology chapter. Both were used in the development of the pilot study which provided the information essential for the programme change decisions, and were the main methods of data collection over the three-year study.

The first step in the design of the pilot was to examine the current state of the business programme and to explore how entrepreneurship was being taught at Olds College. This was accomplished by conducting a before and after learning survey which was completed by 248 students who were participating in various programmes at Olds College in 2015. Students completed the survey before their course participation and then again after they had finished. At that time, the business programme did not include a course specifically devoted to entrepreneurship, but that didn't mean that entrepreneurship education was not embedded within other course content. The survey was used to determine whether or not this was the case.

The survey solicited information on how students felt about the usefulness of entrepreneurship education, if the college promoted this type of education and if students would consider starting their own business.

The next step in the research study and pilot development was to conduct an exploration of the existing literature to assist in establishing a theoretical framework for the study. The literature review examined key research in the areas of entrepreneurship education, assessment, and the effect of leadership and culture on change. The pilot project was designed after consideration of the literature, beginning with the development of the entrepreneurial learning model which provided a foundational vision and structure for how this research study would be completed. The learning model and matrix provided the structure for the pilot project; developing a process to apply and test project-based learning pedagogy. The first iteration of the pilot used learning model concepts which built on the concepts of Williams, Mackness and Gumtau's (2012) emergent learning model. This provided opportunity for students to begin their learning at a foundational level and then, through scaffolding techniques, move towards the level of emergent learning.

Other teaching methods of lectures and game-based learning were examined along with project-based learning through the questions asked in the 2015 survey and interviews. There were small to no real significant differences found in skills, attitudes or knowledge between the different pedagogies except for finance and marketing skills. Other measurement criteria built upon the characteristics of entrepreneurial learning needs shown in Table 2 were then used to select an effective teaching method to base the new programme on. The alignment and fit between the

requirements of entrepreneurial learning, emergent learning and project-based learning pedagogy/andragogy shown in Table 2, supported the decision to use project-based learning as the primary teaching method for the pilot project. Project-based learning will fit the requirements of the entrepreneurial learner and support emergent learning best as it can be tailored to create a learning environment that will not only allow, but encourage, emergent learning, better preparing our students for the real-world.

Characteristics and Educational Requirements of Entrepreneurs	Project-Based Learning	Complexity Theory and Emergent Learning
Flexible	Allows flexible learning environment	Emergent learning is flexible
Adaptable	Students adapt their activities as required by the project	Responsive to the learning situation and adapts rapidly
Creativity	Provides opportunity to be creative and produce new and unique solutions or products	An environment that encourages emergent learning and inspires creativity and innovation
Problem-solving and critical-thinking	Students must use problem-solving and critical-thinking skills to provide solutions to complex problems	Emergent learning requires students to use problem-solving and critical-thinking to create a better understanding of complex concepts
Effective communication	Students must complete a professional report and presentation of their work. Team work and client meetings are also communication requirements	Self-organizing agents have frequent and open interactions
Self-directed, motivated	Requires students to be self-directed learners	Emergent learning requires internal motivation for learners to progress and conquer threshold concepts

Ability to resolve crises and deal with unpredictability	Must learn to deal with crises. Learning may be unpredictable	Learning takes place at the edge of chaos and is unpredictable
Low level of risk aversion	Allows students to take risks and learn from mistakes	Emergent learning requires students to take risks by going outside of their comfort zone
Not always sequential or linear.	Learning is not linear	Emergent learning is not linear
Basic skills and knowledge along with 21st century skills best gained through experiential learning	Students require scaffolding, or prescribed learning in order to become self-directed learners	There needs to be a balance of both prescribed, scaffolding, and emergent learning

Table 2. Aligning the needs of an entrepreneurial learner with the qualities of project-based and emergent learning

Data collection process using three pilot iterations

Table 2 shows that understanding the learning process of the entrepreneurial learner was an essential component of the research study. It provided foundational knowledge for the development of the data collection process. This data was used to test the plausibility of the business programme change.

The development of the learning model, decision matrix and pilot began with an exploration of several well-known learning models which included the work of Dewey (1997), Joplin (1981), and Kolb (1984). These learning models supported the notion that learning is a cyclical process. For example, Dewey (1997) suggested that learning is a process of building on past experiences as a continuous and cyclical process, and Joplin (1981) proposed that experiential learning was a continuous and cyclical process as one learning cycle begins, another ends. Kolb (1984) built upon the work of Dewey and developed an experiential learning model demonstrating the cyclical process of learning in four stages (Roberts, 2006, pp.19-22). The model and matrix also considered the work of Piaget (1952) who provided the foundational stone of cognitive

constructivism, and Bloom's revised taxonomy (2001) which states learners will progress through different stages of cognition throughout the learning process.

The existing literature and research used in the development of the learning model and matrix recognized the need for foundational knowledge and scaffolding to move students from one learning level to the next. The need for scaffolding would necessitate students taking introductory 'breadth first approach' courses, to provide them with a foundation from which they can build future knowledge (Vygotsky, 1968; Walker, 2013, p.261; Zander et al., 2008).

The pilot was developed to ensure that all three stages of the entrepreneurial learning cycle, namely, prescribed learning, scaffolding and emergent learning are accommodated. A detailed exploration of each stage proved beneficial to understand how each could be incorporated within the pilot process.

Prescribed Learning

The prescribed learning stage is the first phase in the entrepreneurial learning process. Providing students with the necessary foundational knowledge is essential, as introductory and theoretical knowledge are the first stepping stones on the learner's journey to the more complex emergent learning phase of the cycle (Roberts, 2006; Joplin, 1981; Kolb, 1984).

Traditional teaching methods such as lectures and readings promote the teaching of the theory behind entrepreneurship and "how" to be an entrepreneur (Donnellon et al. 2014). Prescribed learning is the initial stage in the construction of knowledge, and it is the foundation on which new knowledge is built. The first stage in the development of the business programme should include an opportunity to learn foundational, "how to" knowledge. The choice of teaching methods at this stage should align with learning outcomes that will instruct the student on 'how' to be an entrepreneur. Methods such as lectures, readings and other traditional pedagogies can be effective at this stage of learning.

The entrepreneurial learning model aligned the prescribed learning phase with Bloom's taxonomy level of 'remember'. This phase of Bloom's taxonomy describes the process of cognitive retrieval of information from long-term memory, which is a lower level of cognitive processing where students would be asked to memorize or recall facts. Learning objectives and

the desired learning outcomes were aligned with the requirements of the prescribed learning phase and lower levels of Bloom's taxonomy in the first stages of the student projects. The prescribed learning phase would accommodate learning "about" entrepreneurship, however, when more complex cognitive processing is required; the area of prescribed learning would prove inadequate.

At this point in learning, instructors must provide scaffolding support. Scaffolding encourages learners to progress to higher levels of cognitive demands and assists students through zones of transition as they progress towards the emergent learning phase. Vygotsky's zone of proximal development theory (1934/1962), supports the need for effective scaffolding for learners when demands for higher order thinking skills are required. The next section discusses how the process of scaffolding was accommodated in the pilot for the business programme change.

Scaffolding

Several learning theories provided foundational understanding of the scaffolding process and how it could be accommodated and encouraged in the programme change and the pilot. The scaffolding phase of the cyclical model of entrepreneurial learning (see Figure 7) aligns with Bloom's taxonomy's cognitive level of 'understand', where learners will construct meaning from different types of information. The "understanding" level involves the learner interpreting, classifying, summarising and explaining the material. The scaffolding phase also aligns with the next level of Bloom's cognitive process, 'apply', where learners are asked to execute and utilise the given material in an actual situation. Analysing and evaluating cognitive processes enables the learner to organise and differentiate between elements, helping them to determine what knowledge fits a particular situation. During the pilot I recognized that there would be a need for scaffolding at different stages throughout the student project work to support learning objectives such as 'apply', 'calculate' and 'analyse'. To be effective, the learning environment had to provide students with foundational knowledge and offer flexible scaffolding opportunities demanding a balance between structured, instructor-led teaching and unstructured student-led learning.

Insufficiently structured learning has attracted criticism from those who suggest that pedagogy/andragogy and instructional procedures still need to provide students with a substantial

amount of guidance in order to be successful (Kirschner, Sweller, & Clark, 2006, pp.76-79; Aulls, 2002, as cited by Kirschner, Sweller, & Clark, 2006, p.79; Mayer, 2004, as cited by Kirschner, Sweller, & Clark, 2006, p.79). However, a high level of structure does not align with a constructivist approach, sabotaging the ability of the students to become self-directed and independent learners. The challenges that may arise from providing a lower level of structure can be addressed through the use of an effective blend of structured and unstructured teaching methods that are based upon the students' stage of learning. Students need the opportunity to solve problems and build upon foundational knowledge through the support of peers and scaffolding (Holmes et al., (n.d., p.524), suggesting what can be performed today with help can be performed tomorrow independently (Kirschner, Sweller, & Clark, 2006, p.261; Vygotsky (1934/1962).

As part of the scaffolding process, the design of the business change pilot included a 360-degree assessment process providing ongoing feedback from a variety of sources, including self- and peer-assessment. Formative assessment acts as feedback and provides information to learners measuring their development of learning competencies. Formative assessment can also function as scaffolding to help students assess their readiness to move through a transition zone or conquer a threshold concept. Embedding assessment within the curriculum provides continuous scaffolding opportunities and ongoing feedback of each student's progress (Shepard, 2008, p.101).

This section reviewed the concept and importance of scaffolding for learners preparing them to rise to higher levels of cognition and complexity in learning. Although emergent learning is the ultimate goal, it is acknowledged that not all learners will reach this level as learning is dependent on the content and context of what is being learned and the readiness of the learner. Some learners may cycle back into the scaffolding or prescribed learning phase if they feel unprepared to move to the next level. Students require the ability to move in a cyclical fashion in the learning process and this requires a flexible and individualized learning environment. The pilot addressed these learning needs through the use of project-based learning, and a self-directed, flexible pedagogy. The next section addresses the phase of emergent learning and its associated challenges.

Emergent Learning

Learners in the emergent learning phase will be able to take their current knowledge and skills and apply them in new and unique ways to produce new knowledge (Williams Middleton, & Donnellon, 2014). Emergent learning comes with an element of risk of the unknown. Like a pioneer, entrepreneurial and emergent learners settle new territory and explore new horizons in an attempt to conquer new challenges (Brush, 2008, pp.21-22). This process of discovering new ways to solve problems and apply knowledge can take many different directions and is considered to be the zone of emergent learning. Using the flexible learning method of project-based learning, the business programme pilot provided the students with an environment that encouraged exploration and discovery. An important part of entrepreneurship education is that the student understands the "why" behind the learning. This is where traditional instructor-focused teaching methods such as lectures lack the ability to effectively support learning at the deep level needed to facilitate effective transfer of knowledge to real-life (Williams-Middleton, & Donnellon, 2014).

Bloom's taxonomy provided structure for the pilot to inspire learners to reach the emergent level of cognition and complexity. The emergent learning phase of the cyclical model of entrepreneurial learning (see Figure 7) aligns with the Bloom's taxonomy cognitive level of 'creating' which demands a higher level of cognitive processing by students. At this level, learners need to understand the interrelatedness of the concepts and how they fit together to produce a functional product, design or recommendation. Creativity is essential for entrepreneurs enabling them to connect the dots and look at existing problems or opportunities through a new lens (Mayer, 2002, p.226). Including course integration as part of the programme change provided the opportunity for learners to visualize the interconnections between course content. Reaching the emergent learning phase is an essential part of entrepreneurship education, as the value in this stage resides in the learner's ability to transfer knowledge into real-world situations.

Entrepreneurs must have the ability to effectively transfer skills and knowledge into new and unique situations under a variety of conditions demonstrating both "near and far transfer". An example of near knowledge transfer can be described as the process of the student learning to use

a piece of equipment and then taking that knowledge into the workplace to operate that specific piece of equipment. Far knowledge transfer can be described as the process of the student learning a specific skill such as preparing an income statement and then applying that knowledge in a more generalized context in a management role. In the case of far knowledge transfer, the student is not limiting the use of this knowledge strictly to the accounting profession, but has transferred the knowledge by seeing the connections between two different contexts (Helfenstein, 2005, pp.19-20; Royer, Mestre, & Dufresne, 2005, pp.10-11).

The programme change to project-based learning pedagogy provided students with a learning environment that supported all learning phases from prescribed to emergent. It also demanded both "near" and "far" knowledge transfer through the challenge of working on real-life projects with business clients.

The next section will define the transformation and transition phases of learning and includes a discussion of how these phases were addressed in the development of the research study pilot.

Transformation and Transition Phases

Students leaving one learning phase and travelling to the next must go through a state of transition or transformation. These zones of transformation are sandwiched between prescribed, scaffolding and emergent learning, and take the student through a journey of liminality. Liminality derives its meaning from the Latin word for 'a threshold' and has been described as a state of change and transition (Mälkki & Green, 2014).

As they strive to create a state of equilibrium, learner's stand at the edge of knowing, a precarious and transformative space where they become disoriented moving from a zone of maintenance to that of creativity (Berger, 2004). Project-based learning pushes students towards the zone of transition presenting them with challenges that take them out of their comfort zones. These disorienting emotions are described as 'upheavals of thought' (Mälkki and Green, 2014) and can act as early warning systems, alerting learners to any mismatch between cognitive assumptions and capacity, and the requirements of the situation.

Emotions such as confusion, anger or frustration result when what was previously believed to be true is found to be incorrect, creating a state of flux trying to deal with this disparity. This state

of confusion or despair may indicate when the learner is entering into a state of transition. It is at this point where the instructor should now, according to Mälkki & Green (2014) be termed the 'accompanist at the edge' as they change their role from instructor to that of facilitator. This is a difficult transition for instructors who struggle watching their students arrive at the point of liminality and want to help them pass as quickly as possible through this unpleasant experience. It is important to the students learning journey that the instructor, now the accompanist, steps back to allow learners to explore new frontiers of knowledge.

Knowing these zones exist is the first step in assisting students through transitional challenges. The second step is detecting when a student is experiencing liminality. Experiential and active learning strategies promote individualised learning which can allow students to transition through threshold concepts at their own pace. It is the instructor's responsibility to present a series of strategically designed and appropriately timed challenges that will facilitate this movement (Taylor, 2008). Effective recognition of periods of transition will assist the instructor in the scheduling and design of scaffolding activities. The business programme pilot needed to address this challenge and develop a method for instructors to recognize when students were experiencing a state of liminality. One useful tool to assist instructors is the SOLO taxonomy which can reveal differences in students' responses as they move to a higher level of reasoning (see Table 3).

	SOLO level	Definition	Level of learning
1	Pre-structural	Student has no understanding of the concepts	Level of learning
2	Unistructural	Student understands one element	Rote or surface learning
3	Multi-structural	Student understands several elements, however, there is no understanding of the pattern of relationships	Rote or surface learning
4	Relational	Student understands many elements and the links between them	Deep learning
5	Extended Abstract	Student has the ability to relate the concept to contexts and/or other concepts	Deep learning

Table 3. SOLO Assessment table - (based on Biggs and Collis (1982), SOLO levels)

The structure of observed learning outcomes (SOLO) taxonomy is a model that describes levels of increasing complexity in a student's understanding of a given subject. This method can be used as a measurement metric as it exposes the movements of student learning through thresholds. For example, it can be assumed that if a student is at a pre-structural level, they will have one or more misconceptions in relation to the threshold concept under study. Moving through that threshold provides the learner with new understanding and knowledge allowing them to progress to the next level of learning. SOLO acts as a measurement metric showing qualitative differences in student responses as they move on to multi-structural and relational levels of comprehension. At the multi-structural level, learners will be able to explain several aspects of the concept but will still lack the explanatory framework required to show a full understanding. At the relational level, learners will demonstrate a deeper understanding and recognition of the interrelatedness of the concept principles and be able to apply them in practice (Ramburuth & Mladenovic, 2004). Finally, at the extended abstract level, students will be able to link together related ideas and use this new knowledge in unique and different ways in the real-world.

The SOLO taxonomy is a valuable assessment tool for instructors and for students who can self-assess their own level of understanding when working through the business programme pilot study projects. The ability to evaluate their own work can assist the students to identify threshold concepts and help them through this transitional phase of their learning (Davies, 2006).

3.7 Academic Models for Entrepreneurial Learning

Understanding entrepreneurial learners and existing learning models assisted in the development of the cyclical learning model (see Figure 7) for entrepreneurial learning which was utilized to build a process and pilot to test project-based learning in the business programme change. The cyclical model ensured the pilot study process would recognize the different stages of learning for the students and provide the resources and environment to accommodate those needs.

An examination of other learning models such as the one developed by Canning (2010), explains three learning philosophies that show students' learning progression from an instructor-focused and controlled learning environment through to student-focused and self-directed learning. Canning's (2010) model depicts the three philosophies of pedagogy, andragogy and heutagogy and suggests that learning progresses from pedagogy through to heutagogy. As learners mature and become autonomous, they require less instruction and scaffolding and gain more control over their own learning (Canning, 2010, p.63).

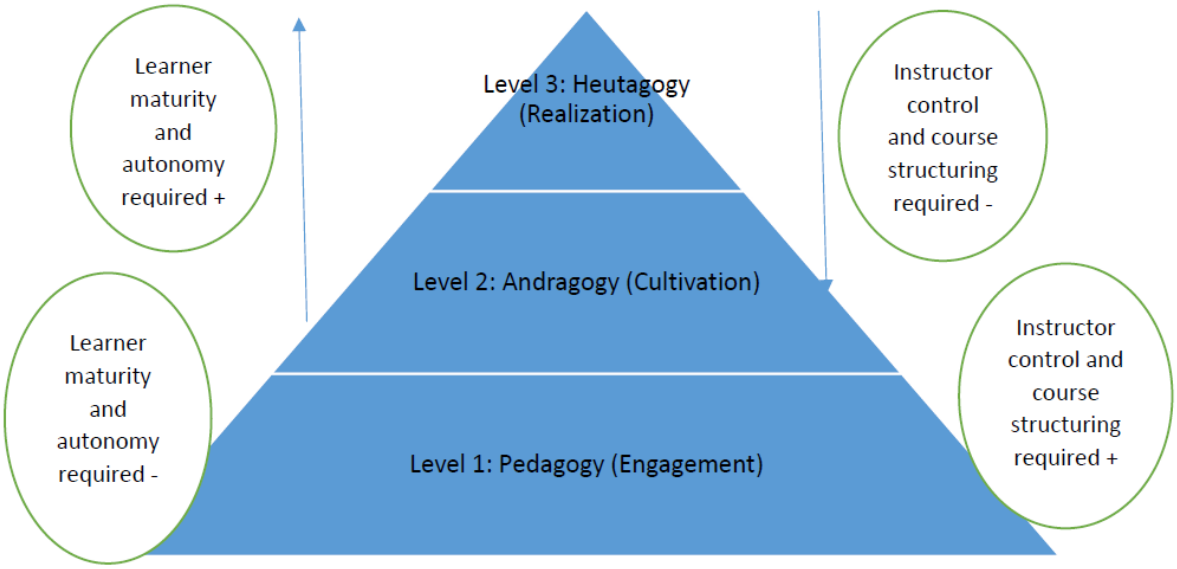

Figure 6. Progression from pedagogy to andragogy then to heutagogy

(Canning, 2010, p.63)

The model based on the work of Canning (2010, p. 63) in Figure 5, demonstrates a learning progression that moves away from instructor controlled pedagogy, to student-focused and self-directed andragogy and finally to heutagogy where the student controls their own learning. This model shares similarities with Williams, Mackness and Gumtau's (2012) model which described levels of learning as prescribed, scaffolding and emergent learning with zones of transition between each. A weakness in Canning's (2010) model is that it lacks a description of how learners will move through the learning stages, and provides no acknowledgement of the transition zone between levels. Instructors need to recognize when students are struggling through these transition zones to be able to provide them scaffolding at the correct times in the learning cycle.

3.8 Cyclical model of entrepreneurial learning

Building upon the learning models of Canning (2010) and Williams, Mackness and Gumtau (2012), I developed the model of entrepreneurial learning presented in Figure 6.

