Public School Principals' Perceptions of Innovation

by

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Thesis Submitted in Partial Fulfillment of the

Requirements for the Degree of

Doctor of Education

in the

Educational Leadership Program

Faculty of Education

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SIMON FRASER UNIVERSITY

Spring 2018

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Title: ***Public School Principals' Perceptions of Innovation***

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Abstract

Public education has long been reputed to be a system that is outdated. However, public education, like any organization has seen its share of change and innovation. This mixed-method study explored the perceptions of public school principals' toward individual and organizational innovativeness. The quantitative phase of the study consisted of a purposeful sample of 23 school principals. It was a partial replication of two previous studies conducted by Mitchell (2008) and Williams (2013), who examined school superintendents' perceptions of individual and organizational innovativeness. Individual and organizational characteristics were analyzed for statistical significance. In addition, principals' survey responses were calculated to determine their adopter category according to Rogers' (2003) classifications. Findings were similar to the replicated studies. Principals, like superintendents, viewed themselves to be more innovative than their schools. Significant, but weak differences were found for the tested professional practices, professional capacity, and gender. There were no significant differences found with the remaining characteristics. The qualitative phase of this study consisted of a purposeful sample of 13 principals who volunteered to participate in interviews from the survey phase. This phase explored principals' views, perceptions, and challenges they faced in fostering innovation in their schools. Findings from this phase further elaborated on principals' perceptions regarding individual and organizational innovativeness from the quantitative phase. Both phases of this study were conducted and analyzed separately. Findings from each phase were then synthesized to further clarify principals' perceptions, and common understanding toward fostering innovation. Although some of the variables tested indicated statistically significant differences, principals did not view them as critical to fostering innovation during interviews. The findings from this study indicated that principals' perceived their own and their school's innovativeness as essential to providing students with a meaningful education. It became clear through interviews that factors such as financial resources, student socioeconomic status, and enrolment were not as critical to the innovation process in comparison to the human element of fostering relationships. Importantly, principals perceived their role as leaders as being fraught with complexity in terms of setting the right conditions for innovation to blossom.

Dedication

This is dedicated to my late mother and father who instilled in me the value of hard work and education. Although they had limited educational opportunities, they made the most of their lives to provide my siblings and me with a better future. For this, I am grateful and dearly miss them.

I cannot forget my dear wife Carmen who has endured the many years of my doctorate journey. Without her unwavering support I would not have completed it. I know it was difficult for you to see me "disappear" to work on the "paper" over the years. My deepest gratitude and love for your patience. And to my two lovely daughters, thank-you for being a part of my journey.

Acknowledgements

It is often said that it is not the destination but the journey that is the most important part of the learning process. A journey it has been with its share of "highways, byways, off-ramps, stops and starts" as well as the many "travelers" one meets along the way. Each piece somehow connected to my final destination.

I have always said that the most enriching part of undertaking an educational endeavour, such as a doctorate, are the people you meet. The richness of conversations, viewpoints and the life stories they bring changes one for the better. To the cohort who began this journey with me I thank you. To Khaled Alajlan, my Saudi friend, you have expanded my cultural worldview beyond the narrow "borders" of my world—thank you.

Thank you to Dr. Dan Laitsch, my senior supervisor, for your instructive feedback and support during this long and winding doctoral road. Thank-you to Dr. Sharon Cohen, my co-supervisor for your technical recommendations and for helping to provide clarity to my writing.

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Chapter One

Introduction

> *Little Red Schoolhouse Dies when Good Road Built…Automation is information and it not only ends jobs in the world of work. It ends subjects in the world of learning. It does not end the world of learning. The future of work consists of learning a living in the automation age.* — *Marshall McLuhan (p. 459)*

In 1964, the enigmatic intellectual Marshall McLuhan (1911-1980) foresaw a public school system that would be radically different in the future. His major body of work explored how media as communication was an important and often ignored force that shapes man and society. McLuhan believed that media as the "message" required that our Western culture or "book culture", as he coined it, needed to "retool" its thinking in order to meet the demands of the emerging electronic environment (McLuhan & Gordon, 2003). Fast-forward and McLuhan's prescience is a familiar echo heard throughout global education systems. Scholars of organizational change and innovation observe that "[t]he education sector therefore should introduce the necessary changes that permit it to adapt to societal needs" (OECD, p. 21, 2014).

A 2008 report published by the *Centre for Educational Research and Innovation* (CERI), a branch of the Organization for Economic Co-Operation and Development (OECD), states that,

> In recent decades, OECD economies have experienced a rapid transformation from their traditional industrial base to knowledge-based societies in which learning (over lifetimes with highly-developed "learning to-learn skills"), creativity, and innovation capacities are central[1]. Such capacities are important not only for a

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[1] Adair (2009) defines *innovation* as the introduction of new ideas, procedures, or products.

successful economy, but also for effective community and social engagement, participatory democracy, and or living fulfilling meaningful lives (p. 3).