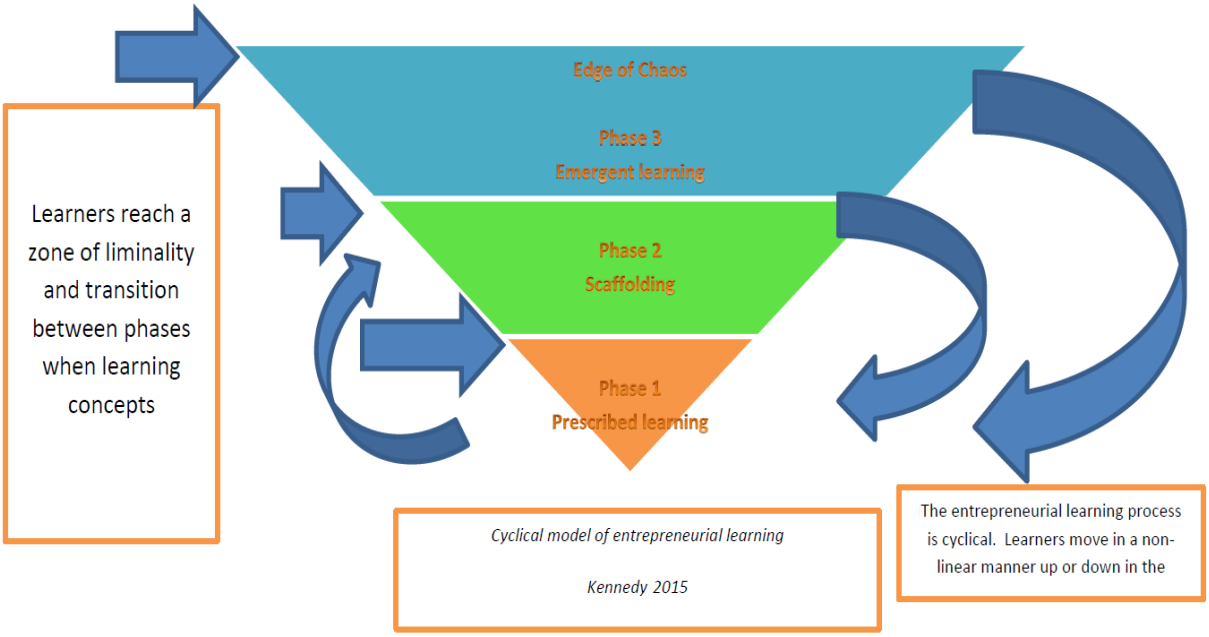

Figure 7. Cyclical model of entrepreneurial learning

(Kennedy, 2015)

In this model, we can see that entrepreneurial learning is a cyclical process. As students attempt to learn concepts, they can move up through all phases and zones, or choose to retreat back to previous positions for additional foundational knowledge or scaffolding. The cyclical learning model (see Figure 7) demonstrates the complexity of entrepreneurial learning, and its requirement for a flexible and diverse learning environment. The revised version of Bloom's taxonomy titled the 'Revised Taxonomy of Educational Objectives' characterized the connections between the content elements to support students' learning at a deeper level. Unlike the original Bloom's taxonomy where knowledge categories embodied both nouns and verbs, the revised taxonomy separates dimensions with the noun providing the basis for the knowledge dimension, and the verb the basis for the cognitive dimension. This revised taxonomy is an

excellent tool to assist in the classification of objectives, learning activities and assessments, and for the development of curriculum (Anderson & Krathwohl, 2002, pp.220-228).

The major difference between the original Bloom's and the revised Anderson's taxonomies for the top three levels is the substitution of verbs in place of nouns (Ben-Zvi & Carton, 2008, pp.12-13).

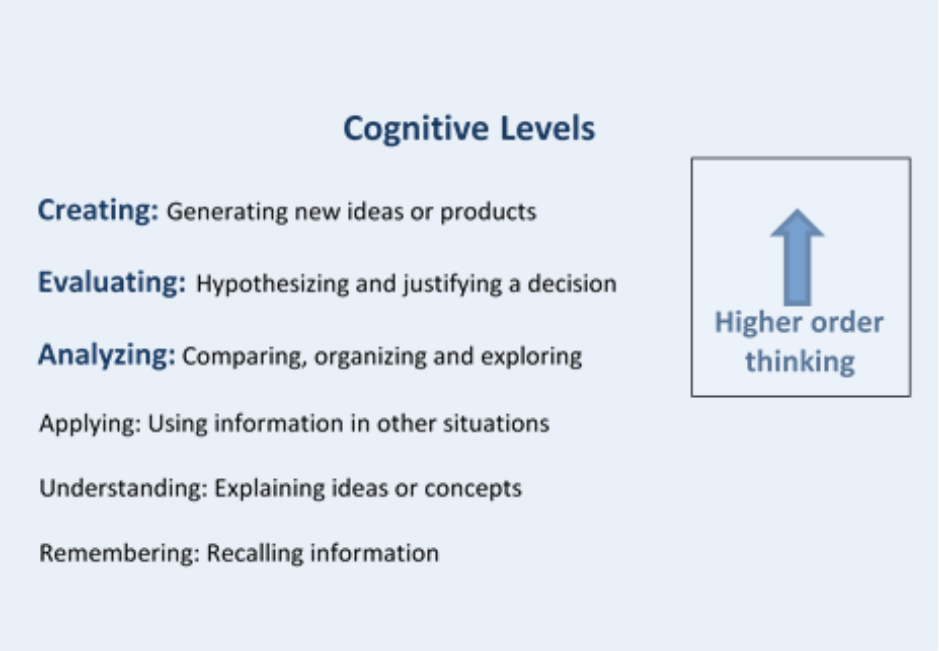

Figure 8. Adaptation of Anderson and Bloom's taxonomy

Bloom's taxonomy suggests that there are four knowledge types: factual, conceptual, procedural, and meta-cognitive. Factual knowledge concerns specific details, while conceptual knowledge is created at higher levels in Bloom's taxonomy and moves towards a more developed understanding of theories and principals. Procedural knowledge involves learning how to study something such as subject-specific skills, techniques and methods, and finally meta-cognitive knowledge consolidates these previous levels of knowledge and moves to the even higher level of strategic and self-knowledge (Ben-Zvi & Carton, 2008, pp.12-13).

It is generally accepted that the lower level behaviours must be mastered before students can progress to the next levels in the learning process. Learners move up through the cognitive levels

beginning with 'remembering' to arrive at the highest cognitive process level of "creating). Bloom's taxonomy's higher order cognitive levels can be an excellent foundation to assist in the formation of an assessment model (McKeachie, 1984, as cited by Athanassiou, McNett, & Harvey, 2003, p.538). According to Bloom's taxonomy, if students are to learn at a deep level, they must master each of the domains in sequence with each phase supporting and scaffolding the learner to the next level of cognition. This is not to contradict the assumption that learning is a cyclical process, but does imply and support the need for, and importance of, both foundational knowledge and scaffolding in the learning process.

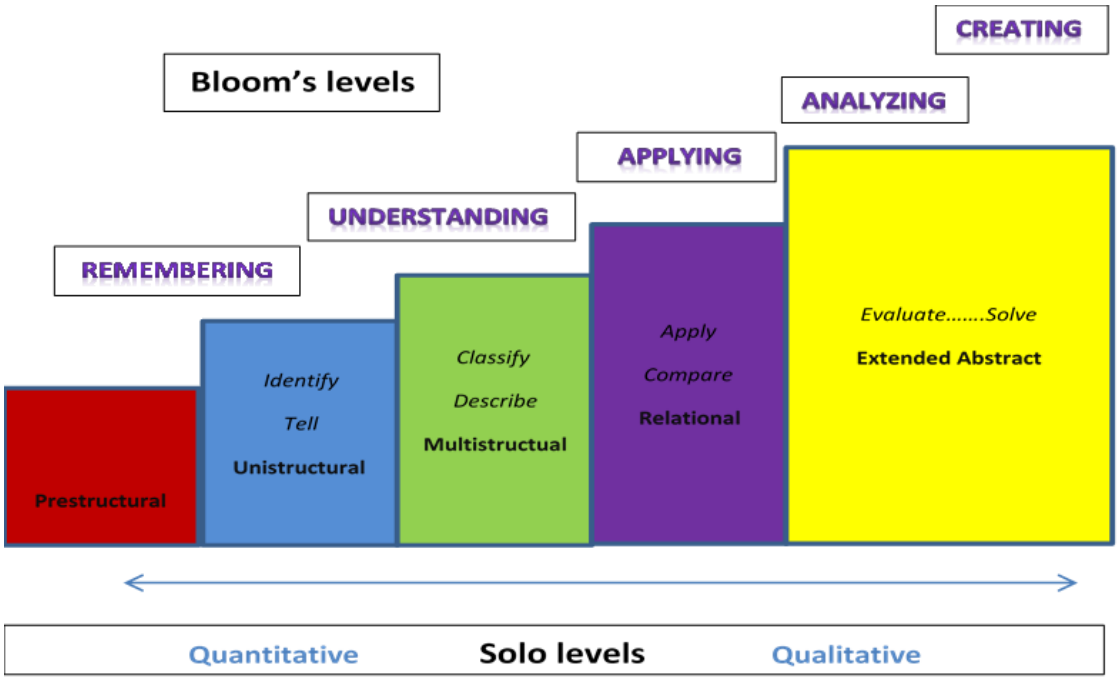

Figure 9. SOLO and Bloom's taxonomies compared

Bloom's has been proven to be an effective tool in assisting instructors to write learning objectives for many years by directing the instructor through the different cognitive levels and providing verbs that alert students to what is expected of them (Forehand, 2010, p.6; Krathwohl, 2002 p. 217). Rushworth (2013, p.18) argues that Bloom's taxonomy is lacking as a learning objective framework as it fails to make a clear distinction between 'knowing how to do' and 'being able to do'. This gap can be addressed by using the SOLO taxonomy for assessment to

measure not only the level of the students' understanding of the concept, but the level of application they are capable of.

The SOLO outcomes taxonomy is closely related to, and can work effectively with, Bloom's and Anderson's taxonomies respectively (see Figure 8). SOLO is similar to Bloom's and Anderson's taxonomies in that the former is scaled to increasingly higher levels of cognitive thinking, thus illustrating how the level of complexity in a student's understanding of a subject may increase. Also, like Bloom's, the SOLO taxonomy assumes that each level is dependent on the previous level, thereby building and adding a level of complexity to the last.

The SOLO taxonomy may be used as an effective assessment framework to assist understanding the interaction between students and the course materials. Informal assessment for both metacognitive and content knowledge can be as simple as a conversation between instructor and student, helping the instructor to understand the level of metacognitive knowledge the student exhibits (Krathwohl, 2002, pp.220-228). The use of both Bloom's and the SOLO taxonomy can work together successfully to support the effective assessment of students' learning (see Figure 9). Bloom's taxonomy complements SOLO by defining the different levels of a student's cognition at which point SOLO may be used to discover the learner's cognitive level. Figure 8 also shows the progression from quantitative to qualitative learning as students' progress up to levels where learning is more individualized and utilises critical-thinking and innovation skills.

Bloom's taxonomy can be useful as a guide to develop teaching methods, curriculum and assessments to inspiring students to become more self-directed learners. It can act as a guide to support the learner to purposefully move through the various levels to get to higher order thinking. This requires the students to understand the purpose and function of each cognitive stage which increases their awareness of their own cognitive development (Athanassiou, McNett, & Harvey, 2003, p.550). Bloom's taxonomy and SOLO were utilized to build the foundation for the decision matrix which is discussed in the following section. Both provided structure from which teaching methods, assessment and learning activities could be aligned and selected.

3.9 Building the Decision Matrix

Pedagogy, andragogy, heutagogy and academagogy can all be effective learning philosophies, depending on the student's level of knowledge and experience, and the desired learning outcomes (Jones et al., 2014, pp. 769-771). Knowing which philosophy is applicable and when to use it is essential to provide an effective learning environment.

The decision matrix is designed to assist instructors in effectively aligning learning philosophies with learning outcomes and assessments. An effective teaching strategy must be aligned with the learning outcomes, to ensure selection of the most effective pedagogy/andragogy (Gibb et al., 2014, p.13). A compendium proposed by Gibb et al. (2014, pp.11-18) focuses on 'how to teach' rather than 'what to teach', testifying to the importance of pedagogical choices. The intention of the decision matrix is to assist in constructive alignment across programmes; to promote deep learning critical to encourage learners to file, retrieve and then apply knowledge in and outside of the classroom (Biggs, 2003, as cited by Rushworth, 2013, p.17). The matrix provides foundational knowledge to instructors, offering guidance while still allowing flexibility in terms of selecting a teaching method. The characteristic of flexibility of choice is especially important when taking an academagogical stance and when teaching entrepreneurship, as the latter requires an array of methods to be effective (Gibb, 1987, as cited by Henry, Hill, & Leitch, 2005, p.106).

The decision matrix follows the cyclical model of entrepreneurial learning (see Figure 7) and is split into three phases: Phase 1, prescribed learning; Phase 2, scaffolding; and Phase 3, emergent learning. The decision matrix shows the correlation between Bloom's taxonomy, and the SOLO taxonomy for student assessment objectives. Instructors can use the matrix to align Bloom's taxonomy learning objectives with the SOLO taxonomy assessment objectives by matching the verbs from each of the taxonomies.

Instructors work from left to right using the model in Table 4, moving from learning objectives on the left to the corresponding assessment and evaluation on the right. Assessment methods may overlap and can be effectively used in more than one learning phase.

Phase of learning	Bloom's taxonomy for construction of learning objectives	Learning objectives	Suggested Teaching Methods	SOLO for student assessment	Assessment learning outcomes (ALO)	Student assessment on the basis of student performance)	Evaluation

Phase 1 Prescribed Learning	Remembering	Define Describe List Recall Paraphrase Arrange	Lecture Reading	Pre-structural Uni-structural learning outcomes	Understanding of prior learning Count Name Arrange Describe	Discussion Test Quiz Exam Rubrics	Student results and marks Student feedback surveys
	Understanding	Explain Estimate Interpret Discuss Illustrate	Lecture Reading Large group discussions	Uni-structural learning outcomes		Test Quiz 1-minute papers	Student feedback surveys
Assessment of Transitional responses: use outcomes to scaffolding learning at this stage							
Phase 2 Scaffolding	Applying	Compute Solve Demonstrate Produce Examine Classify	Problem-based learning Case studies Puzzle based learning	Multi-structural	Paraphrase Classify Compute Illustrate	Learning log Self-assessment Peer-assessment Progress reports with verbal feedback 1 Minute paper Discussion	Student feedback surveys Student results and marks
	Analysing	Analyse Compute Appraise Compare	Problem-based learning Case studies	Multi-structural	Combine Classify Describe Enumerate List Execute Formulate Solve Prove Complete	Class discussion Self-assessment	Progress meetings Student feedback
Assessment of Transitional responses: use outcomes to scaffolding learning at this stage							
Phase 3 Emergent Learning	Evaluating	Argue Defend Select Compare Assess Rank Criticize	Project-based learning Experiential learning	Relational	Analyse Compare Contrast Integrate Argue Implement Plan Construct Design Structure Conclude Substantiate Adapt	Peer assessment Self-assessment Weekly Progress reports	Student feedback

	Creating	Compile Prepare Modify Design Predict	Project-based learning Experimental learning Co-op learning	Relational Extended abstract	Theorize Generalize Hypothesize Predict Assess Evaluate Critically Reflect Prepare	External feedback (Clients) Professional reports Presentations Peer and Self-assessment	Instructor evaluation of Andragogy Student results Student surveys
	Edge of Chaos Zone of optimal learning - students have a high level of self-direction. Students may drop back to previous phases at this point or even give up						

Table 4. Decision matrix for entrepreneurial teaching methods

The decision matrix presented is not inclusive of all teaching and assessment methods, but rather provides suggestions for effective teaching method selection that is based on research results. The matrix adopts and supports an academagogical philosophical view using an 'umbrella' approach to the teaching selection process. Research suggests that the best method is a flexible approach allowing informed academics to select the teaching method best suited to their context (Winter 2009, p.124). In most cases an educator has the option to use processes and inputs that they deem appropriate for specific learning needs, combining pedagogical, andragogical and heutagogical approaches in support of individual student development. Academagogy facilitates this flexibility in teaching and allows instructors to use tried and true methods alongside new and developing methods (McAuliffe & Winter, 2013). This is an important concept as in most cases, the goal of learning is to reach the emergent learning stage. As research suggests, emergence requires a certain amount of scaffolding of interdependent components to provide essential feedback loops (Corbett, 2005; Van de Ven et al., 1999, as cited by Lichtenstein et al., 2007).

The pilot for the business programme change was structured by adopting an academagogical philosophical approach promoting the use of a mix of teaching and learning methods. Taking this approach allowed instructors to select the best teaching methods to achieve specific learning outcomes for learners at all stages. The pilot followed the framework suggested by Murthy et al. (2012) to support an academagogical approach to teaching:

1. Distil course objectives and measurable outcomes;

2. Identify learning outcomes;

3. Map learning outcomes to appropriate learning methodologies (the matrix can help with this as it aligns teaching methods and assessment to learning outcomes);

4. Participatory learning, timelines, ownership, and course delivery. The emphasis in an academagogical framework based on participatory and social learning. This step would employ the 6 A's of thematic learning (described in the literature review) to integrate curriculum (Steinberg, 1997);

5. Review, feedback and continuous improvement.

The review and feedback activities assisted in the research data collection process and provided the structure for continuous improvement with each iteration of the pilot.

3.10 Summary

This chapter described the rationale for using the formative research methodology. This methodology is commonly used in education research studies that have the intention to develop or improve instructional practices which made it an ideal fit for this particular study (Reigeluth & Frick, 1999, p.1). It also provided structure for ongoing improvement over the three-year pilot study which was an important factor to prepare the programme change for full implementation in the fourth year.

This chapter also established the overall theoretical framework from the literature review, which served as the backbone to lead the research study in the correct direction and determine what things needed to be examined and measured. It identified a plan for investigation and interpretation of the findings based on facts obtained from previous research studies. It discussed the development of the learning model and matrix based upon Bloom's and SOLO taxonomies which assisted in directing the pilot study. It also examined the characteristics and needs of entrepreneurship education and learning from which the teaching method of project-based learning was deemed as an appropriate teaching method to use in the new business programme. The previous research assisted in answering some of the descriptive research questions such as what teaching methods are commonly used to teach entrepreneurship but could not answer questions that were specific to this business programme change such as how would the programme change be accepted at our college and what effect did our college culture have on the

change. These unanswered questions directed what questions would be asked in the surveys and interviews and provided ongoing information for improvement over the period of the pilot study.

Formative research is well suited to this research study as the findings can inform educational practice. To assign meaning to the research findings they must be directly applied to practice, and bridge the gap between theory and practice. The intent to apply the study finding in practice to the business programme change assisted in directing how and what data would be collected and analysed. The next chapter presents the data collection and qualitative and quantitative analysis using Minitab and MAXQDA over the course of the three-year pilot project. It also discusses the coding process of the qualitative data and how the data was collected through interviews and surveys over the three-year study.

Chapter 4 – Data analysis

This research study adopted a heuristic case study approach to gain understanding and insight about a specific phenomenon, specifically the change to the Business Management programme at Olds College (Merriam, 1998). Taking this approach to my study provided me with a big picture perspective which included the effect of all stakeholders and time required for the development and discovery of important findings relating to the programme change. The heuristic case study style follows four rules: the first two concern the interaction of the researcher and their topic, while the second two apply to data collection and the analysis of relationships.

Using the guidelines coined by Kleining and Witt, (2000) I began this research study with a preconceived idea that a change to the project-based learning pedagogy would be the most effective method to implement in the new business programme. The research study questions were preliminary and were redeveloped over the three-year period of the study as new findings and information emerged. Developing and then refining the research questions allowed for structural variation of the samples for data collection. Through the research process I discovered new information that affected these preconceptions and opened doors to new research directions, allowing me to consider the value of using a variety of teaching methods. My analysis over the three-year period of the study looked to discover similarities and overall patterns which in turn steered the direction the study took and assisted in the programme's continuous improvement.

The next section will begin with a discussion of the data collection process and its analysis.

Quantitative data from Fall 2015

The data collection began with a paper-based survey gathering responses from students. The survey was administered by several instructors in a variety of classrooms with limited internet access, which made it difficult to deliver the survey online. The intention of this survey was to compare the different teaching methods that were in use at the college and to gather the thoughts of the students regarding how well the college was promoting entrepreneurship. A total of 248 students, ranging in ages from 16-30 and drawn from a variety of business courses at Olds College were surveyed. The survey attempted to measure any changes in entrepreneurial skills, knowledge and attitude before and after their course participation using a Likert scale of 1-5, 5

being the highest. The results from the survey analysis provided insight into the current state of the business programme content and teaching methods as well a direction for the next phase of the study. A copy of this survey is included in Appendix I.

The use of the Minitab statistical software (Ozgur et al., 2017, p. 758) covers statistics needed to analyse quality improvement data and allowed for the completion of several tests in sequential order. This began with tests on data collected during phase one survey in 2015. In turn, the Anderson-Darling test was utilized as an assessment of "normality" and indicated that the data was normally distributed. Welsh's 2-sample t-test was utilized to compare the two independent groups based on "before and after" student survey responses with the assumption that their variances were not necessarily equal. This indicated that the best fit was Welsh's test (chosen over the student-test) as it is sensitive to unequal variances in sample sizes.

The ANOVA test was performed to identify any significant differences in students' learning or preferences between the four teaching methods; specifically looking for any changes in students' entrepreneurial knowledge, skills or attitude. The analysis found significant differences in student learning between the pedagogies of lecture-, game-, and project-based learning as it related to finance and marketing skills. Finance showed results with low values of a before a p-value of .005 and an after p-value of .008 (Question 11), while marketing also showed low values of p value of .012 before and .006 after (Question 12). These low p-values suggested that the student sample provided enough evidence that the null hypothesis of "there was no difference in learning between the different pedagogical groups" could be rejected for the skills of marketing and finance. This was not the case for the majority of the survey data analysed which showed high p-values, meaning there were low significant differences or little changes in skills, attitudes and knowledge between the different pedagogical groups.

In summary, the 2015 surveys' statistical analysis results revealed little to no significant differences in student learning quality between the different pedagogies of lecture, games or project-based learning. These findings were somewhat surprising as I believed the survey results would show significant differences in student learning between lectures and teaching using more active, student-centred learning pedagogies. This assumption was based on research literature

and the work of scholars such as (Pittaway, & Cope, 2007; Rae & Carswell, 2000) who stress the importance of action and experiential learning in entrepreneurship education.

Quantitative data from 2016 and 2017 surveys

A change was made in 2016 to place the survey online using the Survey Monkey registered application. Moving from a paper-based to online format facilitated easier data collection and analysis.

The partial student survey results of self-assessed skills and knowledge for 2016 and 2017 before their course and project participation and then again after completion is discussed next.

A statistical calculation using a p-value was completed as part of the survey analysis with the assumption that a p-value of .05 or less suggests I can reject the null hypothesis as there is enough evidence to show there was a difference in the students' learning when comparing their "before and after" project work. Thereby, the lower the p-value, the more confidence I can have to reject the null hypothesis.

A low p-value was evident for 2016 data for the categories of accounting, finance, marketing, communications, writing skills, presentation skills, working collaboratively, problem-solving, decision-making, critical-thinking, and project management. The 2017 results showed a low p-value in the "before and after" results for finance, communications, working collaboratively, problem-solving, critical-thinking, strategic thinking, confidence to start my own business, and project management.

The 2016 student survey results revealed low p values of .05 or less and high T values for all 21st century skills included in the survey which included communication, writing skills, presentation skills, working collaboratively, problem-solving, decision-making and critical-thinking. Student survey responses were gathered in 2017 before and then again after student participation in project-based learning. Analysis of this data performed using Minitab software revealed a low p value of.047 and T value of -2.02 for communications, p value of .002 and T value of -3.24 for working collaboratively, p value of .016 and T value of -2.47 for problem solving and a p value of .01 with T value of -2.62 for critical-thinking (see apex #). A low p value for these 21st century skills suggests the sample for this survey provided enough evidence that there was a

significant difference in student learning based on their before and after project participation. The t-value is the calculated difference in units of standard error, the greater the T value, the greater the evidence there is a significant difference. These results suggest project-based learning was effective for teaching and learning of 21st century skills.

Further research is needed using a control group of students who are not participating in project-based learning to provide a benchmark from which a more accurate comparison measurement might be made. It can be interpreted that students did learn and improve some entrepreneurial skills and knowledge during their participation in the projects, particularly in strategic planning, project management, critical-thinking, working in a team, problem-solving and finance, all pf which had a p-value of >.05 in 2016. A p-value of .05 or less does not necessarily mean a given conclusion is right or wrong; significance only suggests the experiment is worthy of more attention and should be repeated (Goodman, 2008, p.135). The analysis of this survey data suggested more research would be required to truly understand what teaching methods would be the most effective for the business programme change.

The findings from the first student survey directed the research study to take a deeper look at the programme change using a different lens. The original intent of the survey was to explore the current state of the business programme and to gather information which would inform decision-making to choose the most effective teaching method for entrepreneurship education. Attempting to find the "best" or most effective method of teaching entrepreneurship was going to be an almost impossible task as the students' learning could have been influenced by other stimuli in their environment as I could not single out particular elements. Student survey results varied, raising the possibility those students' individual preferences might infer that a one-size fits all solution would be less effective as an instructional practice. Learning preferences changed depending upon the phase of learning the student was in. For students who would be in the prescribed learning phase where they had little to no knowledge of the content they requested instructor-focused teaching methods such as lectures. The selection of teaching methods is more effective when choosing those that are most appropriate for the content and the students' level of knowledge, experience and ability (Riener & Willingham, 2010; Rolfe & Cheek, 2012; Romanelli, Bird, & Ryan, 2009, p.4).

The before and after student survey analysis was performed over a three-year period and the results provided a cause for reflection after each iteration. Results gradually led to the study taking a new direction, as the entrepreneurship learning model and interview responses suggested taking a closer look at using a variety of different teaching philosophies and methods would be more effective. Observations and responses revealed that students required a prescribed learning phase to be able to understand how to learn when using project-based learning. Several students stated they were confused, stating there was no direction provided and they didn't understand what was expected. Others needed instruction on how to research and find answers for themselves as they suggested this was not demanded of them in lecture classes.

Instructor survey and interview responses also changed the direction of the study, namely from a focus specifically on effective pedagogy for entrepreneurship education to a study that adopted a more holistic perspective. Interview responses suggested considering the effect and impact that students, instructors and leadership had on the programme change. Instructor responses stated that leadership could either encourage or hinder the programme change and the college culture might not be ready for something so innovative. Instructor and leadership responses regarding the effect each had on the change demanded a deeper exploration of these issues and steered the study in new directions. Understanding how and why these participants behaved or felt the way they did and how these feelings and behaviours would affect the business programme change required taking a closer look. To better understand the present, we need to understand the past and the effect of linear causality. This concept implies that a researcher will only be able to solve a problem if they are able to ask the question "why?". In other words, having the ability to ask "why" requires a better understanding of the historical cause and effect (Becvar & Becvar, 2003, cited in Van Niekerk, 2005, pp.53-54). In this way, linear causality binds together the parts of complex phenomenon through reductionism to simplify a complex idea and provide a simplistic cause-effect view of the event being studied. In addition, looking at the effect of organisational culture and historical information on previous change initiatives at the college would help to understand the behaviours and attitudes of the present change participants.

Taking a social constructionism view implies that "the mode of relating we have to others is taught by our culture" (Owen, 1992, p. 386). In turn, the effect that organisational culture and historical behaviours and interactions between programme change participants and how they

related to other would have on the success of the business programme change called for taking a more holistic view. Satisfying the social constructionism paradigm, the next section presents a discussion of how the qualitative data was collected and the analysis process was used to interpret the findings.

Qualitative data analysis

To support the collection and analysis of qualitative data, multiple methods of data collection were employed; this included surveys, personal observations, and interviews which utilized open-ended questions, allowing for the development of emergent themes. The themes for 2015/2016 are identified in Table 5. The analysis of the 2015/2016 data facilitated the identification of additional themes analysed in 2017. This allowed for an inductive approach to data analysis. These methods of data collection also fit well with the study's constructivist approach, as collectively they provided the data to effectively appreciate the differences in, and effect of, stakeholders' beliefs and feelings.

The following is a list of question topics covered during the instructor interviews:

1. Pedagogies currently being used by instructors at the College;
2. Current assessment methods in use;
3. Appeal of project-based learning for both instructors and students;
4. Effectiveness of PBL in student learning (quantitative for PBL numbers, first questionnaire);
5. Amount of resources required;
6. Student challenges;
7. Instructor challenges;
8. Effect of organisational culture on the programme change;
9. Effect of leadership on teaching.

The interview data analysis revealed a mixture of *a priori* themes (i.e. present in other literature or answers to direct questions asked in my student and instructor interviews), such as common teaching methods used for entrepreneurship education and emergent themes (thoughts and opinions which were expressed by participants which emerged naturally from the responses),

including challenges specific to our college instructors. In turn, the semi-structured interview questions encouraged participants to express their opinions without inhibition as all names and responses were kept strictly confidential. A total of ten faculty members teach in that division of the school, eight of whom participated in this study while two members who chose not to participate for their own reasons.

4.1 Coding the Qualitative Data

Thematic analysis is a flexible analytic technique used to identify, analyse and report themes within data. The thematic analysis method can assist in organising and describing data in rich detail, and can assist in the interpretation of various aspects of data (Braun & Clarke, 2006, p.6). In addition, thematic coding is a valid and reliable method and a useful research tool to assist in the identification of common themes over a set of interviews (Vaismoradi et al., 2013, p.400). This qualitative data analysis method was a good fit for this study because, as the researcher, I played an active role in identifying themes within a social constructionist epistemology. Social constructivism is a process by which reality is created by the observer, and the process of researching gives meaning to what is being observed and the researcher's active experience of it (Jonassen et al., 1995).

The coding for the qualitative data utilized Greenhalgh et al.'s (2005) recommendations and standards, whereby I reviewed the interview material several times, enabling the identification of connections between interview responses and how these same responses addressed the research questions and programme change. A thematic category coding system helped to identify the connections, variances and similarities in the responses. Quotes from the interview responses were compared with external literature which either substantiated or dismissed my interpretations, explanations or perceived connections between the study findings and previous research and theory.

Themes capture important information about the data in relation to the research questions and represent a level of patterned responses or meaning (Braun & Clark, 2006, p.10). There can be some degree of interpretation when a researcher is coding text and every attempt was made to ensure no relevant data was excluded. As the researcher, I needed to immerse myself in the data by reading and rereading to gain a full understanding of the complexity of the responses (Satu et

al., 2014). The credibility of my interpretations of the similarities and differences found in the interview responses was established through the use of quotations from the text in the dissertation's findings and discussion sections (Graneheim & Lundman, 2004). The commonality of themes was measured by how many times they occurred in the data and their importance was measured by the degree to which they captured elements addressed in the study's research questions.

The Microsoft Excel programme was used for thematic sorting of the qualitative data from the 2015 and 2016 student (Appendix III). and instructor interviews (Appendix II). The responses were sorted by entering each question on a separate worksheet in Excel. The responses from each participant were entered into the corresponding spreadsheet and the data was read through several times to explore the emergence of themes in the material (Niglas, 2007).

2015/2016 Themes	Code	Definition
Real world application	RW	Helps students apply theory in real-world situations
Transfer of knowledge	TK	Bridges the gap between academic knowledge and real-life application
Learning quality	LQ	Learning environment conducive to promote effective student learning
Student attention and motivation	AM	The desire or willingness of students to learn; the condition of being eager to act or work
Instructor/student relationship	ISR	Working relationship between instructors and students, or instructors and instructors
Common understanding	CU	Everyone understands things in a common way; use of common language

Change in work/process	CWP	Anything that would require a change in current process or the way things are done
Cost/benefit	CB	Is the benefit derived from an action, worth the cost
Like/dislike PBL	LDIS	Do instructors like or dislike using PBL for teaching
Additional codes in 2017		Leadership interviews were included in the 2017 analysis. Instructors were asked additional questions regarding leadership and culture.
Culture/leadership	CL	Effect of organisational culture or leadership on the programme change
Implementation of the programme change	IM	The success depends upon how the new programme is implemented

Table 5. Themes identified in 2015/2016

The 2017 data used a similar thematic sorting method, but applied the MAXQDA qualitative software to assist in the coding process. MAXQDA supports the interpretive style of coding which looks for an individual's personal perception of an event and allows the researcher to create links and memos within the data. It also facilitates the addition of small notes to the individual code assignations if desired (Saillard, 2011). The first step was 'free coding' which consisted of creating broad labels and then coding the interview text with them. This process helped to organise and sort the responses, allowing the researcher to begin to see patterns and emerging themes.

After numerous readings and reviewing the participants' responses, several themes began to emerge which expressed how the stakeholders might affect the programme change and its sustainability. The coding structure was developed by taking both an *a priori* and emergent theme approach with each theme capturing something that was important in answering the research questions. Themes were developed from the relevant literature on entrepreneurship education and learning, from my knowledge and experience of the business programme, and this study's data analysis providing my interpretation and assumptions of the nature of the data. As I thought about the data and how the themes linked together, the code book which began with fifteen *a priori* codes collapsed to nine which captured the most important elements regarding the programme change.

Reflection on the 2015/2016 data led to the identification of an additional two codes, namely organisational culture/leadership and implementation of the programme change; these codes were not evident at the beginning of the analysis process. This led to a further exploration of these issues during the 2017 data analysis process. The first emergent code – organisational culture/leadership as a driver for change – started to show up and develop in instructor interview responses in 2016. The second emergent theme – implementation of the change as an intrinsic factor for success/failure of the programme – developed at the beginning of the 2017 data analysis process as student and instructor feedback suggested project success was dependent on how the project work was implemented. This will require future research and analysis to examine how the context and implementation of each project may differ and how these differences could affect student learning and project success in the business programme at Olds College**.**

The qualitative data gathered in 2017 followed the original collection process and incorporated gatekeeper/leadership interviews (Appendix IV). The instructor and leadership interview included questions to collect data on the new themes of organisational culture and leadership to better understand what effect and influence they would have on the programme change. It was important to gain knowledge regarding the issues such as the level of faculties' trust of leadership as it could affect their motivation to participate in the change which would in turn affect the success of the programme change.

A review of relevant literature provided the basis for what questions to ask for the 2017 interview and surveys. Research suggests trust between faculty and leadership has a direct relation to teaching quality and on faculty's motivation levels to participate in change (Hörnqvist & Leffler, 2014; Kasturiratne et al., 2012; Leithwood et al., 2008). It is also suggested that educational change benefits from a supportive environment (Fullan, 2001) and that organisational culture is a key influencer when considering instructional innovation and change processes (Adamy & Heinecke, 2005; Aguinis & Roth, 2005). The motivation for faculty to participate in the business programme change was important to understand. Too many or poorly understood change initiatives may leave faculty with a wait-and-see attitude, looking to leadership for direction and to set an example. Some may turn to co-workers for clues about which direction they should take. Keeping strong momentum to participate during the entire

three-year period was challenging in terms of trying to overcome the "boomerang effect" where willingness to commit to continued participation fades when leadership stops paying attention to this particular change project, moving on to other priorities (Aguirre, von Post, & Alpern, 2013, p. 2).

This 2017 version of the interview expanded the focus of the study to include an examination of the college's organisational culture and leadership to determine the impact they might have had on the programme change. A total of eight instructors, ten students and four members of the leadership team participated in this version of the interview process which lasted from forty-five minutes to one hour and scheduled on completion of the student/client projects.

There were four *a priori* themes developed from the literature that were included in the 2017 interview questions. These themes started to provide a structure for answering the research questions by guiding how the data would be initially organised. Table 6 shows these *a priori* themes with the descriptions and sub-themes that emerged from these themes as the data was analysed. Repeatedly reading through the response material helped to better visualize and interpret the responses which assisted in recognising connections and interconnections between the themes, and how these relationships might affect the success of the programme change.

Themes	Description of themes	Sub-themes
Organisational culture	College Culture	• Risk • Entrepreneurial
Leadership support	Leaderships' support of faculty and the programme change	• Resources • Vision
The change process	How the change happened and how it was accepted	• Sense of urgency • Improvements • Resistance • Collaboration • Appeal
Project-based learning	Experiential learning Need for change	• Course integration • Challenges • 21st century skills • Collaboration • Community benefits

Table 6. Summary of qualitative themes

A review of the themes provided an enriched understanding of the effects certain elements would have on the programme and the change decision process. Figure 10 illustrates a holistic view of the interconnectedness of themes that emerged from the 2017 data analysis process.

Figure 10. Initial thematic map

The thematic coding was summarised in four major themes which were used to structure the 2017 findings discussed in Chapter 5. These themes are supported by relevant quotes from interview participants and represent important points made by programme change stakeholders, thus presenting their varied perspectives.

The following chapter is a discussion and interpretation of the findings extrapolated from the study's data analysis. The findings are presented first by theme followed by research question responses.

Chapter 5 – Discussion and Interpretation of Findings

5.1 Introduction

This chapter presents the findings of the data analysis previously discussed, as well as the interpretations of that analysis, focusing on how the findings link to and answer the original research questions. Findings were derived from the key research objectives using a formative research methodology designed as a cyclical process, with each iteration providing insight for the next research phase. Interviews and surveys were the primary methods for data gathering, providing important feedback to understand more about the programme stakeholders and their possible effects on the programme change. The data was collected and analysed against pre-determined outcomes to address two fundamental goals, to answer the research questions posed in chapter one, and to understand, develop and implement ongoing improvements for the business programme change. The findings from this research study demonstrate the potential for applying theory into practice as it ultimately supported a tangible change to make the business programme more sustainable and entrepreneurship focused.

5.2 Research study goals

Analysis of the data provided significant information to answer the following three research goals:

1) Is there a learning model and decision matrix that can be generalized to assist instructors in making effective teaching method and assessment choices?
2) Would project-based learning pedagogy effectively meet the requirements for entrepreneurship education and the new programme change?
3) Is project-based learning a plausible method to use in the Business Management programmes at Olds College? How will it be accepted?

1. Is there a learning model and decision matrix that can be generalized to assist instructors in making effective teaching method and assessment choices?

A deep understanding of how entrepreneurs learn was necessary to assist in the development of the cyclical learning model and the pilot study process. The primary purpose of the cyclical

learning model (see Figure 7) was to explain how the entrepreneurial learning process transitions students from the foundational knowledge phase, using scaffolding to prepare them for emergent learning. The cyclical learning model presented earlier in chapter 3 was based upon the work of (Williams, Mackness & Gumtau, 2012) which supports taking a holistic look at the learning process stating it is important to ensure the learning scape is appropriate for both learner and context (Rae 2005). Between each learning phase is a zone of transition where the learner may experience a period of confusion or partial knowing. Learners must transition through this zone before progressing to the next learning phase or return to the previous stage in their learning process for additional foundational support. The model illustrates how students could regress to previous phases in the learning cycle if they require more foundational knowledge while learning a new concept. The model conceptually reinforces the importance of thinking about learning as a cyclical, and not necessarily a linear process requiring a balance of prescribed learning and scaffolding to move up to emergent learning phase.

The learning model and decision matrix provided foundational knowledge and structure which were utilized in the development of the pilot study and to provide support for instructors to make effective teaching choices by creating awareness of the requirements in each of the learning phases. There were a variety of responses from instructors regarding the value the model and matrix would bring. One instructor stated, “It would be difficult to produce a universal model or matrix due to the uniqueness of the entrepreneurial discipline”. Another said, “Entrepreneurship will be a challenge to teach if each project is unique”. This comment represents that one of challenges and characteristics of entrepreneurship is its heterogeneity (Patel & Fiet, 2010, p.128) and its ever-changing educational requirements (Vanevenhoven, 2013, p. 467).

The decision matrix must be flexible and continuously updated, in order to accommodate entrepreneurship education’s heterogeneity and evolution. In 2015, two of the instructors expressed their fear that if the matrix became standardised, it would limit their choice of how to teach in their classroom; however, seven out of the eight instructors felt the matrix would be a useful tool to assist in their teaching practices. One new instructor stated, “It would have been great to have such a tool when I first began teaching here. I have never really received any training on teaching methods and would have found it useful”. These responses provided feedback on the acceptability of the learning model and decision matrix. Two instructors raised

concerns about the possible infringement of their rights to make teaching decisions in their own classroom, however this fear was overcome by the fact that the use of the matrix would be optional.

The curriculum and teaching method in the new programme was unfamiliar to most of the instructors. Faculty's use of the learning model provided valuable information to build the structure of the pilot. Observations of the students and analysis of their interviews and survey responses revealed that students do go through a cycle of learning similar to the one described by Joplin (1981), Kolb (1984), Dewey (1910/1997) and Piaget (1952), whereby learning is completed in phases as a process of transforming information into knowledge, and is an experiential, cyclical and continuous process.

Support for the cyclical learning model (see Figure 7) was revealed through instructor observations of the students who began their learning cycle with a need for foundational or prescribed learning. When learning with project-based pedagogy, students initially need scaffolding to guide them. This need was first evident in the 2015 pilot where there was little scaffolding provided regarding how to learn using project-based learning. Students interview responses showed that students appeared to be confused and then frustrated, and some even angry with the instructor for "not teaching them and telling them how to do things". One student stated, "I don't know what to do, she is not teaching us, there are no clear instructions for things and lectures". Another said, "I like working on the projects, but I don't know what I should be doing, the instructor is not giving us writing instructions". This feedback from the first pilot iteration contributed to the 'lessons learned', and as a result, part of the prescribed learning phase in 2016 included a one-day workshop acquainting students with project-based learning pedagogy and how they could obtain the most benefit from it. In 2016, students were observed by instructors to be less confused and had lower levels of frustration as they better understood how project-based learning was self-directed and what would be expected of them and of their instructor. One student stated, "Learning this way is much more work but once you know you are the one that needs to find the answers I liked taking that responsibility". Overall in 2016, 85% of the student's responded on the after-project completion surveys that they preferred this method to learn. The cyclical learning model shows that the learning process should begin with prescribed learning and be scaffolded up to emergent learning. The student responses and

instructor observations revealed the necessity of a scaffolding process for effective student learning.

The formative research process created awareness that changes were needed in order to maximize the usefulness of the prescribed learning phase. As a result of this awareness, additional focus was added to this phase during the 2017 pilot; previous students and business owners personally mentored student teams at the beginning of the project process. This resulted in greater overall success and a quicker transition through the various learning phases. Only two of the 34 students who fully participated to the project completion had responses that suggested frustration with project-based learning. Through instructor observations it was noted that the 2017 students when compared to the 2015/2016 students moved more quickly from the prescribed learning phase to emergent phase for most concepts as they appeared to become more self-directed taking on the challenges of research and finding answers on their own. The 2017 students after receiving mentorship and a higher level of scaffolding than previous year's students displayed more self-confidence and higher levels of motivation to proceed with the project work challenges.