Our world is a complex, technologically advanced and knowledge based society. Communication is at the "speed of light". Learners of today and the future will need to be comfortable and competent with skills such as technology, critical thinking, creativity, and collaboration. These skills will be necessary for occupational, societal, political and cultural competency. Fullan (2007) and other education scholars believe that change to the present public school system is imperative if learners are to be prepared for the future. Friedman and Mandelbaum (2011) lament, "[t]he United States has not adapted its educational system to prepare Americans for well-paying jobs in a world economy shaped by globalization and the revolution in information technology (p. 76). Similarly, in British Columbia, Canada, the newly introduced *BC Education Plan* states that even though they have one of the best school systems in the world it, "is an education system modeled on the very different circumstances of an earlier century – a time when change was much more gradual than it is today" (BCEd Plan, 2015, p.3).

Change and improvement has been the familiar battle cry for public education throughout its long history. Present day reforms can be traced back to Frederick Taylor's (1911) "factory model" based on assembly line protocols of the Industrial Age. Politicians and industry leaders believed that this model for schools would produce the "workers" needed for its society. In Canada, a 1939 article in The Globe and Mail newspaper reported a "sweeping wave" of educational reform across the nation. Reform was occurring in several areas such as curriculum, administration, teaching methods and general educational philosophy. The article went on to say that "schools do not exist for the mere perpetuation of a traditional store of knowledge, but for the development of the powers and the capacities of the boys and girls" (The Globe & Mail, 1939, p.6). The launch

of the Russian Sputnik satellite in 1957 caused the United States to reform its educational curriculum for fear they were falling behind the Soviets in technology. Harsh criticism of the U.S. educational system resurfaced during the 1980's with the release of the 1983 report *A Nation At Risk: The Imperative for Education Reform,* which was likened to the impact of the earlier Sputnik launch (Pulliam, p. 226). The 1990s saw a continuation of the 1980s trend where the focus was on education outputs such as students achieving proficiency in state-wide assessments in order to remain competitive with other countries. Again, there was the underlying fear that an underachieving society would have a negative effect on the U.S. economy (National Center for Education Statistics, 2003). Because of our strong ties to the United States, our Canadian context is in many ways linked to the waves of educational reform efforts that have buffeted the U.S. educational landscape. As O'Sullivan (1999) asserts, in Canada, "the paradigm of global economic competitiveness prevailed in the last decade of the 20th century, but it was just as pervasive at the beginning of that century" (p. 312).

Entering the 21st century the prevailing accountability demands for improved student achievement continued to shine the spotlight on public education. Policymakers in the United States brought in dramatic reform under the 2001 No Child Left Behind (NCLB) Act. This controversial policy boldly stated that all students will achieve at grade level in reading and math by 2014. To date, the NCLB Act has met with limited success. Canada has not been immune from the external pressures exerted from the various sectors of society and the demand for accountability from public education. Central to this phenomenon has been the call for 21st century learning competencies (such as creativity, character and innovation) to be taught in schools. As a result, provincial governments across Canada have begun the process of reforming curriculum with a focus on these

competencies under the auspices of 21ˢᵗ century learning. According to Boudreault, Haga, and Paylor, (2013), "The objective of 21ˢᵗ century learning is to build capacity in areas that promote a resilient society capable of effectively adapting to rapid change" (p. 3). As with any mandate formulated in a bureaucratic system, such as public education, the 21ˢᵗ century learning model eventually finds its way to the "ground level" where pressure is exerted on schools to implement such policies.

This, however, has not quelled the waves of education reform as we enter the second decade of the 21ˢᵗ century. As a result, the educational landscape worldwide has seen a proliferation of "21ˢᵗ century learning" policies aimed at addressing the demand for preparing learners for an unknown future. The OECD report, *21st Century Learning: Research, Innovation and Policy Directions from recent OECD analyses* states that,

> In the knowledge economy, memorization of facts and procedures is not enough for success. Educated workers need a conceptual understanding of complex concepts, and the ability to work with them creatively to generate new ideas, new theories, new products, and new knowledge. They need to be able critically to evaluate what they read, be able to express themselves clearly both verbally and in writing, and understand scientific and mathematical thinking. They need to learn integrated and usable knowledge, rather than the sets of compartmentalized and de-contextualized facts. They need to be able to take responsibility for their own continuing, life-long learning. (2008, p. 1)

The response in North America has been similar to that of other parts of the western world. In the United States (2011) its national reform initiative, *Partnership and the Framework for 21st Century Learning,* emphasizes the urgency for sweeping change to the current system. Canada has responded with similar reform efforts. The province of Alberta introduced its (2011) *Framework for Student Learning: Competencies for Engaged Thinkers and Ethical Citizens with an Entrepreneurial Spirit,* which highlights much of the OECD report recommendations from above. British Columbia's (2011) response was to unveil its *BC Education Plan* with a similar emphasis on skills such as "critical thinking,

inquiry, creativity, problem solving, and innovation" (p. 4). There is no denying that change is inevitable in all facets of life. Without it our world would cease to exist. Public education and its plethora of reform efforts to improve its system are but one piece of the mosaic of society's fabric. Yet, its importance to the survival and sustainability of our world cannot be understated. The latest demand on the "place called school" requires transformation of a system replete with complexity. Schools will need to embrace the notion of innovation as a way to meet this challenge. Public school districts will require organizational leadership in order to make the necessary systemic improvement to prepare students academically, socially and emotionally for their future. At the school level, the role of formal leaders (principals) will be integral to leading and facilitating organizational change. They will need to be the "innovation leaders" who champion and foster innovation within their schools. One of their greatest challenges will be to find ways to increase the likelihood of innovations being adopted and implemented for the purposes of "retooling" schools for today's and tomorrow's learners.