Dhital et al., (2015, p.2) describe the stages of experiential learning as beginning with the student's experience, followed by an attempt to understand the experience, reflecting on that experience and finally applying what they learned in the real world. Experiential learning in andragogy allows the student to learn by doing by discovering what it is they needed to know and where to find the required information. This learning process provides students the opportunity to take an experience, organise and make sense of it, then apply it. (Kolb, 1984, pp.3-5). Academagogy is a model that meshes these philosophies into one (Winter et al., 2009, as cited by McAuliffe & Winter, 2013, p.83). This 'mesh' of models creates a flexible learning environment and opens up choices for both learner and instructor to use multiple teaching methods and apply what works for them in a variety of context. The cyclical model was developed upon the work of McAuliffe & Winter (2013) and the decision matrix based on Bloom's and SOLO taxonomies to assist instructors in making effective pedagogical, assessment and learning activities choices. By providing a variety of choices the matrix assists instructors in choosing methods based upon the academagogical philosophy to apply the method that works best for that context. The cyclical learning model (see Figure 7) and decision matrix were

generalizable as instructors teaching different courses utilized them to assist in better understanding the cycle of learning and to make some of their pedagogical and assessment choices.

The cyclical learning model (see Figure 7) and decision matrix served their purpose to help develop the pilot. The model and matrix provided knowledge of entrepreneurial learning requirements and supported the need for a flexible learning environment for the new programme by illustrating how entrepreneurial learning is a cyclical process. The revised programme took an andragogical approach to teaching using a variety of teaching and assessment methods to suit the different learning phases of the student to accommodate these learning requirements.

2. **Would project-based learning pedagogy effectively meet the requirements for entrepreneurship education and the new programme change?**

The Olds College's strategic plan was directly influenced by the Alberta Provincial Government mandate providing the direction for the business programme change. There has always been an ongoing debate in literature regarding the teachability of entrepreneurship (Haase & Lautenschlager, 2011, pp.145-146). The research interviews in this study revealed that six of the eight instructors surveyed in 2015 agreed that business skills could be taught, along with some soft skills such as problem-solving and decision-making, but soft skills such as creativity and attitude could not. These findings corresponded with the work of Timmons and Stevenson (1985, as cited by Henry, Hill, & Leitch, 2005, p.107) who stated that skills are teachable; attitude, internal motivation and risk appetite are not, but can be developed through experience based on real-world situations (Timmons & Stevenson, 1985, as cited by Henry, Hill, & Leitch, 2005, p.107). The teachability of entrepreneurship may be perceived as a science when teaching technical business skills and an art when teaching the more challenging soft skills (Jack & Anderson, 1998; Saee, 1996; Shepherd & Douglas, 1996; as cited by Henry, Hill, & Leitch, 2005; Nasr & Boujelbene, 2014, p.714).

The 2015 survey asked instructors and students what they believed were the characteristics of entrepreneurship. This had the objective of ensuring that the programme would properly teach these identified characteristics and also provide a benchmark so that after course completion it could be confirmed that the objectives of the entrepreneurship education had been achieved.

There were varied responses with the highest incidences detailed in Table 7. One of the challenges the business programme change needed to overcome was the misalignment of teaching priorities between faculty and students. Providing them with the opportunity to work collaboratively with faculty in developing their own curriculum will increase their motivation, engagement and relevance in the learning process (Bovill et al. 2011, p.138).

Students suggested: **(Student interviews)**	**Instructors suggested:** **(Instructor interviews)**
1. Skills to start a business: accounting and marketing 2. Management skills 3.Business planning skills	1. Communication skills 2. Planning skills 3. Selling and marketing 4. Determination 5. Creativity 6. Innovation

Table 7. Student and instructor responses to objectives of entrepreneurship education

Interestingly, students did not discuss the need for soft skills, yet it was a priority for instructors. Incongruences between the objectives as expressed by students and instructors, demonstrated one of the challenges of teaching entrepreneurship skills. Students will not be motivated to learn if they do not see the relevance and value that soft skills such as creativity, innovation or determination can bring. Interview responses revealed that instructors and students were not 'on the same page' regarding curriculum choices for the new business programme. Students appeared to assume the focus of entrepreneurship education should be placed on professional skills with most students neglecting to mention soft or 21st century skills. One student stated, "Entrepreneurship education should teach us about accounting, marketing and finance, all things to run a business". Another student agreed and added, "We are already learning accounting and marketing in the business programme, those are the most important things to know". On the other hand, instructors suggested competencies such as communication, problem-solving and the ability to work well in teams should be the top priorities to include in the entrepreneurship programme curriculum. One instructor stated, "Students need to be able to recognize and act upon opportunities. For this they require critical-thinking and decision-making skills". Agreeing with the previous two comments another instructor said, "The top priority of for curriculum for

the new programme is communication and problem-solving. You have to have those skills to succeed in industry".

The importance of the soft skills and 21st century skills such as communication for successful entrepreneurship education is supported by several prominent learning theories such as Wenger's (1998) social theory of learning and Rae's (2004) triadic model of entrepreneurial learning. Rae's triadic model underlines how important social interaction is for the development of intuition and opportunity recognition, both important characteristics of entrepreneurs. The significance of this came through in some of the student interview responses when one student stated:

> Project-based learning provided me with a sense of professionalism and an appreciation of real business communication. It gave me more of a feel of how school is really tied into the real-world. It has better prepared us for the workplace because it put us into a real-life situation where we needed to solve problems and make decisions.

All eight instructors felt that using this teaching method would provide students with greater opportunities to gain real world experience. One stated that "It takes the student out into the community and into the real-world to apply what they have learned," while another observed, "There is greater learning value for the student when they are working with real clients; they will see what business ownership is really like". Pedagogies that take an active learning approach using 'real-world' problem solving are advantageous when it comes to entrepreneurship education (Tan & Ng, 2006, pp.425-426). This advantage was evident in this research study's findings as 80% of the students surveyed felt that project-based learning provided them with experience and transferable skills that will be useful in their careers. The other 20% of the students stated project-based learning did not fit their learning preferences, objecting to the work load and time demands required.

Only two of the students did not fully support the project work with one remarking that "overall it was beneficial but it's hard to see how to use it specifically towards my industry of agriculture, but I guess I can see that some main skills like research will help me out in the future". Another student stated: "It was just too much work with not enough directions to tell us how to do the project". One other student also commented on the amount of work required in the projects,

stating they learned from this experience that they did not want to start their own business. I and other instructors observed some student participants had a low level of perseverance when it came to completion of all the project challenges and work. Markman and Baron (2003) suggest that a high level of perseverance is a required trait to become a successful entrepreneur, as they must rise above many obstacles and endure harsh conditions. In turn, three of the eight instructors interviewed in 2015 agreed that entrepreneurs must demonstrate the trait of perseverance to be able to overcome the obstacles every new business owner encounters. One stated that "resilience, determination, creativity, communication, and knowledge of one's self and others" are the most important traits and characteristics of an entrepreneur.

The needs of the learner will shape the design and nature of the delivery process. Although this research found that no one method can fulfil all entrepreneurship education learning needs, project-based learning was the most closely matched. Table 8 makes it clear that project-based learning aligns quite effectively with entrepreneurship education requirements. This teaching method can provide the flexible environment required to promote creativity and innovation while providing opportunity for students to develop problem-solving and decision-making skills through the project work (Jones & English, 2004, pp. 421-422).

Entrepreneurship Education Requirements	Project-Based Learning
Flexible learning environment	Facilitates a flexible learning environment
Adaptable learning	Unique learning opportunities dependent on the project
Creativity	Requires students to be creative and innovate to produce unique solutions or products
Problem-solving and critical-thinking	Students must use problem-solving and critical-thinking skills to provide solutions to complex problems
Effective communication	High level of client and team communication requirements
Self-directed and motivated	Motivates students to be self-directed learners

Table 8. Characteristics and similarities between entrepreneurship education requirements and project-based learning

Providing a flexible and adaptable learning environment is especially important for millennials who have been cited as being the most diverse generation who require a high level of engagement in their learning process. Millennials also embrace the "trial and error" approach to learning as the environment they grew up in has programmed them to learn this way (Bovill et al. 2011, p.166).

Research such as the work of Ulrich, (2009) has shown that entrepreneurs prefer active learning methods and hands-on pedagogies. This research study revealed the preference for active learning methods to be true for Olds College as students found active pedagogies to be the most popular teaching method used. The first student survey completed before the pilot study began in 2015 by 245 students (see Appendix I) found that students' learning preferences ranked as the following: games or simulation 6.25%, case studies 12.5, in class textbook assignments 12.5, lectures 18.75% and project-based learning-real life projects at 50%. Unfortunately, instructor and student interviews responses in 2015 revealed that active learning pedagogies were not the most commonly used teaching methods at Olds College in the business programme with lectures still at the top of the list of teaching methods applied. At that time, project-based learning was just being introduced into one of the courses; however, students were assigned hands-on projects in two of the five courses being taught by the instructors interviewed. This survey question asked students which teaching method they preferred giving them only one option for their answer. This question will be revised for future surveys to take a closer look at the value of taking the academagogical approach by asking students which teaching methods they preferred using several independent variables such as curriculum, level of experience or existing knowledge.

The cyclical model of entrepreneurial learning (see Figure 7) and decision matrix developed in this research study, and the academagogical philosophy of learning show that the teaching method should be dependent on the phase and level of learning the students are engaged in. It should also be dependent upon the context and material being presented. A pedagogical teaching strategy can be appropriate for foundational learning when learners are dependent and looking for direction when learning new and unknown content (Knowles et al., 1998, p.70). For example, lectures are effective in some cases, such as when the learning outcomes require short-term knowledge acquisition in the prescribed learning phase (Strobel & Van Barneveld, 2009, p.53). Active teaching methods such as the use of case studies are more appropriate when learning

objectives are complex, especially when students are scaffolding to the emergent learning stage. Research has shown that active, student-centred learning strategies are more effective when learning demands include critical-thinking, problem-solving and higher levels of cognition (Youndblood & Beitz, 2001 as cited in Popil, 2011, p.205). Experiential learning, in particular, the use of case studies, promotes a more active learning environment and assists students in understanding more complex as well as interrelated processes (Kunselman & Johnson, 2004 as cited in Popil, 2011, p.205). 50% of the students surveyed felt learning by using more hands-on methods including case studies better prepared them to use their knowledge in the workplace. One student said, "I learn better when we use hands-on methods, I can't remember much when the instructor uses lectures".

As the complexity and demands of learning objectives move higher in the Bloom's taxonomy, to be successful, students need to use higher levels of critical-thinking, and analytical skills to solve complex and real-world problems (Duch, Groh, & Allen, 2011 as cited in Savery, 2015, p.12). Experiential teaching methods such as project-based learning have been found to be more effective for these types of learning requirements and encourage students to become self-directed learners. Students in the emergent learning phase need to be able to understand how processes and knowledge are interrelated and connected to be able to apply them in new and unique ways. One student stated, "Project-based learning helped me to see how my course material could be used in the real-world as we worked on our client projects". Another stated, "I can see how all my courses would be useful, and I would need to use the different skills in combination".

Teaching entrepreneurship involves both creative and innovative thinking, along with business and management competence, which are most effectively developed in a real-life learning environment (Rae, 2004; Jack & Anderson, 1999, as cited by Heinonen & Poikkijoki, 2006, p.83).Traditional teaching methods such as lectures do not provide the opportunities for hands-0on, active learning opportunities that are needed in effective entrepreneurial learning environments (Gibb 1993, 1996, as cited by Heinonen & Poikkijoki, 2006, p.84). This also suggests a need for our instructors to replace their instructor-focused lectures with more active teaching and learning pedagogies (Gibb, 1993, 1996, as cited by Heinonen & Poikkijoki, 2006, p.84; Ulrich, 2009, p.98; Fiet, 2001b; Hynes & Richardson, 2007).

This study found that even though all eight instructors believed active learning methods could be more effective, they were reluctant to use them. One instructor stated, “I use lectures because they take the least amount of time and effort. I don’t like to say that but with our current workloads, doing anything else that takes more prep is difficult”. Another instructor remarked “In theory, these types of teaching methods make great sense on paper, but realistically they take up too much time and resources”.

If the programme change was going to develop into an effective entrepreneurial learning environment, it needed to address the students’ need for hands-on, real world learning experiences. In keeping with the academagogical philosophy of learning, a variety of teaching methods were applied. Case studies and project-based learning teaching approaches are both valid instructional strategies that promote higher-order thinking and synthesis (Savery, 2015, p.15).

Combining educational approaches is essential for the development of the type of learner entrepreneurship education is trying to create (Jones et al. 2014, p.77; Winter et al., 2009, p.6). Based on the literature and 2015 student feedback, the decision was made to change the business programme from a traditional linear structure to a more flexible format encouraging the use of a mix of pedagogies while maintaining a major focus on project-based learning. One student stated that, “I prefer project-based learning because it gave me an opportunity to learn in different ways, we had some lectures, but we also had guest speakers and did research on our own”. Another student suggested “Both lectures and project-based learning have their attributes; however, instead of being in the classroom all the time we can be out working with real businesses. I got to work closely with the clients and I found the external feedback valuable”. Another student remarked “I think being adaptive to different learning methods is a great skill, I like the variety and different ways to learn in the class, and being able to work on only one major project with a real client was great. Students agreed that taking an academagogical approach by using a mix of teaching methods was beneficial, however, 85% of the students surveyed in 2015 preferred project-based learning and embraced the fact that not all learning was completed in the classroom. One of the major learnings from this was that taking more of an academagogical philosophical approach to teaching entrepreneurship as suggested by Winter (2009) could take the focus off whether we are teaching children or adults, and place it back on becoming better

teachers. Matching the teaching method to the learning requirements and objective instead of age is a more effective way to teach**.** Academagogy according to Winter et al. (2009, p.6) is not a "pick and mix" method of teaching but rather is a method that allows instructors to tailor to the students' learning needs. This teaching philosophy can be utilised across many disciplinary and generational backgrounds and adapts to students' prior knowledge levels.

Student interview and survey responses revealed that Olds College students who participated in the pilot study found project-based learning appealing and effective. Several students commented on how they would be able to apply their learning easily into the workplace. The 2017 survey responses indicated that only 7 out of 41 students preferred lectures over hands-on or project-based learning supporting its appeal. All eight instructors interviewed noted they felt the level of engagement was much higher for hands-on assignments as compared to lectures which provided students more opportunity for distractions. Instructor's observed later in the study that students started to become more self-directed and responsible for their own learning during their client project work.

Overall the student survey responses showed positive results over the three-year pilot as students ranked their skills post-participation. The student self-assessment used a ranking based on strongly disagree, disagree, no opinion, agree or strongly agree that project-based learning pedagogy helped them to improve the skills necessary for successful entrepreneurship. The number of positive responses of students who suggested project-based learning should be used for future classes increased from 85% in 2015 to 86 % in 2016 with a slight drop to 80% in 2017.Overall, these number held steady revealing that all students over the three-year study found project-based learning an appealing learning method, suggesting that it continued to be used as the primary teaching method in the future. Other questions in the survey focused on the effectiveness of project-based learning. The increase in percentages year over year were attributed to the ongoing improvements to the pilot, in particular, the change from a pure focus on using a single pedagogy, project-based learning, to taking a more academagogical approach. This new mixed teaching method approach used the cyclical learning model (see Figure 7) as a reference for understanding the different learning phases and necessity to tailor the pedagogy to the context and student (Winter et al., 2009, p.6). Effective entrepreneurship education requires a mixture of learning opportunities Sroufe & Ramos (2015, p.156) and following an

academagogical philosophy can provide this customized approach (Winter et al., 2009, as cited by McAuliffe & Winter, 2013, p.83).

Another factor led to the application of more than one teaching method. Students in the 2015 to 2017 groups stated the projects were just too much work when all the classes were not integrated into one major project. Meeting the obligations of such a large project along with other programme course projects was stressful. Two of five courses were integrated into the major project in 2015 and three out of five courses were integrated in 2016 and 2017, with the intent to integrate all five courses into the project for 2018. The purpose behind a three-year progression was to reach a full five course integration into the major project and to provide instructors with time to gain knowledge, experience and adjust to the pedagogical change. Students still required foundational knowledge and scaffolding for each of the five courses making it challenging to use a single pedagogy for all learning needs.

To address the change in programme content instructors were asked what they believed were the most important skills and knowledge to include in curriculum for entrepreneurship education. All talked about the need for soft skills such as decision-making, innovation, communications and teamwork. Research has shown that business schools have been criticised for using pedagogical approaches that fail to focus on soft skill development (Higgins & Elliott, 2011, p.4).

Two of the eight instructors felt that students needed to develop their ability to recognize and act on opportunities, however, there must be a balanced mix of skills and competencies. Successful entrepreneurs need to have a balanced combination of technical, business and entrepreneurial or 21st century skills (Geber, 1999).

Project-based learning teaching method application in the revised business management programme provided the opportunity for students to develop soft skills and a balanced combination of technical and business skills. Students were asked if project-based learning was effective in helping them develop their competencies in the soft skills of problem-solving, critical-thinking, conflict resolution, active listening and team work, all skills essential for successful entrepreneurship (Boyles, 2012, p.42; Tucker, 2014, p.167). There was an overall increase in percent from 2016 responses to 2017 responses (see appendix V). These results

showed that students believed that project-based learning was an effective method to learn these types of skills.

Project-based learning was seen as a solution to provide many of the entrepreneurship education needs and as a way to alleviate the misalignment of curriculum priorities. Project-based learning is an experiential, hands-on, active, learning and teaching method permitting a high level of flexibility to accommodate differences in curriculum and learner's requirements. This method of learning follows the philosophy of academagogy which is described by McAuliffe and Winter (2013) as a 'meshed' model combining pedagogy, andragogy and heutagogy which offers flexibility in teaching and learning. Barriers to taking an academagogical approach include maintaining academic rigor and college policy which place restrictions on students' choice of content at the curriculum level. The introduction of project-based learning into the business programme helped mitigate these barriers by allowing students to choose projects focused on their area of interests. Limitations to these choices revolved around learning competencies required to be covered by each course which are auditable by the Provincial Government.

Business clients who mentored the students during their projects said they felt a closer connection to the college and the students: "It was a pleasure working with the students on the project. I had no idea that they were capable of doing so much. It sure opened my eyes". Another remarked, "I didn't know what the business programmes were all about. Working so close with the students provided mentorship for them but it also educated me as I was learning too". Six business clients from the town of Sundre worked with the students in the first year of the pilot in 2015. Upon the completion of the projects, the Town of Sundre presented the instructors with an award of appreciation for strengthening the ties between the town and the college and for providing a valuable service to their rural community.

3. **Is project-based learning a plausible method to use in the Business Management programmes at Olds College? How will it be accepted?**

This implementation style research study, examined the design, planning and implementation of project-based learning into the new programme. The student and instructor interviews and survey collected data to analyse and measure the metrics of effectiveness, efficiency and appeal of the programme change. These metrics were important in terms of the plausibility of implementing

the programme change and included measurements that examined process feasibility, resource challenges and – one of the most important issues – how well faculty and students liked and accepted the new programme (Reigeluth & Frick, 1999, pp.6-7).

The data gathered for the metrics of effectiveness, efficiency and appeal were self-reported meaning they were the perceptions of the participants and may not have been what actually happened. Reliance on these types of measures can be misleading and their associated pitfalls must be acknowledged (Thomas, 2000, p.18).

This section will begin with the analysis of the data and a discussion of the findings for the metric of effectiveness.

Effectiveness of the programme change

The definition of effective learning only has meaning when the learning goals and context are stated (Watkins, et. al., (2007, p17). If we determine this metric for project-based learning by applying this definition it would be a challenge as there are not always stated learning objectives. A better way to think about the effectiveness of project-based learning would be to take the position that effective learning should inform future action. One of the easiest ways to assess the effectiveness of a programme change is to ask participants involved in the change what their perceptions are of the benefits and/or challenges. Identifying whether the programme change was effective required asking the following questions:

> Is moving to a project-based learning and entrepreneurship-focused programme the right change for Olds College?
>
> Did this change fit within the strategic direction the college wanted to take, and would it fulfil the mandates of the provincial government?

Student's survey responses reflected a definite 'yes' it was a good choice for the programme change as over the three-year pilot from 2015 to 2017, on average, 85% of students responded they preferred this type of learning. One student stated, "I didn't like learning this way at first, I just didn't fully understand it but once I understood that I needed to figure out some of the work on my own I enjoyed working with the business clients. I really learned a lot". Another student

said, “I think I will be able to take what I have learned and use it when I get a job. Project-based learning provided a lot of learning experience opportunities, we did analysis and research along with gaining real life experience”. A third student stated, “It was tough, and it was challenging but it gave us lots of good hands-on experience you wouldn’t get in a classroom”. The majority of the student feedback was positive towards the use of project-based learning as most of the students saw the value it would bring to them in the workplace. However, not all students’ learning preferences aligned with project-based learning, one remarking, “I prefer lectures and standard tests with set and specific deadlines. I really don’t know if I’m learning all of the competencies”. Another added, “there should be more templates and guidelines with posted due dates for project work. I need very clear instructions”. Marketing and recruiting efforts would need to explain to potential students the characteristics and demands of a programme that is delivered with a focus on project-based learning.

Leadership felt that the urgency to change was necessary and was ignited by the need for a better strategic fit for the business programme. The project-based learning concept provided the unique direction the college was looking for to ensure a better strategic fit. One leader suggested:

> We are a destination campus, people move here to take programmes because we have something different to offer. In the past this business programme was not hands-on or different from what other institutions were offering. Taking this new direction and pedagogical approach will align it with what we want to provide to our students.

One member who left the leadership team stated, “The business management programme did not fit within the strategic focus of the organisation, it was destined to be cut if changes were not made”. Another leader said “We had a desire to make this programme more practical and hands on. Taking an experiential and practical approach set this programme back within the strategic direction the college wanted it to take”. Leadership agreed that this programme change created a better fit with the strategic direction of the college and fulfilled the mandates of the Provincial Government to provide more robust entrepreneurship education.

Faculty felt this change would ensure the programme was unique and appealing for students making it more marketable, as one instructor stated, “Students would want to enrol because they understand that the learnings and competencies they gain from this type of programme will carry

over into the workplace, in other words, a project-based learning project makes them more marketable when looking for employment". A second instructor stated, "It takes more time and resources to teach using this method but in the end, it provided a higher level of value to the students Another suggested, "You get more 'bang for your buck'. Using this method is a lot of work but there are also substantial returns".

Eighteen of the twenty-two student, faculty and leadership members interviewed offered positive opinions regarding the effectiveness of the new programme format using project-based learning.

This formative research framework applies the metrics of efficiency, effectiveness and appeal to measure "preferability" of the programme change and how instructors and students felt about project-based learning.

Efficiency of the programme change

Efficiency of learning can be defined as the ability to learn and comprehend using minimal resources. For the purposes of this programme change, this was assessed by analysing feedback from surveys and interviews. This analysis assessed changes in student learning, in order to measure the efficiency of project-based learning for teaching entrepreneurship.

Survey results revealed that there was an overall increase in the mean for student learning for the categories of problem-solving, critical-thinking and decision-making from 2016 to 2017. This was an important finding as research and instructor interview responses suggested these skills were becoming increasingly important in entrepreneurship education (Kivunja, 2014, p.41). One instructor commented:

> Using project-based learning brings an element of realism and hands-on experience students can build resumes upon. They can take what they learn and immediately use it in the workplace. It is important in that it really helps develop their critical-thinking and communication skills which they will definitely require in today's world.

Research suggests the 4 C's, or 21st Century super skills, of creativity, communication, critical-thinking and collaboration are required for student's success and should be infused into a programme as part of the learning objectives (Kivunja, 2015; Saxena, 2015).

In addition, the 2016 and 2017 survey results showed low p values suggesting there were significant differences between the results of the survey students completed before their course. and the results from the survey they completed after course participation. The results show that project-based learning pedagogy was efficient for student learning for many of the 21st century skills.

Effective implementation and application of project-based learning

The effective implementation of project-based learning can be dependent upon the way it is implemented. Instructors will need to reconceptualise their approach to teaching in the classroom. How each instructor interprets project-based learning will direct how they will implement and apply it (Rogers, et, al., (2011). Having differences in implementation may cause variations in student learning.

Three of the instructors' surveyed felt project-based learning was the right thing to do but weren't sure how to do it, and suggested more training for those instructors who would be teaching in the new programme. The challenge was maintaining consistent quality in terms of how project-based learning was implemented. The range of variables impacting how project-based learning is implemented may produce different results each time. These differences could be attributed to issues such as the instructor's skill level, the type of project work, the student's level of experience, or other human factors that could affect the end result (Hung, 2011, pp.532-533). It is essential to the quality of education in the new business programme that instructors receive professional training to deliver project-based education. One student stated, "It would have been a better learning experience if all instructors involved in the projects knew what was going on and how to teach that way".

The measurement of effectiveness was difficult to interpret as five of the eight instructors interviewed had not used the teaching method, thereby their opinions were based on their observations and readings. Student feedback was positive regarding the efficiency of project-based learning as they felt that any extra time and effort they put into the project work was well rewarded at the end. Obtaining a true statistical measure of efficiency was difficult due to the noise of other influences affecting the students' learning over that time. This could be an

opportunity for further research in Year 4 of the revised programme when the focus moves beyond the implementation stage.

Students and faculty responses indicated the changes to project-based learning were efficient for teaching entrepreneurship.

Appeal of the programme change

Appeal is about attractiveness and likability and student and instructor perceptions of the programme change and project-based learning. It is also about how relevant and useful students would find entrepreneurship education. The first analysis performed on the appeal of the new programme and project-based learning for students looked at the correlation between question 3 and question 4 on the 2015 student survey, (see Appendix VI). These questions examined the relationship between the student's self-efficacy to start their own business and their perception of the value of entrepreneurship education.

Q3. I have the confidence and knowledge to start my own business

Q4. Entrepreneurship education would be of great value to me

Analysis shows that the lecture group's confidence to start their own business and the value they place on entrepreneurship education is inversely related, the higher their confidence to start their own business the lower the value they would place on entrepreneurship education or vice versa. The other pedagogical groups tested, games and simulations and project-based learning felt that the more confidence that had to start their own business the more value they placed on education. This could be interpreted as students with high levels of confidence who placed high values on education could have already participated in active learning educational activities and saw the value and experience it had provided. Other students learning through passive methods such as lectures placed low value on education. This could be interpreted as entrepreneurship requires hands on experience to be successful. Lectures were not providing this to the students making it more challenging for them for to transfer their knowledge into real life (Ulrich, 2009, p.98).

The second student survey completed at the end of each pilot iteration (see Appendix III) results showed that appeal responses for project-based learning ranked high, with an average of 85% of

the students suggesting it should be used in the future, and 100% of the instructors stating that it was an appealing teaching method to use for the new entrepreneurship programme. While eight instructors supported the use of this teaching method, several still had concerns regarding issues such as increased workload, lack of administrative support and poor faculty communication. Other issues that arose were the challenges of project selection and concerns related to liabilities and the resources required for student travel. One faculty member remarked:

> I think this is doable. I would like to use it to teach communications, as it would be such a good fit. What would appeal to the students is the opportunity to form professional connections and to receive feedback from these connections. Although they may find it a challenge as it disrupts the traditional learning model they have been working with since the beginning of their education.

Most students said they preferred this teaching method after they had time to adjust to it. One stated, "At first I hated it, I was confused. But once I really got into the project work and understood what I needed to do, I really liked it". Another remarked, "I like the way the project work blended in with the course material, having the courses integrated really made sense". Students liked the real-life experience it provided: "Having a chance to work with other entrepreneurs inspires you to start your own business when you see what they are doing. I also found it better prepared me for dealing with conflicts and doing presentations". Two of the students interviewed preferred to learn using less active methods such as lectures, stating they found this method confusing and much more work adding they didn't have the time in their schedule for this level of commitment. A programme using a pure project-based learning approach is not suited to every students' learning preference; however, taking an academagogical approach helped to create a flexible learning environment allowing for the use of multiple teaching methods to accommodate a variety of the students learning needs. Student feedback gathered through interviews and surveys over the three-year pilot study supported the student's interest in, and appeal for, a flexible project-based learning environment (Blumenfeld et al., 1991; Winter et al., 2009).

4. What effect did Olds College leadership have on the programme change success and sustainability?

Leadership should indirectly have influence over academic outcomes through capacity building and by having a focus on, and providing support for, improvements in teaching and learning (Hallinger & Heck, 2011, p.7). There were mixed responses from faculty regarding the level of influence leadership exerted over their teaching in the classroom. One faculty member stated, "Leadership had no influence over what I do in my classroom, they are not even aware of what or how I teach, so I feel they do not influence my teaching practices". Another instructor said, "Leadership is very supportive when it comes to faculty professional development. We have a very generous professional development fund provided by our association and leadership fully supports us by providing the time for us to participate in courses, conferences and workshops. I feel this does influence the way I teach in the classroom". Most instructor responses agreed with research which suggests a transformational leadership style will foster the conditions for improving teaching by stimulating motivation and engagement in professional learning activities (Leithwood et al. 2004; Leithwood et al. 2008; Thoonen et al., 2011). Two instructors did not see the connection between professional development support and their teaching in the classroom. When asked why, one instructor suggested it was their work and effort to participate in the professional development that affected their teaching, not leadership providing them with a day off to do it. Olds College leadership felt they did enthusiastically support professional development as one member stated, "We are very proud of how our faculty has taken the intuitive to participate in professional development and we fully support their efforts. We have many completing degrees, speaking at conferences and working on several different research projects, this shows their passion for teaching". Leadership felt their position of support was to provide the resources of time for professional development. They saw this as fulfilling part of transformational leadership role, which in turn affected teaching. It appeared that instructors who did not understand the management style did not see these connections. No clear process for communication was currently in place that would assist in increasing faculty's level of understanding. Further research in communication effectiveness and processes in the college could assist in better understanding how to correct this issue.

Olds College leadership member interview responses informed this study that they had applied a transformational leadership style to assist them in developing a more innovative and entrepreneurial organisational culture. Research by Abbas et al., (2012) suggests the application

of a transformational leadership style can be related to innovative and high-performing organisational cultures. These leadership models can direct the behaviours of leaders to motivate employees through the development of stronger ties with organisational goals (Sarros et al., 2008, p.146).

The presence of a transformational leadership style was evident at Olds College and was revealed in several areas; leadership's extensive investment in professional development (PD) and promotion of academic learning activities agrees with Thoonen et al., (2011, p.499), who suggest that strong support for, and participation in professional development promotes better teaching practices and higher quality of instruction. One instructor stated, "One thing that provides evidence of leadership support for instructor learning how they encourage us to participate in professional development and make it part of our employee evaluations". Olds College leadership influences teaching through their strong support of our professional development by providing interesting and relevant guest speakers". However, not all faculty felt this way with one member stating, "It is not the leadership group that is providing us with the funding for professional development, it is our association. If not for them, we would not have support or resources for any development". Possible evidence of a transformational leadership style was cited by four out of the ten business programme students interviewed who felt Olds College promoted and was transforming to a college with an entrepreneurship focus through its on-campus businesses which included a brewery and meat store. Olds College leadership interview responses (Appendix IV) suggested they believed the application of transformational leadership, specifically Kotter's dual operation system model, was fostering an entrepreneurial organisational culture however a deeper examination of this with further research would be required to fully support this assumption.

Olds College leadership interview responses (Appendix IV) revealed that they were using the specific transformational leadership style of Kotter's dual operating system model (2014) specifically for the business programme change. One member of upper management stated, "I have started applying Kotter's dual operating system model to manage this business programme change. I think this will be an innovative method to use for the direction the college wants to take".

The following list the eight accelerators of Kotter's dual operating system model (2014):

Kotter's model applies eight accelerators:

1. To create a sense of urgency around a single big opportunity. It is important to decrease complacency and increase urgency to change.

2. Build and maintain a guiding coalition. This is made up of volunteers with a broad range of skills coming from different areas of the institution.

3. Develop the strategic vision for the opportunity or change. The vision should be easy to communicate and feasible.

4. Communicate the vision and strategy to create buy-in and develop the volunteer army. If the right message is not shared, skepticism will defeat the passion required for the volunteer army, defeating the sense of urgency for change.

5. Remove barriers that will prevent movement towards the vision. Ensure there is authority to act, and adequate resources.

6. Celebrate short-term wins, make it visible. Skeptical employees may build obstacles if they do not quickly see proof that the dual operating system is creating results. Celebrating short-term wins provides quick proof that change efforts are productive and successful.

7. Don't celebrate a full victory too soon in the process. If the institution takes the focus away from one change initiative to shift it to new ones, it will create cultural and political resistance. This will reduce the determination of the volunteer army to keep going to complete their objectives. Their focus will return to their work in the hierarchy and neglect work in the volunteer network army.

8. Institutionalise the change into the culture. The strategic initiative or change is not complete until it has been incorporated into the day-to-day operations.

Since it was leadership's choice to apply Kotter's dual operation system model, it was essential that it be effectively applied for the success of the business programme.

Faculty appeared unaware of the change from the traditional leadership style used in the past to Kotter's model, which may have left faculty confused regarding leaderships expectations of them. Faculty's feelings became evident from their interview responses as one stated, "Leadership has provided no direction regarding this change, past leaders have dictated the how, what and when for change. I am not sure what is going on, I don't think leadership fully supports this change, or it doesn't appear as they do".

The following sections provide evidence from research analysis of the study's findings, organized into each of Kotter's model steps providing an examination of how the model was applied at Olds College for the business programme change.

Create a sense of urgency

To develop the readiness to change at the college, and encourage faculty to act, leadership needed to create a state of urgency (Kotter, 2012). Change recipients must see a need for the change to exist, described as "a deviation from acceptable performance", or the "burning platform" (Armenakis et al., 1999). The "burning platform" in this case was the mandate to align the new business programme with the strategic direction of the college and increase programme competitiveness (Armenakis et al., 1999). To motivate action, faculty members had to believe a discrepancy existed between the business management programme and the college's strategic plan.

Some faculty had mixed feelings regarding the existence of a discrepancy, and whether a state of urgency for the programme change had been established. One instructor stated, "There was maybe too much urgency in too short of a timeline, this was a state of chaos, not urgency". Another instructor underlined, "I didn't hear anything about why we had to change, this was never communicated to me, I guess it was because the programme was just due for a revision". Several instructors did not acknowledge any discrepancy, stating they were not aware of the reasoning behind the change, and suggesting the vision had not been clearly communicated. Another instructor argued there was no need for a change citing they had been using the same teaching methods for many years, and felt it worked very well. This same instructor was asked if they had participated in the programme change process, the response was no, they did not have any knowledge of what had been planned.

It appeared that only faculty members who were directly involved in the programme change felt a sense of urgency and recognized discrepancies, as they were privy to the strategic plan information. Being involved in decision-making and planning can help an instructor internalize the organisational goals, increasing motivation and self-efficacy (Thoonen et al., 2011, p.506). This statement would appear to be valid as the instructors who were involved in the planning process appeared to be fully committed to the programme change, whereas the instructors who were not part of the process showed resistance and mistrust of the change. Being able to get these instructors on board with the change proved to be difficult as the damage appeared to be already done. This experience revealed that ensuring good communication and the opportunity to participate for all instructors is important and would need to be part of the change process in the future. Participation in decision-making and good communication are positively related to acceptance of change (Bordia et al., 2007, p.6).

Two of the eight instructors felt that the change was not initiated to make a better strategic fit, but was purely a result of budget or other external pressures. One stated that "This change would not have happened if there were no external pressures such as budget constraints". A second instructor agreed and suggested that "This was all about putting students in seats; if programme numbers were high, there would have been no change". Overall, the majority of instructors surveyed, six out of eight, felt the sense of urgency was created for the change only as a result of the decreasing number of students in the programme and not to make it a better strategic fit. This again showed a lack of communication of what the strategic plan was and confusion of the source of the sense of urgency.

Leadership experienced a sense of confusion about the need to create a sense of urgency. They believed a state of urgency for change had been created when they stated "The current business programme no longer fits within the Olds College strategic plan. The college is moving towards a more entrepreneurship and rural focus and requires a programme that will accommodate such a change". One leader stated, "The sense of urgency was created by having a set implementation date for the change, with all paperwork and changes to be completed by that specified time". However, another member of leadership group said;

> Fortunately, we did not have to fabricate the sense of urgency, the business faculty recognized the pressures on the organisation [whereby] if they didn't act, action would be taken upon them; so, they took charge of their own future and a vision was co-created with that school. We were fortunate to have champions to be the guiding coalition.

There were different perceptions on the existence and creation of the sense of urgency for change. One in the leadership group talked about faculty's attitude as being risk averse and security seeking, which forced a 'change or be changed' leadership style. This leadership member stated:

> Higher education in general has a culture of high job security; the whole tenure concept promotes the culture where there is no fear of loss of reputation. This culture doesn't normally draw in risk takers; some want the lifestyle, others job security, and there is no risk/reward for excellence or poor performance. Our college has attempted to overcome these things. If you can't change, we pivot you so you either need to come along with the change or get off the boat. Industry people recognize they need to change, whereas pure academics have a difficult time with this realization. I think the fact that we are small and nimble and can pivot quickly if needed will rattle some of the set-in ways of some instructors. The culture has supported change by taking bold risks, but I have been battling the attitudes that 'If it's not broke, don't fix it', and 'This is the way we have always done things around here'.

These responses reveal that there were different approaches being taken by leadership members in the attempt to promote a cultural change at the college. One previous leadership member suggested that looking back; there may not have been clear communication of the urgency for change outside of the leadership group which could have created some of the confusion.

Change initiatives experience a higher rate of success when employees work together with leadership who are engaged and facilitating (Higgs & Rowlad, 2011, as cited by Carter et al., 2013, p.952). The perceived lack of communication lead to incongruences between leadership and faculty regarding leadership's true vision for the change, and what part faculty was to play,

with seven of the eight instructors citing some inconsistencies. Three of the four leaders interviewed thought communication and the sense of urgency regarding the change had been clearly shared, revealing discrepancies when compared to the responses from faculty. Having knowledge of the responses from both leadership and faculty provided insight into the miscommunication of the sense of urgency with some faculty seeing no reason to participate in the programme change. Leadership suggested in their interview responses that the sense of urgency would be communicated from other faculty members, however it is suggested from change management models such as Kotter's (2012) that this information should be communicated from the top and not disseminated through the grapevine.

Along with a sense of urgency to stimulate action for change, there was a need for strong leadership support. Support may present itself in many different forms, such as clear communication of the organisational vision, or by providing adequate resources to create and implement the change. Strong leadership needs to do more than simply articulate the vision for change, they need to show they believe in it by investing the required resources to make it a success (Emil & Cress, 2014, pp.543-547). One faculty member stated, "Leadership will need to show their support for this change by providing adequate resources for it to get off the ground and for it to be sustainable". Three of the eight instructors surveyed talked about leadership having a history of moving quickly from one project to the next, leaving the initial project unsupported and left to an inevitable demise. These statements were supported by previous leadership member comments, "We should gauge leadership's support for this change by the amount of resources they have committed to it". This leader felt there was weak support from present leadership members, as few resources had been committed to the change project and any that had been provided had been donated to the college or were based on volunteer time of faculty.

Build and maintain a guiding coalition

Kotter (2012) suggests that building a guiding coalition will establish buy-in, which in turn will affect motivation and minimize resistance towards the change. Leadership can develop an effective coalition by appointing the right people with the right expertise. As both researcher and instructor in the business programme, I was appointed by leadership at Olds College to take the

lead for the change. To ensure the change success, there should also be leadership engagement with the team for the duration of the change process. This level of engagement varied and was complicated by several things. One leader not directly involved in the change observed that "Other than one instructor, I am not convinced that there is much focus on the follow through for this change". Another leadership member suggested that:

> Much has changed. The business programme dean has left, and the programme chair has moved to another role. Those were two of the three principals for this programme change. Two instructors have also left although they were the reluctant ones, so this may be a blessing. The area has openings for two new instructors and so far, the organisation has not moved to fill those roles. This is also a tell-tale sign of the caution now employed by the organisation regarding the future of the programme. Sustainability of the programme change cannot be fully supported by the one remaining instructor. Some loss of momentum and historical knowledge for the change has been lost through the change of people who were originally involved in this project. It will be difficult to gain back that momentum.

The sustainability of the guiding coalition for the change was challenging due to extensive changes in the school of business. These issues may not have been overcome if not for the fact this programme change was the focus of a research study.

Develop the strategic vision

Leadership's vision was to strategically align the business programme change with the strategic plan and goals of Olds College. The vision included creating a more entrepreneurial learning environment as mandated by the Alberta Provincial Government in 2015. The current leadership members believed the vision for the programme change had already been adequately shared with faculty and made no further efforts other than sharing a link in an email where the plan could be read. One member stated:

> "Faculty were given the opportunity to explore on their own the lack of strategic fit of the old programme and could see the need for change. The proposed change has developed the business programme into something that is somewhat unique in the

> Canadian context; it now fits with the strategic goals of the organisation and our culture. Experiential and practical learning is a strategic fit for the direction the institution wants to take as a whole".

The strategic vision was developed at the leadership level, the desire to create a more entrepreneurial focused learning environment. This vision when compared to the current business programme revealed a gap which created the opportunity for change. Instructor's interview and survey responses revealed misunderstanding or lack of awareness for some of this gap which could have created the mistrust and lack of motivation to participate experienced by faculty. Better communication of the strategic plan could have increased this awareness as it was evident that not all faculty took it upon themselves to read and become familiar with the college strategic plan.

Communicate the vision

There is a strong connection and positive impact between leadership support and influence on the success of change as long as goals are aligned (Antonios and Dimitrios, 2015, p.14). Three of the eight instructors interviewed felt that leadership members and faculty had different visions of what the change would look like. Communication of a clear vision for the programme change was further complicated by a turnover of several leadership members during the three-year pilot` study.

Communication, when used with non-strategic intent in change initiatives, can be viewed as just a way to publicise current news within the organisation, having a negative impact on change (Barrett, 2002**,** p.220). The communication efforts of leadership members regarding the programme change were seen by some as just another picture-taking opportunity. Two instructors talked about the history of change at the college, stating that historically, most change initiatives faded quickly when the next great picture-taking opportunity came along. This attitude influenced the motivation levels of faculty to participate in the business programme change. Several stated they did not see the value in putting their time into another project that would be short lived.

This lack of communication may be explained as inadequate management of the psychological contract between management and faculty. The psychological contract is a two-way exchange of perceived promises and obligations (Guest & Conway, 2002, p.22). It is "The perceptions of both parties to the employment relationship and of the reciprocal promises and obligations implied in that relationship" (Herriot & Pemberton, 1997 as cited in Guest & Conway, 2002, p.22). The process of communicating the psychological contract is more important than the contract content. How this process is managed is complex and can result in weak or dysfunctional management/employee relationships. Violating this contract can result in employees questioning management's fulfilment of their commitments, which in turn affects employee related outcomes (Guest & Conway, 2002, p.35). One instructor questioned management's level of commitment, citing their minimal input of resources towards the programme change. It has been found that clear and specific contracts increase employees' trust and perception of fairness (Herriot & Pembertson, 1997, as cited in Guest & Conway, 2002, p.35). The contract plays the mediating role between management and faculty, and can effect organisational change and employee involvement (Rehman, 2011 pp.179-182). The business programme change could have created incompatibilities between management and employees within the psychological contract, which resulted in dissatisfaction and confusion as voiced by the faculty members.

Remove barriers

This programme change initiative experienced several barriers that challenged its success. The programme changed from a more traditional, lecture based programme to one that employed project-based learning pedagogy as its major teaching method. Many of the instructors teaching in the School of Business were not familiar with this method but were eager to try it, while other faculty members were hesitant to apply it as they did not fully understand the concept or its process. To reduce this barrier, instructors received information from the literature review, learning model and matrix developed in this study. The ongoing findings and experience gained from the pilots from each of the three years was also shared to gain their input and to inform them on the pedagogy and process.

One of the major barriers discovered during the research study was that of a high level of mistrust between faculty and leadership. Mistrust is a barrier to effective programme change

completion and can affect the motivation of instructors to participate in the change and influence their teaching practices (Morgan & Zeffane, 2003). One instructor remarked "Leadership must start to show more support for this change to move forward. It is not enough to write it into the strategic plan; they need to walk the walk, I don't see them doing that".

Four out of the eight instructors interviewed indicated there was a level of mistrust of management, with higher levels of mistrust demonstrated by faculty who had been at the college for five years or more. Faculty employed at the college for longer periods of time may have more past experiences from which to build higher levels of mistrust. This observation is supported by the work of Lines et al. (2005), suggest that the amount of trust leadership will receive will be affected by the past change experiences.

Two faculty members felt mistrust was caused by the leadership group not believing in their own message, suggesting this was evident in the poor quality of communication regarding the change. Mistrust between these two groups can have a negative effect on the programme change and impact teachers' professionalism, motivation and the energy they are willing to contribute to organisational goals (Tschannen-Moran & Hoy, 1998, as cited by Thoonen et al., 2011, p.507). E Evidence of this was exposed when three faculty members disclosed their doubts of the long-term sustainability of the programme change citing leadership's past history of not seeing other change initiatives through to completion. One faculty member stated, "Leadership was only going after the latest shining star, this interest will soon pass when the next star quickly appears on the horizon". Another said, "They [leadership] will soon move on to the next picture-taking opportunity". This led faculty members to question the astuteness of investing their time in an effort they believed may be short-lived. It was apparent from the interview responses that a consequence of having an attitude of mistrust was a reduction in faculty's level of motivation to participate in the programme change.

Building on their stock of relevant experiences, instructors talked about previous change initiatives which had negative results such as increased workloads. One instructor suggested that they were concerned with the amount of time and resources the programme change would require, stating "There will be more work for no extra pay". Other instructors felt that management would want to reduce the number of faculty teaching in the programme if their role

changed from instructor role to facilitator. The level of mistrust of the leadership members appeared to have influenced the level of acceptance and motivation of faculty's participation in the programme change.

One other source of the mistrust between these two parties may have evolved from leadership's attempt to use Kotter's (2014) dual operation system model. This model discussed earlier, suggests using many change agents, and enlisting volunteers to build a guiding coalition to drive the change. The model's structure is a system within a system; the first is a network consisting of a volunteer team working specifically on the change, the second being the hierarchy which encompasses all the college's daily functions. To be effective there must be a constant flow of information and activity between the two systems, with the volunteers in the network working simultaneously in both systems. This ensures there is a flow of organisational knowledge and established relationships between the hierarchy to the change network. So, although leadership intended to benefit from this model, by not supporting the components required to make it work, the choice of model may have been ultimately ineffective or damaging to the change process.

There was a lack of awareness of the existence of the high level of mistrust between faculty and leadership. Interview responses revealed that poor communications between faculty and the leadership group were possibly intensifying this barrier, however little was done to remove this barrier during the time this pilot was being conducted. One instructor stated, "Even after this change has been ongoing for a year, I still haven't been really informed about its intent. I still don't know what is going on". Going forward we now know that the barrier of mistrust exists and that it will require attention to ensure the success and sustainability of this programme change and for the success of future change initiatives at Olds College. This will include making a change to the college organisational culture, developing it into one with more transparency and open communication which would better inform faculty of the urgency and reasons for change. Creating awareness is the first step, developing a process for communication and improving change management processes is the next step to remove barriers for effective change.

Celebrate short-term wins, make it visible

This accelerator in Kotter's model was difficult to find and appeared to be overall absent in the business programme change process. There was little to no acknowledgement or inquiry as to the

progress of the change project from leadership to the change network team. It was later revealed during one of the leadership interviews (Appendix IV) that there had been updates within the different levels of leadership, however, this information was not clearly shared with faculty or the network. One of the leadership group stated, “I was informing upper management of how the project was progressing during monthly leadership meetings”. Not including faculty in the updates disrupted Kotter’s dual operation system rule of close and continuous communication between the hierarchy and the change network, which added further complexity and challenge to the change initiative. The absence of this accelerator affected the level of motivation of faculty to participate which in turn also affected their level of trust of the leadership group to support the programme change.

Don’t let up on the sense of urgency until it is complete

This step of Kotter’s model suggests the need to keep a level of urgency going until the change has been completed and institutionalised. There was little to no evidence of this step being applied in the business programme change. Faculty felt the change project had been forgotten and was not at the top of leadership’s priority list. Three faculty members stated the focus on the project would be short lived as one said, “Historically leadership supports new change initiatives but moves quickly to the next not providing enough time for the change to fully develop”. The sense of urgency was soon lost with lack of communication and no acknowledgment of short-wins. Holding the programme change on task was the fact that it was part of this research study and that after the first year, external business clients wanted to participate in the projects with the students, and were requesting the programme continue.

This section addressed the application of Kotter’s dual operating system for the business programme change management. For most of the programme change we can see that leadership found it difficult to stick with this model throughout the three-year pilot and change process. This could have been attributed to the lack of experience leadership had using this model or poor communication with faculty and network members regarding the use of Kotter’s model for the management of the programme change.

The next section will examine the effect that the Olds College organisational culture had on the programme change and on the attempt to institutionalise it.

Institutionalise the change

Any programme changes or improvement affects everyone by taking place at all levels within the college. The programme change can only be considered a success when it is evident that teachers have adopted and implemented the change into their classrooms (Hall, 2013, as cited by Feldhoff et al. 2016, p.214). This change was institutionalised by fully incorporating it into a new business programme at the end of the pilot study. Effective change management was essential for the successful implementation of the programme change. This process began with an understanding of the business programme before the change in regard to content and teaching practices. This step in the analysis ensured that any change proposed would make a positive difference in the programme design. Instructor and student interviews and surveys conducted in 2015 identified teaching methods applied and gathered students' responses to these methods. These responses revealed lectures were the most common teaching method being used at Olds College in 2015 and 2016, with 7 out of 8 instructors using them on a consistent basis. This was closely followed by the active teaching methods of case studies, used by 5 out of 8 instructors, and roleplaying, used by 2 out of 8 instructors.

The lack of communication between leadership and faculty regarding the use of Kotter's dual operating system model appeared to cause confusion and evoke a level of mistrust and lack of confidence in the leadership group. This in turn appeared to decrease faculty's level of support and commitment for the programme change which was evident through interview responses that stated, "This is just another short lived, picture taking opportunity which will soon pass. Why would I want to spend my time participating when next week they will place their focus on something new?" Another instructor stated, "Historically, changes like this are short lived, I don't have the time to commit to something that would not show long-term returns". One other said "Leadership is not supporting this change; they say they are, but it is not showing in their actions". With no knowledge of Kotter's dual operating system model, faculty did not understand how the model utilized a volunteer team to create the change. This lack of awareness of the leadership and change model applied appeared to faculty as a lack of support. Change participants were also not aware they had been granted the authority and freedom to make decisions regarding the programme change work. More transparency and communication

between faculty and leadership would minimize this barrier, increasing faculty understanding of the reason for change and expectations.

Institutionalising the programme change was an ongoing process over the three-year pilot study. One year into this study, students stated some instructors in the programme were attempting to change their teaching practices moving away from all lecture based classes. All eight instructors stated they were exploring the use of a variety of teaching methods in a classroom, but the reason for this was not clear. Only one instructor stated she was attempting the change to match the teaching method with the learning outcomes. A few instructors felt they were already taking a mixed method approach, one stated, "I use a mix of teaching methods including lectures and lots of interactive assignments, the students seem to respond better to those". These responses revealed that the programme change and use of project-based learning was in the primary stages of becoming institutionalised as instructors were experimenting with it in their classrooms. This acceptance and initial application was essential to the programme change success.

5.3 The programme change's success and sustainability

As with organisational culture, the concept of sustainability and success was not initially considered as prat of the original research goals. However, as a result of the 2015 and 2016 analysis it became apparent it would be important to explore these concepts for the programme change. Sustainability can be affected by many factors such as how the change is implemented, stakeholder commitment or other contextual or external events. Factors that can either support or jeopardize sustainability are unique to each change initiative. Being aware of these factors can increase the chance for long-term success. There are six major factors that may affect the sustainability of change (Buchanan, et, al., 2005, p. 14). Each has been discussed in relation to the business programme change to better understand its chance for sustainability and long-term success.

1. Was the change perceived as central to the college and it effectiveness or survival? Would the business programme survive if the change was not initiated?

Leadership stated, "The business programme is no longer a fit for the Olds College strategic plan, it must be changed, or it will be dropped". It was very clear a change had to be made.

Instructors had a personal interest as two stated, “I believe the change to the programme must be made, not just for the students but to save our jobs”. There were concerns regarding the competitiveness of the business management programme, as one instructor stated, “We are a small college and cannot compete with the larger universities and colleges who are offering the same programme. They have more resources to offer students and this makes it difficult to compete with such a common programme”.

The perceived change would not be considered central to the survival of the college but most certainly to the business programme at Olds College. The programme change would be considered as having an influence on the effectiveness of the college as one of the Alberta Provincial Government mandates was to create a more effective entrepreneurial learning environment.

2. Was the change made in a stable, external context to maintain a level of relevance, or would it quickly become obsolete?

Some instructors believed the change to the programme focus to a project-based learning platform would be short lived, while others felt it depended upon the resources provided to sustain it. One instructor said this change is a shining star, which will soon fade, while others felt it would be innovative and important enough to change the organisational culture of the college.

If the change is institutionalized and a process for continuous improvement is put in place, the chances for its survival increase exponentially. The formative research methodology provided the foundation and structure to build an implementation strategy for a continuous improvement process to be embedded within the programme to ensure a continued high level of relevance.

The continuous improvement process is a cyclical process as data is gathered from instructors and students at the end of each pilot iteration.

Issues and challenges were discovered, and insight gained through each iteration of the pilot. These insights and new knowledge were immediately utilized in a cyclical manner to formulate solutions and make improvements for the following pilot iteration.

In 2015 several issues were brought to my attention through the instructor lessons learned meeting at the conclusion of the projects and through student interviews. The first issue was that students were complaining about a lack of understanding of expectations. Instructors observed frustration on the part of the students and lower levels of self-direction in the beginning. This was addressed by ensuring adequate prescribed learning opportunities were and place and more effective scaffolding was offered to the students. To ensure this challenge does not present itself in the future, prescribed learning and scaffolding were set in place as a yearly standardized process in the planning stage of the programme for instructors.

Another 2015 issue was the lack of awareness instructors felt about when their students were in a zone of transition or when they were showing readiness to move to the next learning phase. This issue was partially addressed through the use of the cyclical learning model (see Figure 7) and application of the SOLO taxonomy which was a useful tool for both instructor and student to create this awareness.

The final issue of 2015 discussed at the lessons learned meeting was the need for more integration of curriculum. Both instructors and students commented that the lack of integration was creating redundancies and miscommunication between courses. There was still also the challenge of the student's inability to see the big picture and the connections between courses and materials. The solution for this was developed from the work of Adria Steinberg (1997), "the six A's". This is a standardized process for mapping curriculum and assisting in integration. This solution was implemented over the final two years of the pilot project, beginning with the integration of two courses in a semester and ending with the full five courses in 2018 after the pilot's completion. The higher level of curriculum and course integration also addressed the challenge of poor communication between instructors teaching in the business programme. The standardized mapping process completed at the beginning of each winter forced close communication between instructors as they needed to keep informed at the part each would teach in the programme, and how their part would fit into each of the student projects.

Other challenges arose in the 2016 pilot iteration. The first being the inadequacies of the project application forms. Clients were not providing enough detail regarding their project proposals for instructors or students to make informed decisions about accepting or rejecting the project. The

solution was to develop a template that included more detailed request for information. The 2018 version will also include student mentor expectations as most project clients did not know what was expected of them.

Complaints from both students and instructors regarding the level of knowledge regarding how to apply project-based learning was partially addressed by additional sharing of this research study information and lessons learned materials. Future development of specific project-based learning training to be incorporated into the college new instructor workshop programme was suggested.

In 2017 the biggest challenge was the problem of part-time students being allowed into the business programme cohort. The new programme was set up to function as a cohort with all five of the winter semester courses being fully integrated into the major project. Miscommunication between leadership and the registrar's office allowed several part-time students to participate making it challenging for instructors to accommodate the special needs of these students. A more detailed policy and clear communication between the programme and registrar's office is under development for the 2018 academic year.

3. Was the timing of the change carefully phased?

The programme change took place over a three-year period with full implementation of the new programme in the fourth academic year. The five-course integration into the major client projects was also phased in, beginning in 2015 integration of two courses and ending with the integration of all five courses in 2018. There were several considerations to the timing of the programme change implementation. The timing revolved around the academic year, instructor workloads and allowing instructor's time to prepare to deliver the new programme model.

4. Were change stakeholders committed or compliant regarding their participation?

Instructors demonstrated a mixture of both for their participation in the programme change. I, as both researcher and instructor, was highly motivated and committed to this change as it was my chosen research project and I firmly believed this change was the best option to promote entrepreneurship education. Other instructors stated they were participating in order to save their

jobs. Leaderships' level of commitment to the change was perceived by faculty as being low, contrasting leaderships' perception who felt they had shown full commitment to this change.

One instructor stated, "There have been few resources provided other than donations by external sources, leadership is really not showing they are committed to this programme change". One leadership member's interview response confirmed they felt they had demonstrated their full commitment by stating, "We have provided faculty with the vision to see the need to change and to have the opportunity to take on this project with our full support".

5. Did the implementation process include a high level of communication?

Interview responses from leadership maintain there was quality communication regarding the urgency for change, however faculty had mixed feelings concerning the clarity of this message. One instructor stated, "I didn't know what was going on, I wasn't included in any of the planning sessions and much of the information was not shared with everyone in the programme". Instructors who were active participants in the change did communicate well as a team as it was essential to plan and share class time, guest speakers and hold student- team meetings. One participating instructor suggested, "As a team we worked well together, you have to when working on client projects".

6. Did stakeholders in positions of power see themselves as winners or losers from the change?

The assumption is stakeholders in positions of power in this instance refer to the leadership team at Olds College. Leadership saw pursuing the new programme direction as an opportunity to promote Olds College as progressive and innovative. Two members of the leadership group used the implementation of project-based learning into the new business programme and findings from this research study as a topic for national educational conferences. One in the leadership group wrote a journal article on the subject. This and several speaking occasions were evidence that leadership felt they were "winners" as a result of the programme change.

5.4 The effect of organisational culture on the programme change

Considering the impact of organisational culture on the programme change was not originally included in the research goals. However, after the analysis of the 2015 and 2016 surveys and interviews it became apparent that culture might have an impact on the success of the programme change making it important to understand those factors.

Organisational culture in higher education institutions is comprised of leadership's, teachers' and students' values and beliefs. Culture can affect how teaching and learning takes place within the institution and is especially important in promoting innovative and entrepreneurial attitudes (Marcoulides et al., 2005; Hofman et al., 2002, as cited by Zhu & Engels, 2014). Organisational culture may be either an enabler or a barrier to the creation of an entrepreneurial attitude (Zhu & Engels, 2014), depending on whether or not people feel it is empowering and flexible enough to allow entrepreneurial behaviours.

The organisational culture must be aligned with the strategic direction of the college, which in turn is directed by external pressures and trends (Zitner, 2014). Post-secondary education operates in an environment that has become increasingly competitive and fuelled by industry needs, government mandates, and demands to increase entrepreneurial learning opportunities. In an effort to conform to these demands, Olds College had developed their strategic plan to comply, and leadership had responded by initiating an urgent requirement for a programme change. This strategic realignment involved more than just a physical programme change. It required a modification of both beliefs and practices to enable the college to shift its culture to align with new entrepreneurial strategies. Olds College attempted to increase its agility and competitive capabilities by changing from a hierarchy of risk-averse decision-making, towards a more entrepreneurial and dynamic structure (Zitner, 2014). This journey to a more adhocracy-based organisation was fuelled by institutional strategic planning that specified incentives and goals for the college to become more entrepreneurial. This cultural adaptation was essential to the success of the business programme change as it increased the flexibility to respond to external demands (Stoll, 2009; Bain et al., 2011, as cited by Feldhoff, Radisch & Bischof, 2016). One leadership member stated, "The college must be able to pivot quickly to respond to the fast

pace of change that is happening in the academic environment. Olds College is over 100 years old and has found this pace of change difficult in the past, however going forward it is essential".

The majority of faculty interviewed, nine out of the ten, considered the culture at Olds College was in a state of transition. Faculty and leadership interview responses (Appendix IV) suggested the organisational culture was evolving to a state where it was becoming more entrepreneurial and open to trying new things. One instructor stated, "I think the college culture encourages us to try new teaching methods and be innovative in our classrooms".

One leadership member suggested that they believed the college already had an entrepreneurial attitude and culture saying, "As a college we are known for our entrepreneurial culture, it shows in our programming, research and community involvement". Another leadership member stated, "Leadership at this college have an attitude that we need to be first and trend setters, we are always looking through an entrepreneurial lens". Instructors' responses agreed with leadership's belief that that the college already had an entrepreneurial culture, with one stating, "I think leadership is pretty encouraging for us to try new things" but also remarked, "There are expectations, they [the leadership] use words like 'innovation' and 'entrepreneurship', I think they believe their own message to a degree but does faculty?"

One instructor suggested that "The college claims to have an entrepreneurial culture and environment, but I'm not exactly sure if this was true in practice", they did feel that this type of culture would be essential in supporting such a programme change. Another suggested that "Culture has no effect on the way we teach, entrepreneurship is being used as a buzz word at this college, I don't know if we could really say we have an entrepreneurial culture, it still needs work". The interview responses revealed there were differences in opinion regarding Olds College organisational culture amongst faculty and leadership. Differences in beliefs and attitudes could affect change and create misalignment between faculty and leadership, obstructing the successful attainment of goals.

Olds College needed to address several cultural challenges that would affect the ability to effectively implement the programme change. Impediments to change included lingering attitudes as described in the statements from both instructors and leadership. One leadership member stated, "the college is over 100 years old with a deeply engrained agricultural focused

culture making change difficult. However, we are a small college which may make us more nimble than larger organizations when it comes to change". A faculty member supported this attitude by suggesting that some things were too deeply rooted within the college culture to be easily influenced or changed.

During the programme change there was an organisational cultural drift which left many faculty members in a state of confusion. If faculty perceives the programme change doesn't fit the organisational culture, and 'how we do things around here', this misalignment could increase the chance of failure (Aguirre, von Post, & Alpern, 2013). Six of the eight instructors interviewed, felt Olds College culture encouraged instructors to be innovative and stay informed, thus decreasing the probability of a negative effect on implementing the programme change.

Several challenges were identified that could influence the organisations' culture, conversely, the organisations' culture also could be influenced by the programme change. One new instructor felt that this type of programme change would actually alter the culture underlining that "This kind of programme will help drive the culture because it is so unique and hands-on, it could be a flagship, influencer programme". This participant's statement supports the work of Adamy and Heineck (2005, as cited by Zhu & Engels, 2014), who suggest that organisational culture is a vital factor in influencing instructional innovations and successful educational change. Leveraging change to engender creativity and encourage instructors to take new paths will benefit the programme change by allowing the college culture to develop in innovative ways.

Interview responses revealed that consistently student opinion was that Olds College culture was taking an active approach in supporting entrepreneurship on campus through initiatives such as the green house store and entrepreneurship club. One student said, "I think there is a good chance for new entrepreneurs to grow here and get the base they need to succeed". Another student remarked, "Instructors have always encouraged us to think outside of the box and project-based learning helped us to see if we wanted to become an entrepreneur". There were no visible discrepancies between student opinions regarding the existence of an entrepreneurial culture, all students agreed it was present.

A final consideration that could affect the organisational culture is the presence of a union or association. One leadership member stated, "Change will always be difficult when there is an

association or union involved". Another agreed and suggested that "higher education has always provided great job security, with the whole tenure concept there is no fear of retribution. This attitude still prevails today making it difficult to encourage change". Iverson et al. (2003, p.485) suggest low trust is represented by a formal employment relationship and contracted obligations, whereas high trust is reflected when employer/employee interests are aligned. Open communication and sharing a clear vision of the strategic direction for the programme change may have overcome any negative effects the Faculty Association had when aligning faculty/leadership interests.

Transformational leadership has the ability to change organisational culture; however, it requires a tremendous amount of energy and commitment to achieve desired outcomes (Sarros et al., 2008). One previous leadership member stated, "Commitment can be measured by the amount of resources provided". There was little evidence provided through faculty and leadership interview responses (Appendix IV) that suggested leadership efforts towards the change had any substantial effect on the creation of a more entrepreneurial college culture. Most responses stated they felt the college culture already had an entrepreneurial focus with only a few suggesting it was still in a state of transitional towards that goal. The business programme change was overall seen as a positive step towards providing students with more entrepreneurial learning opportunities.

5.5 Findings Summary

Leadership sets the tone for the organisational culture at Olds College; most change stakeholders including faculty and students felt the college culture was entrepreneurial and innovative. Leaderships' support for the programme change was essential to faculty's motivation to participate. Faculty and leadership had conflicting perceptions regarding the level of support provided. Leadership suggested if positive results were not realized from the programme change within the next two to three years the business programme would be suspended. This created a sense of urgency for some faculty to participate, however, this information was not shared with all effecting faculty's motivation to participate.

The mistrust of leadership support appeared to influence the faculty's level of acceptance of the change and the motivation they felt towards it. This in turn influenced the teaching and learning

within the programme as some instructors were not motivated or excited to implement the change stating it was potentially a waste of their time. Interview comments alluded to the level of mistrust between leadership and faculty with interview responses suggesting that leadership must to earn their credibility by walking the walk and doing what they say they will do (Kouzes and Posner, 1993, as cited by Simons, 1999). Instructor responses showed a lack of confidence in leadership. Smollan (2013), suggests this mistrust can led to the failure of change initiatives, producing the consequence of conflict and negativity. Exploration of the effects of low levels of trust and confidence will need to be completed at a more detailed level for future implementation of change initiatives.

During the interviews leadership stated they were attempting to follow Kotter's (2012) dual operating system model to manage the programme change. This change model follows the principle that change should include input from people throughout the organisation and not reside just with a few appointees. Leadership's application of this change model was not shared with faculty, so there was little understanding resulting in a lack of transparency of how the change was being managed. This change management style, although common in industry, is unfamiliar in post-secondary education institutions, leading faculty to have the perception leadership was unsupportive and behaving inconsistently. Instructor's perception of this change management style was seen as proof that leadership was not supporting the change and had already moved their focus to something new.

Efforts to improve communication and build trust between faculty and leadership will be required to ensure sustainability of this programme change. Good management brings order and consistency, good leadership is coping effectively with change (Kotter, 2000). Instructors perceived the lack of resource support as a barrier for programme change. There were very little resources directed at the promotion of the new programme and no allotment of time provided for the extra project work. Instructors who had a vested interest in the change took it upon themselves to develop material to update the website and produce brochures to market the new programme. Instructors cited different reasons for their participation such as job preservation and learning new methods of teaching.

One instructor comments suggested they felt leaders who were new to the College did not have the required knowledge of project-based learning or experience regarding the history and vision of the programme change to provide effective leadership. Atkinson and Butcher (2003, cited by Smollan, R.K., 2013) who argue that "organizational [sp] change is one area where trust in management can disappear suddenly, with telling consequences" and can affect commitment to change (Smollan, R.K., 2013). It was apparent from instructor and leadership comments there was an issue regarding mistrust between these two groups which was affecting faculty's motivation to participate in the change. What can be learned from this experience and utilized to inform future change initiatives is to not underestimate the importance of trust and communication in the change process. Utilizing a change management model which would include a communication component could ensure there is a set process to follow that would make certain participants were informed and understood not only the importance of the change, but what the desired future state would look like.

The criteria used to measure the feasibility of the implementation of project-based learning into the Business Management programme at Olds College was partially based on the work of Reigeluth and Frick (1999). This formative research framework applies the metrics of effectiveness, efficiency and appeal to measure "preferability". To achieve this ranking a high rating of all three metrics must be attained. The preferability of project-based learning as a teaching method was evident as students' feelings towards learning using this pedagogy were overwhelmingly supportive, with on average 85% of students and 90% of faculty stating they found it effective and appealing. These findings correspond with and are supported by the work of Garavan, & O′ Cinneide (1994, p.34) who suggest that there is both direct and indirect evidence to support the popularity and perceived learning benefits of project-based learning among both student and instructors.

The next chapter will present the limitations and conclusions of the study, as well as my reflections on learning for this research study.

Chapter 6 – Conclusions, Learning reflections and Limitations

Olds College is a small rural college with a faculty of 8 instructors teaching in the Business Management diploma and Agribusiness applied degree programmes. Over the three-year period of this pilot study there were, on average, twenty to twenty-five students enrolled in each programme. The results of this research study proved beneficial to a diverse group of stakeholders which included Olds College faculty and students, and the surrounding rural community.

6.1 Conclusions

The main focus of the research study was to examine the plausibility of changing the business management programme to a more entrepreneurial focus, using the metrics of effectiveness, efficiency and appeal. The intent of the business programme revision was to adapt to the changing needs of entrepreneurship education and to better prepare students for the workplace, while improving the programme's strategic fit with Olds College. The instructors, students and leadership group provided valuable feedback through surveys and interviews on the effectiveness, efficiency and appeal of the programme change.

Instructors suggested they had some reservations about their ability to effectively apply project-based learning in their classrooms as a result of a low level of knowledge of this pedagogy. They were also unsure of the amount of time and resources it would require as compared to teaching using lectures. Changing teaching practices takes time and requires several cycles of trial and error to reach a comfort zone. Instructors needed to feel that there was a compelling reason for them to change their teaching practices, such as improving student learning and accommodating strategic alignment (Elmore, 1996 as cited in Smith et al., 2003). The compelling reason and motivation for instructors to change their teaching practices grew from the transformation of the teaching requirements of the new business programme, and the need to accommodate the diverse learning needs of entrepreneurship learners (Jones et al., 2014; Winter et al., 2009). The three-year pilot allowed time for the business programme instructors to learn and adjust to the new teaching requirements (Elmore, 1996, as cited in Smith et al., 2003). The research and findings from this study identified the unique requirements of entrepreneurship education, helping to inform and support faculty as they altered their teaching practices.

Most, but not all instructors agreed the new programme content should focus on development of 21st century skills such as problem-solving, decision-making and critical-thinking. This type of skill is challenging to teach through traditional lecture style classes, and would therefore not adequately meet the needs of entrepreneurship education (Ulrich, 2009). Taking on a programme change such as this requires a high level of motivation to participate on the part of faculty to be successful. Challenges arose from the few instructors at Olds College who resisted the change. The new programme runs as a cohort with all five semester courses for the winter semester second-year business programme being fully integrated within the projects. This requires an all-encompassing level of collaboration between the faculty teaching in the programme. This type of collaboration can be viewed as a chain, having even one faculty member not on board with the change can produce a break in the link, putting at risk the success of the course to project integration process, one of the major foundational concepts the new programme is built upon. Ensuring faculty are motivated and prepared to fully participate will take professional development training and in some cases, new faculty members who are willing to apply new teaching methods in their classrooms.

The programme change to project-based learning was appealing to students. Eighty-five percent of the students said they preferred this learning method over lectures or games. The other 15% stated they preferred less active methods such as lectures, as those learning methods were what they were familiar and comfortable with. Faculty found this new teaching method appealing saying they thought it was beneficial to their students as it would provide them with opportunities for real-world experience. However, there was still a concern over the increase in workload which could result from using this pedagogy, and how leadership would provide resources to address that concern. Leadership stated the issue of resources and workload would need to be a discussion held each year during the workload planning process.

The results of this formative research study demonstrate that a project-based learning business programme can support and improve connections between entrepreneurship education, industry and the Olds College community. The programme, having been established at Olds College, will continue as part of a continuous improvement process; it would be interesting for further research to be conducted, with a view to assess the notion of sustainability as it relates to academic programme change. The leadership group stated they would be interested in the

information that the continuous improvement process and data collection would provide. Such information would support the sustainability of the programme by providing information on continued appeal, education quality and challenges to address.

The first two years of this study did not consider the effect that organisational culture and leadership had on the business programme change. After researching and reading numerous studies on complex adaptive systems and change management, I realized there was a gap in the research due to not taking a holistic look at the programme change. Complex systems produce unpredictable outcomes demonstrating self-organising and emergent behaviours (Harkema, 2003). Olds College functions as a complex adaptive system, requiring an awareness of what others were doing and how they interacted. Change should be considered as a self-organising learning process through which a co-evolution of both the system and its environment take place (Dooley, 1997). For this reason, the programme change could not be isolated from other activities or functions of the college, making it essential to consider the effect of organisational culture and leadership as part of this research study. Consequently, for the third iteration, I expanded the study to include assessment of the context using the lens of organisational culture and leadership.

The college functions as a complex system with all stakeholders bringing a diverse collection of knowledge and expertise to the table. In times of conflicting objectives, it is essential that everyone receives clear communication and the opportunity to articulate the goals of each party, in order to facilitate a collaborative problem-solving approach (Miles, 2013). Using a more adaptive management approach as suggested by Miles (2013) has the potential to frame competing objectives, while improving all parties' capacity to communicate and commit to change. Adaptive management is described as an approach to provide structure for framing competing objectives as testable hypotheses, while facilitating an opportunity for learning, based on an organisation's response to management's actions (Miles, 2013). The results of the research findings revealed the extent to which mistrust was affecting the success of the programme change. Faculty suggested leadership was using communication regarding the change as 'picture taking opportunities' for non-strategic intents or for personal gain. and this appeared to have a negative impact on change (Barrett, 2002). Performing future research on the application of

adaptive management at Olds College could provide further insight and potential solutions for the current lack of trust between leadership and faculty.

6.2 Reflections on learning

This reflection on learning documents my personal journey through my DBA studies and Thesis preparation. It provides my personal view of that journey, what it meant to me, and my perception of its effect on my college, colleagues and students.

To complete this DBA was a significant challenge as I attempted to fit the demands of the research and writing into my daily life, which included a full-time teaching position, volunteer work, and family commitments. My research study topic had a deep connection to both my career and professional interests, which provided ongoing internal motivation to fulfil the research tasks and requirements successfully. Understanding the sources of intrinsic motivation helped me become more aware of my learning, and reflect on my research journey.

Intrinsic motivation has been related by Ryan & Deci (2000) as the natural and spontaneous drive to seek out challenges, and explore and learn while pushing the limits of one's capacity. It has also been described by Di Domenico & Ryan (2017) as having the tendency to be interested and curious seeking to develop knowledge and skills.

McClelland's 'achievement motivation theory' suggests that all people have three factors that drive their motivation, achievement, power and association. These factors develop and are dependent upon our life experiences and the environment we live in (Lazaroiu, 2015). I suggest that the desire to research can be related to the motivation of an entrepreneur. Both want to feel a sense of accomplishment, are inclined to solve problems, and have a willingness to want to know the end results of their judgments (Bull & Willard, 1993 cited in Lazaroiu, 2015). Referencing this theory of motivation, I can strongly relate to the desire to feel a sense of accomplishment, not just for this research project, but for everything I do in life. The feelings of self-satisfaction and gratification result from accomplishments. My goal for this research study was to produce findings that would actually be implemented to effectively and successfully change the business management programme. I felt a huge sense of accomplishment when the programme change had passed all requirements and was fully implemented. The implementation also fulfilled the

needs for power and association as it provided me with some say over how the programme would develop and function.

The theory of self-determination is a theory of motivation that focuses on three psychological needs: autonomy, competence and relatedness. Competence is defined as the experience of mastery, relatedness is the desire to be connected, and autonomy is experienced when an individual makes or causes things to happen in one's life (Ran & Deci, 2000). My desire to become competent in the field of education motivated me to seek out the challenge of completing a DBA, having the desire to extend my capabilities into a new discipline, as accounting had been my first profession.

Referencing the theory of self-determination facilitated the understanding of my desire to feel a sense of belonging, and to feel more secure in the company of my academic peers. Entering the teaching profession from the accounting industry was a huge challenge and change which necessitated an extension of my knowledge and experience in the education discipline, in order to fulfil the desire for that sense of belonging.

The need for autonomy in the sense that it is the need to feel in control of my own actions and my environment was fulfilled. Performing this research study allowed me to shape the environment I would be working in by playing a large part in changing the business management programme, allowing me to feel a sense of control.

I have always been interested in how to best prepare students for success in the workplace, as coming from the accounting industry, I experienced many challenges when hiring and training new employees. Many students encounter transfer-of-knowledge challenges when asked to apply their academic knowledge in real-world situations**.** Changing my profession from working in the accounting industry to teaching that discipline in a college provided me with a more comprehensive view of both industry and the academic environment, allowing me to recognize why there were gaps between these two worlds. I struggled to be content using lecture based pedagogy, as I observed students not being able to transfer and apply their academic knowledge into the real world. An example of these knowledge transfer challenges was presented when one student who had been assigned a client project involving producing a budget suddenly stated half

way through his work, “Now I get it, this looks different than in the textbook, but the concepts are the same and now that I have actually completed one, it works”. I have always been receptive to investigating and experimenting with new teaching methods to provide my students with effective and transferable education. Implementing changes in the foundational accounting course to integrate with the first-year business programme computer class, allowed my students the opportunity to learn Excel using hands on application. Incorporating the use of a game based simulation game for my strategic planning course and the application of more case-based learning in a human resource class allowed me to investigate the effectiveness of different teaching approaches. These experiences increased my desire to provide my students with even more experiential learning opportunities, and to research other more effective teaching methods.

One opportunity for this type of experimentation resulted from the sense of urgency created by the mandate to change Olds College’s business programme. My DBA topic emerged from this urgency to change, allowing me to explore entrepreneurship education and learning, a topic I have always been passionate about. Reflecting on theories of intrinsic motivation helped me to better understand myself, and why I was motivated to perform the research study and take on the challenge of leading the change in the business management programme.

The DBA programme was very demanding with a ten-course workload to be completed in the first two years, leading to a research study and thesis preparation. At first, the course work was very time consuming; however, as I developed a study routine and increased my foundational knowledge, the journey became easier. One of the modules I found to be the most interesting and beneficial focused on complex adaptive systems. This module provided foundational knowledge. It was not clear to me in the beginning how this related to my research study and learning journey, however, it become clear as I progressed in my research.

The course on complex adaptive systems provided structure to understand change and the interactions between agents within an organisation. Understanding these relationships proved to be one of the most important factors regarding the success of the development and implementation of the entrepreneurial programme change at Olds College.

What I found particularly insightful, throughout the research project, was the negative impact of ineffective communication, and the lack of a complete understanding of the change model being

used for the programme change. The impact was noticeable in the mistrust that developed between faculty and leadership. This mistrust affected faculty's motivation and willingness to participate in the change process, making it challenging to gain support. As suggested by (Shaw et al., 2006 as cited by Carter et al., 2013), poor relationships between faculty and management can create challenges and questioning of support and competencies.

I learned that so much of the success of the business programme change depended upon the interaction of communication between the agents of leadership and faculty. The behaviours of these agents followed the definition of a complex adaptive system, which is defined as a diversity of agents interacting with each other, and in doing so generate behaviour for the system as a whole (Lewin & Regine, 1998). The interactions or lack of interaction in the form of communication between these two groups did generate behaviours of mistrust, which affected motivation to participate in the programme change.

My original presumption was that project-based learning would be the solitary correct answer for our new programme. Interactions with colleagues and students, and the experience of using this teaching method myself over a three-year period encouraged me to take a broader view of the needs of the entrepreneurial learner. These interactions facilitated the emergence of a new direction for the programme, now guided towards an academagogical approach to teaching.

This insight helped me to link what had happened in my study to the work of Harkema (2003) who suggests that learning from within and from projects should not be focused on the procedural aspects of innovation, but on the relational aspects that underlie how people interact with each other. Harkema's (2003) theoretical position helped me discover a weakness in my research project resulting directly from a misdirection and limitation of focus. Originally, the research emphasised the procedural aspects of pedagogy or academagogical choice; however, I realized I needed to take a more holistic approach and also consider the relational aspects of the change.

The success of the business programme change and its full implementation in the 2017/2018 academic year bridged the gap of confidence and starting a healing process for the mistrust between leadership and faculty. One leader commented on her growing support for the new programme by stating, "I tell the story of our new programme and explain why it is so unique

and differentiated from all the other business programs". Leadership's trust in faculty increased after the successful implementation of the new business programme, as demonstrated by the application of project-based learning in other contexts at Olds College. The fact that Olds College was already successfully using project-based learning in the business diploma programme was appealing to funders who donated to the college to develop a new facility for the agricultural programs based on the use of this academagogical approach.

The process of choosing the appropriate methodology for this research study sharpened awareness of my ontological and epistemological perspectives, which were based on the social constructionist view (Jonassen et al., 1995). This philosophy suggests that learners create their own meaning and develop cognition through their interactions with each other and their environment (Kim, Fisher, & Fraser, 1999; Vygotsky, 1978). Team work is a type of cooperative learning supporting the social constructivist learning theory, where the interaction between team members provides support and feedback which assists the students in making sense of what they are learning (Tsay & Brady, 2010). The opportunity to observe this theory in action occurred when the pilot used a project-based learning teaching method in the programme pilot case study. The results from the pilot confirmed and supported my ontological and epistemological points of view, as I observed students creating their own shared meaning through their interactions with team members. Shared meaning about a process, theory or product is an act of learning something new through an exchange of information which impacts the ability of teams to coordinate work (Hinds & Weisband, 2003). Interaction with others enables students to make sense of what they are learning, as they are responsible for articulating and discussing content with their peers (Adams and Hamm, 1994). The project work was structured to ensure each participant's responsibilities were clear, with the expectation they share their work and learning with other team members during their daily work sessions. Team work learning strategies create learning environments that foster feedback and support systems that assist in the development of problem-solving and decision-making skills (Rushatz, 1992). Students stated that after their participation in the project-based learning they felt better prepared to apply valid support and research to make decisions and solve problems.

This study began with a student survey with a quantitative focus, but moved to a qualitative focus when I realized I needed to make a closer examination of the relational aspects of the

change. Student and faculty acceptance and motivation to participate were critical, as were leadership support and management in the implementation and sustainability of the new programme. Qualitative methods proved more effective in gathering data that provided participant beliefs, opinions and levels of acceptance. As a novice researcher, but also in a position of being an insider, I too grew in my understanding of the importance of establishing and maintaining focus on relationships, while building consensus for change.

My reflections were captured in a learning journal, which was eventually replaced with my actual thesis and its iterations. My knowledge developed from a critical review of the literature and from data gathered during the pilot study. Discussions with other instructors were also a valuable source of feedback, learning, and reflection, as they shared challenges and suggestions for ongoing improvements to the pilot and eventually the programme.

The knowledge I gained from the literature review fulfilled two key purposes, the first was to inform the development and direction that the research project would take**.** The literature supported taking a design-based approach to this study, using formative methodology, as historically it has been successfully used in educational improvement and change interventions (Roma, 1990; Greeno, Collins, & Resnick, 1996; Lingam et al., 2014; Simmons, 1991).

The pilot study was built using the structure of design theory and steps suggested by the work of (Reigeluth and Frick, 1999). These steps included selecting, designing and then testing several iterations of an instance which is what the three-year pilot study accomplished. I found the process of developing and implementing the pilot study very interesting, and learned the value of the process of design theory and how I could apply it in other future projects.

The literature review facilitated discovery and better understanding of the interconnectedness between the epistemological views of social constructivism, the learning theories of Vygotsky (1978) and Williams et al. (2012), and the requirements of the entrepreneurial learner. I was already aware, through prior readings, of the holistic view of the common characteristics and requirements of entrepreneurship education; however, the literature review provided me with a deeper and more comprehensive understanding. The literature suggested that entrepreneurship education would require taking a thematic and diverse teaching approach using collaborative and cross-disciplinary learning methods to effectively facilitate the transfer of academic knowledge

into real-world applications (Sroufe & Ramos, 2015). Referencing my experience from industry and in academics, I could relate to how taking a thematic approach could prove useful to more effectively facilitate student's transfer of knowledge. Taking a cross-disciplinary approach to teaching would provide students with the opportunity to see how skills and competencies work together and must be applied in parallel in the real world.

The exploration and critical analysis of the literature on entrepreneurship education and teaching supported the development of soft skills, which led to the selection of project-based learning as an effective pedagogical choice (Fayolle & Gailly, n.d.; Linan, Rodriguez-Cohard & Rudeda-Cantuche, 2011; Potter, 2008; Peterman and Kennedy, 2003; Zhang, Duysters & Cloodt, 2014). The literature also developed the direction and structure for the research study as it pointed out the importance of real-life experience in entrepreneurship education (Haase & Lautenschläger, 2011), and the value of providing students with the opportunity to take a 'through' approach (Middleton & Donnellon, 2014). Again, having industry experience provided me with the insight of the value that taking a 'through' and hands-on approach to learning could bring to the students. As a researcher, this guided me to direct the pilot study towards the use of an academagogical approach to teaching that would provide the flexibility required to fulfil most of these learning requirements.

The second purpose of the literature review was to examine the effect that the college organisational culture and leadership would have on the programme change and its sustainability. As the researcher, I needed to be aware of how each would affect the programme change and the challenges this would present for my study. As an instructor working within the programme, I had to acknowledge that I could be placed in a difficult position at times, stuck between leadership and fellow faculty members.

The literature revealed information that directed the study towards a closer examination of how the business programme change was affected by the leadership group at the college, and by its organisational culture. Research has shown that organizations that have clear goals and supportive cultures have higher success in the implementation of instructional innovations and change (Zhu & Engels, 2014; Martins & Terblanche, 2003). An exploration of Olds College's organisational culture showed that all except two interviewed in faculty, leadership and the

student groups believed the college culture did display entrepreneurial traits. This was an important finding as it showed that most of the change participants aligned with each other regarding organisational culture, showing participants had common beliefs, views and assumptions.

Writing my thesis was my greatest challenge, and in retrospect this task helped me reflect on my research. I was always encouraged and supported by my college colleagues and this gave me the motivation and perseverance to continue with my work. The literature and data analysis performed assisted me in 'digging deeper' into the research to better understand the programme change, which resulted in several refinements to the research questions and study's direction. The discovery of new information regarding organisational culture and leadership, and their effect on the programme change, led to a refocus and change in direction of the study as the research revealed levels of motivation, trust, communication and the sustainability of the change were all challenges requiring attention.

Gaining more knowledge of entrepreneurship education and learning improved my teaching competencies along with providing a better understanding of project-based learning. The literature review helped my development as an instructor, as I became more adept at understanding how students learned, and how I could better accommodate their needs through scaffolding and support**.** As an instructor, I learned how to take the literature and apply it in useful and practical ways assisting me in providing my students with more effective teaching in my classrooms. As a researcher, I have learned how to take relevant literature and build upon it or to critically question it.

At a practical level, I gained new knowledge in other areas including experience using several software products. The two software packages of Minitab and MAXQDA assisted me in statistical analysis and in the coding of the qualitative data gathered through the instructor and student interviews. The software Minitab was used to calculate the p values and other statistical calculations which, to my disappointment, revealed little significant differences in the data collected through the first set of student surveys in 2015. This iteration of surveys focused on discovering which teaching methods were the most effective for entrepreneurship education**.** Beyond using this statistical software to perform data analysis for my research I was able to

transfer this knowledge to my students who applied it to their own research projects. This new knowledge will provide structure for continued improvement to the programme for not only my courses but for the programme as a whole. Other faculty may benefit from this new-found knowledge by being able to build upon what was learned in this study when applying project-based learning into their classrooms for the new business management programme.

This DBA research study was undertaken with the assumption that it would provide evidence and knowledge that would be used to make decisions in the development of the new Business Management diploma programme at Olds College. This objective was accomplished as the findings and knowledge generated by this study resulted in the decision to change the business programme to an entrepreneurship focus using project-based learning as the main pedagogy. This change was fully implemented in the 2017/2018 academic year. This programme change produced a stronger alignment between the business programme and Olds College's strategic plan. This new programme direction also accommodated the Alberta Provincial government's mandate to create better entrepreneurial learning environments**.**

This research was also used as a basis for material at six speaking engagements and two poster sessions at a variety of conferences in Canada, the United States, and Ireland. Participation in these conferences provided valuable feedback from colleagues who were interested in how Olds College applied project-based learning in a post-secondary environment. Many of these colleagues agreed project-based learning would work in theory to provide students with valuable real-world experiences. Others had strong reservations regarding the resources and time it would take and concerns about ensuring rigor in meeting course competencies. The feedback received at the conferences provided a fresh external perspective to reflect on and take back to share with faculty members.

I can now look back and appreciate that the value of completing this thesis is not in the end-product as much as it was in the journey. As I reflect on the years I have invested in this research and thesis, I can say that this study has taken me in many unique and challenging directions. These experiences have been joyful and exhilarating, along with frustrating and demanding at times. The work has broadened my understanding of post-secondary education and entrepreneurial learning, change management and organisational culture. It allowed me to

develop a more holistic view of entrepreneurial learning and what it takes to make a successful programme change. This research study allowed me to see my role as an instructor more clearly and provided me with knowledge to address challenges such as this programme change within my own institution. The interactions with other faculty provided me with a deeper appreciation of the importance of clear communication and the ability to work well as a team. This work has increased my level of self-confidence as a scholar practitioner in the field of teaching, by helping me make the transition from the accounting industry into the world of academia.

In the end, the overall result of the full implementation of the business programme change reduced the likelihood that this programme would be cut from the programme offerings. The success of the programme change has also ensured future students will receive an effective and flexible method to learn about, for and through entrepreneurship. Communication through conferences and sharing information with other educational institutions has placed Olds College in a premier position as being one of the first colleges in Canada to offer such a programme. Olds College wanted to create an organisational culture that was innovative and entrepreneurial; this programme change has assisted in meeting these goals.

Long-term sustainability of such an innovative programme change may present ongoing challenges. Taking a formative methodology approach to this study has established a process that can be applied to collect data and perform analysis to ensure continuous improvement over the long-term.

I have come to the realization that this learning journey, with all of its ups and downs, has been valuable, opening many doors that I did not know existed.

6.3 Limitations and future research

One limitation of my research was the number of faculty teaching in the business programme at Olds College. We are a relatively small institution with on average 5 to 8 instructors teaching at any one time. The number of participants in this study may be seen by some as inadequate, however over 95% of faculty, students and leadership did participant in the study providing a good understanding of the programme change for our college. Another limitation was the time constrictions of the academic school year, which limited the amount of time I could spend on the

collection of data and observations. This limitation was mitigated by conducting the research pilot over a three-year period in order to provide adequate time for data collection.

The three-year pilot programme and formative research study were completed in 2017 and the programme change met all approval channels of the academic council at Olds College and the Alberta Provincial Government (PARPS), provider and programme registry system. This approval process reviews how the programme change addresses economic demands, fits within the institutional mandates, adds distinctiveness and can impact learners. The newly revised business management programme has been fully implemented in the 2017/2018 academic school year with enrolment doubling from 2017 to 2018.

Through a process of conceptualization, experimentation and implementation, the research findings and results became generalizable within Olds College. This is clearly demonstrated as plans are underway to extend the use of this programme model and project-based learning to the Agricultural degree programme at Olds College. Leadership and faculty had a vested interest in my research study, and I shared with them throughout my research journey. Faculty in other areas of the college were interested in how teaching this way could affect their workload, the process to find suitable projects, the process for course integration, and in the end, how appealing our students found this learning method. Lunch meetings with the Vice President of Academics and monthly school meetings provided the opportunity for me to share my research; however, hallway encounters and lunch room conversations were the most effective methods. These conversations started other faculty thinking about how they could apply this in their school departments.

This research work also found value as the current president of Olds College stated it was referenced in an application for a large funding opportunity which the college succeeded in obtaining. The funder was particularly interested in how project-based learning could be implemented into a new Agriculture Centre that was being proposed for the college. Project-based learning would be the foundation for the newly revised bachelor of agriculture degree programme that would reside within this new facility.

Expanding the application of project-based learning into other discipline areas such as the Agriculture programmes will provide opportunities for future research studies, and a closer

examination of collaborative learning and the long-term effect this type of programme may have on student careers.

Finally, the emerging ‘landscape’ of post-secondary education requires institutions to innovate learning environments to accommodate the changing needs of learners. Our world is demanding our students become more interconnected every day, and the ability to network and connect with the world is increasing, making it more important that programmes offer opportunities for students to be able to develop these competencies. The Business Management diploma programme at Olds College has taken a positive step towards developing this type of learning environment for their students.

This research study has made me stronger as an instructor and researcher and has provided me with the opportunity to facilitate change within my institution and as a scholar/practitioner. I thank all of the people who contributed to make this change happen; their contributions played an invaluable role towards the development of this research.

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Appendices

Appendix I - Student survey 2015

Entrepreneurship Research Survey Questions

Part 1 and Part 2

Thank you for participating in this short research survey on entrepreneurship. Your input will be a valuable component in this study. This is part 1 of 2 surveys you will be asked to complete. The second survey will be issued after you have completed your entrepreneurship activity. Do not write your name on this questionnaire. Your responses will be anonymous and will never be linked to you personally. Your participation is entirely voluntary. All responses will be complied together and analyzed as a group.

Please answer all questions as incomplete questionnaires create severe problems in data analysis.

Please check the correct answer

- ☐ Male
- ☐ Female

Age range

- ☐ 16-20
- ☐ 21-25
- ☐ >26

Which year of your education are you in?

- ☐ certificate (1st year)
- ☐ diploma (2nd year)
- ☐ degree

Which program are you enrolled in?

- ☐ Business
- ☐ Horticulture
- ☐ Agriculture
- ☐ Land
- ☐ Fashion
- ☐ Trades
- ☐ Animal science
- ☐ Other _____

Will you or have you participated in the any following activities at the College? Please check off **all** that apply.

- ☐ Entrepreneurship app: Spirit of Entrepreneurship
- ☐ Project-based learning project
- ☐ Small business course
- ☐ Other Entrepreneurship activity (please state _____

Test your Knowledge and Attitude of Entrepreneurship

CIRCLE ONE NUMBER AGAINST EACH STATEMENT	strongly disagree						strongly agree
1.To what extent do you agree with the following statement, "Can entrepreneurship be learned?" (as opposed to having to be born with the traits required to be an entrepreneur)	1	2	3	4	5	6	7
2. To what extent do you agree with the following statements, "Entrepreneurs perceive change as an opportunity"	1	2	3	4	5	6	7
3. I have the confidence and knowledge to start my own business	1	2	3	4	5	6	7
4. Entrepreneurship education would be of great value to me	1	2	3	4	5	6	7

CONTINUE TO TEST YOUR KNOWLEDGE PLEASE CIRCLE THE CORRECT ANSWER TO THE FOLLOWING QUESTIONS

5. What financial statements would Entrepreneurs use to run their business?

a. income statement.

b. ending balance sheet.

c. cash flow statements.

d. All of the above.

6. Why would it be better for you to use a cheque, not cash to pay expenses for your business?

a. a check can't be traced once it is cashed

b. cash is easier to lose and keep track of

c. a check will provide a paper trail and written proof of payment

d. Using cheques will keep the banks in business by charging us fees

7. Which two would be considered business costs?

a. materials and labor

b. gross and net

c. fixed and variable costs

d. cost of goods sold and administrative expenses

8. A business plan may assist a company _____.

a. operate more efficiently and effectively

b. define its mission and strategy

c. raise capital and funding

d. All of the above

9. Statistics have shown that Entrepreneurs in Canada tend to work:

a. fewer hours than employed people.

b. about the same number of hours as employed people.

c. more hours than employed people.

d. there is no information on who works more hours

10. Cathy says to the group she is working with, "let's just list some options for a solution and vote on the best one". That would be the democratic way of solving this problem. Is this the correct way of solving this problem or has she overlooked a step in the problem-solving process?

a. She forgot to have the group consider the pros and cons of each solution.

b. She followed the correct process and is being fair.

c. She forgot to have the group set up criteria for solving the problem.

d. She forgot to have the group summarize all the problems suggested.

Rate your level of knowledge/skill in the following areas:

CIRCLE ONE NUMBER AGAINST EACH STATEMENT	strongly disagree						strongly agree
11. Finance and Accounting skills and knowledge	1	2	3	4	5	6	7
12. Marketing skills and knowledge	1	2	3	4	5	6	7
13. Leadership and Management	1	2	3	4	5	6	7
14. Communication and speaking skills	1	2	3	4	5	6	7

You will answer the same questions in part 2 of the survey which will be completed at the end of your semester (project)

Thank you for your participation.

Appendix II - Instructor interview 2015/2016

Effectiveness

1. How effective is PBL in achieving learning outcomes and objectives?
2. Are the courses sufficiently integrated to help students see the connection between individual subjects and their application?

Efficiency

1. How much ‘bang for the buck’ does PBL pedagogy provide?
2. Did you experience any additional costs when using PBL pedagogy? If so, identify those costs.
3. Did the benefit to the students learning outweigh the identified additional costs?
4. Would a standardized process make course integration more efficient for you?
5. Do you think using PBL pedagogy will require an adjustment to your workload?

Appeal

1. What appealed to you when using the PBL pedagogy to deliver your course material?
2. Did you find it motivating to use PBL pedagogy?

Formative research questions

1. What worked?
2. What didn’t work
3. (Suggestions for improvements)

Learning model

1. How effective do you think the Williams et.al. (2012) learning model is in predicting behaviour?
2. Your opinion of the importance of prescribed learning.
3. Your opinion of the importance of scaffolding.

4. Provide methods of scaffolding you use.
5. Did PBL provide students with the learning environment that would allow emergent learning to develop?
6. From your observations of the students, did they reach a point in their project work where they became frustrated? Did you find that students wanted more assistance when reaching this point?

Decision matrix

1. How effective do you think the matrix could be to provide instructors with pedagogical and assessment advice?
2. Would you use this matrix to support decision-making when using PBL?
3. Do you think this matrix could assist a new instructor when making pedagogical and assessment choices?
4. Do you anticipate any challenges or barriers to the implementation of PBL pedagogy in the Olds College business management program?

Appendix III - Post-Project Student Survey 2015-2017

Student survey 2015-2017 - (Administered by kwiksurvey online software)

1. There was sufficient time in one semester to complete my 'Project-Based Learning' project

2. There were sufficient resources for me to complete my 'Project-Based Learning' project

3. My participation in courses that used the 'Project-Based Learning' teaching method allowed for more interactions with Olds College faculty

4. My participation in courses that used the 'Project-Based Learning' teaching method allowed for more interactions with the surrounding communities

5. My participation in courses that used the 'Project-Based Learning' teaching method increased my engagement in my major

6. My Participation in courses that used the 'Project-Based Learning' teaching method helped me to clarify my career path

7. My participation in courses that used the 'Project-Based learning' teaching method helped me improve my conflict resolution skills

8. My participation in courses that used the 'Project-Based Learning' improved my ability to run meetings

9. My participation in courses that used the 'Project-Based Learning' teaching method improved my ability to actively listen

10. My participation in the 'Project-Based Learning' project improved my ability to work effectively as part of a team

11. My participation in the 'Project-Based Learning' project helped develop my critical-thinking skills (Critical-thinking skills include the ability to interpret, verify, and reason)

12. My participation in the 'Project-Based Learning' project helped develop my problem-solving skills (Problem solving consists of using generic or ad hoc methods, in an orderly manner, for finding solutions to problems)

13. My participation in the 'Project-Based Learning' project helped me become a more self-directed learner (Self-directed learning describes a process by which individuals take the initiative for their own learning)

14. The Project expectations were clearly defined and evaluation rubrics were provided

15. The 'Project-Based Learning' project required me to integrate previous knowledge and build new knowledge to effectively complete the project

16. The strategy and research courses included activities involving reflection on learning (e.g., reflective paper, log, journal-keeping, etc.)

17. I felt supported by College faculty/staff in my 'Project-Based Learning' experiences

18. My Interactions with community business owners during the project were positive and supported my learning

19. My 'Project-Based Learning' activities were valued by my community business owners

20. I had some control/voice over the 'Project-Based Learning' activities I was involved in (Choice of project, meeting times, schedule to get of the work completed)

21. My participation in the 'Project-Based Learning' project as well as the strategy and research classes, helped me improve my analytical skills (Analytical skill is the ability to visualize, articulate, and solve both complex and uncomplicated problems and concepts and make decisions that are sensible)

22. My participation in the 'Project-Based Learning' project as well as the strategy and research classes, helped me improve my technical writing skills

23. My participation in the 'Project-Based Learning' project as well as the strategy and research classes, improved my research skills

24. My participation in the 'Project-Based Learning' project helped me improve my financial analysis skills

25. My participation in the 'Project-Based Learning' project helped me improve my communication skills

26. My participation in the 'Project-Based Learning' project helped me improve my marketing skills

27. My participation in the 'Project-Based Learning' project enhanced my understanding of local/community issues (Small business problems and issues)

28. My participation in the 'Project-Based Learning' project changed my attitude towards becoming an entrepreneur

29. My participation in the 'Project-Based Learning' project provided real life experience I can use in the future

30. The feedback that I received was timely

31. The feedback that I received was valuable

32. The methods of assessment for the project were fair

33. The methods of assessment for the project provided feedback that added value to my learning experience

34. I learn best with instruction based on

35. I prefer the flexibility 'Project-Based Learning' provides

36. It is important for me to be able to choose a project that I am interested in

37. It is important for me to be able to choose my team members

38. The learning log provided me with a method to assess my mastery of the competencies required for the course

39. The community business owner's assessment provided valuable feedback

40. I would recommend that the 'Project-Based Learning' method be used in the future

Appendix IV - Leadership interview questions

1. What factors helped you to decide to move forward with this program change?
2. How will the change to this program make it a better fit in the College strategic plan and the direction the college wants to follow?
3. This question is to have a conversation to understand leadership's views on the process of transformative change. And so Kotter (1995) states that for effective transformative change to place the following must occur.
    i. Establishing a sense of urgency
    ii. Forming a powerful guiding coalition
    iii. Creating a vision
    iv. Communicating the vision
    v. Empowering others to act on the vision
    vi. Planning for and creating short term wins
    vii. Consolidating improvements and producing still more change
    viii. Institutionalizing new approaches

How do you feel this process was accomplished? Please talk about your response.

4. What has the college invested in this program change?
5. Management has stated there was a need for an entrepreneurial attitude at the college. What challenges has leadership experienced developing this entrepreneurial attitude for faculty?
6. Once it was decided to make the change, what role did management play in support of the change and what did that look like?
7. How do you think the organizational culture of Olds College has affected the instructional innovations or the way faculty teaches?
8. Do you think the change to project-based learning will better fill the changing needs of the job market?
9. Do you think the change to project-based learning will produce or improve innovative, or entrepreneurial instructional practices?
10. What value do you think a program like this brings to the college? To the Colleges surrounding community?

Specific Questions for new Dean

1. What did management share with you regarding this change and their support for it?
2. What do you think the new program is about?
3. Why do you think there was a need for this change?
4. What do you think it will take for this program to be successful?

Instructor interview questions (Revised from 2015 and 2016 versions)

1. Did you teach in the new program?
2. What value, if any do you think the change in the program has brought and will bring to the college? To the students?
3. How did the students met their stated learning objective using this learning method?
4. If you did teach in the program, how satisfied do you think your students were with this learning method?
5. What would you do to improve on the program with the new changes in place?
6. Why would students want to enroll, or why would they not want to enroll?
7. What value do you think this program now brings to the surrounding communities?
8. Do you think this method would take more of your time and resources, or did it?
9. What internal factors affected the need for this change?
10. What external factors affected the need for this change?
11. Has teaching in the new program changed your level of collaboration with other faculty members?
12. Do you feel the program needed to be changed or should it have stayed as is?
13. Do you believe that College leadership has an effect on the attitudes and learning of students? On your teaching?
14. Do you think the success of this program change could or would be related to the organizational cultural environment?
15. How do you think the organizational culture of Olds College has affected the instructional innovations or the way faculty teaches? Or has it?
16. Do you think we should create a more entrepreneurial learning environment? If so, why?

Appendix V - Two-year comparison of student survey results 2016-2017

	2016	2017

Self-assessed Skills or Knowledge	Before	After	Before	After	Before	Before	Before	After	Before	After	Before	Before
	Mean	Mean	SD	SD	T	P	Mean	Mean	SD	SD	T	P
Communications (Meeting with clients)	3.48	4.29	.926	.75	-4.09	.000	3.79	4.2	1.08	.86	-2.02	.047
Writing skills	3.55	4.07	1.03	.721	-2.55	.013	3.72	4.07	.719	.808	-1.92	.059
Presentation skills	3.45	3.9	.96	.917	-2.02	.047	3.57	3.92	.867	.947	-1.66	.101
Working collaboratively	3.9	4.43	.831	.709	-2.95	.004	3.75	4.38	.867	.795	-3.24	.002
Problem-solving	3.74	4.17	.729	.73	-2.45	.017	3.9	4.28	.723	.596	-2.47	.016
Decision-making	3.74	4.2	.855	.723	-2.44	.017	4.03	4.26	.81	.734	-1.3	.199
Critical-thinking	3.7	4.25	.773	.732	-2.57	.013	3.66	4.16	.89	.762	-2.62	.01

Appendix VI - Correlation between Q 3 and Q 4 on the 2015 student survey

Pedagogy (Activity is taking a course)	**Correlation Q3 to Q4 before activity**	**Correlation Q3 to Q4 after activity**	**Q3 to Q4 covariance before activity**	**Q3 to Q4 covariance after activity**
Lecture	.273	.292	.7988	.4190
Game	.364	.366	.5690	1.0588
Project-based learning agriculture students	.365	.645	.5632	2.2754
Project-based learning business students	-.105	.405	-.1667	1.9181

Q3. I have the confidence and knowledge to start my own business

Q4. Entrepreneurship education would be of great value to me