Background: The Complexity of Leadership

"If we open a quarrel between past and present, we shall find that we have lost the future." — Winston Churchill

Much of the criticism from the political, institutional, and industrial sectors of society is aimed at the education system as a whole. Microsoft founder Bill Gates (2005) argues that "training the workforce of tomorrow with the high schools of today is like trying to teach kids about today's computers on a 50-year-old mainframe. It is the wrong tool for the times" (Sahlberg, p. 262). Increasingly, cries for public accountability of a school system inevitably trickles down to the local school level. O'Day (2002) points out that, "new accountability approaches, by their very nature, seek to influence from the outside what goes on inside schools" (p. 295). Hence, the school principal, as the formal leader, faces

the pressure to lead and facilitate innovative change within the walls of schools that are perceived to be outdated. Fullan (2010) emphasizes that, "the key to the speed of quality change is embedded in the power of the principal helping to lead organization and system transformation" (p.15).

Indeed, to transform the education system will require radically different approaches to educating learners. We can no longer view educational change through a 19th century mechanistic lens. Tony Wagner (2012), the first innovation education fellow at the Technology and Entrepreneurship Center at Harvard University, asks if "we have the courage and sense of urgency needed to make a radical break from the old ways and create schools with the cultures of innovation that our students want and our economy needs" (p. 69).

Trilling and Fadel (2009) authors of *21st Century Skills: Learning for Life in Our times* cite a question that 400 hiring executives were asked regarding skills they were looking for from potential hires. The question, "Are students graduating from school really ready to work?" They overwhelmingly responded with, "Not really". According to the authors, this study clearly demonstrates that there is a "skills gap" worldwide that has significant economic impact on business. They list these basic and applied skills that are desperately lacking from secondary school, technical college, and university graduates:

- Oral and written communications

- Critical thinking and problem solving

- Teamwork and collaboration

- Working in diverse teams

- Applying technology

• Professionalism and work ethic

• Leadership and project management

As well, academic scholars, policymakers, politicians, industry leaders and future thinkers stress the importance of a well-educated workforce in order to remain competitive and produce wealth for one's country in the global economy. It is a trend that highlights the urgency for skilled workers to be conversant with the age of information and knowledge management. Margaret Wheatley (2005), a renowned organizational thinker, states that, "[t]he organization that knows how to convert information into knowledge, that knows what it knows, that can act with greater intelligence and discernment—these are the organizations that will make it into the future" (p. 145).

The December 1999 issue of the *Futurist* published its special edition, *Outlook 2000*, with their predictions for the upcoming millennium. Various futurists, scholars and notable thinkers offered their insights into what the future would hold for societal sectors ranging from agriculture to religion. Predictions for the business sector mentioned a shift from manufacturing to service providers with an emphasis on tapping into the social consciousness of customers. In addition, competition would grow as "less-loyal consumers have more access to information about competing products and services, including those available around the world" (p. 4). For the communications sector, wireless networking will be prolific. Hence, with the loss of landline revenue, telephone companies will diversify by offering internet and other telecommunication services in order to remain competitive. Reading and writing could give way to "image and/or oral forms of communication [that] will be more in line with the right-brained, intuitive thinking skills necessary for a true Knowledge Age" (p.4).

The education system will see pressure to meet the demands for future jobs requiring science, technology, and engineering competency. It will struggle to educate learners for this technology-based economy. Conversely, the issue of equal access to post-secondary education will leave the "undereducated poor" with grim prospects for jobs in a highly skilled workforce (Futurist, 1999, p. 5). Other predictions were that within two decades the advent of "electronic" learning would evolve where "dozens of subjects and the ability to download instructional information and interactive assignments in dozens of languages, at a cost of one penny per course" (p. 5).

As we enter into the second decade of the millennia a current review of the first half reveals many of these predictions mentioned above have come to fruition. Technology and the speed of communication are integral to the social, educational, economic, political, religious and environmental fabric of this world. Governments and corporations are embracing the potential of technology as a way to inform and invite public input. Education systems worldwide are experiencing pressures to change the way teaching and learning occur. Online and blended learning are harnessing the power of technology to engage and motivate learners. What the future holds for this globalized society is unknown. However, what is clear is that the world is dramatically different than the 20th century. Futurist David Houle (2012) posits the thought that society is only now beginning to realize that looking in the "rearview mirror" of the past may not be the best approach to understanding and living in the 21st century.

As schools travel the *brave new century*, pressure for change and accountability will continue to be exerted by the various sectors of society. School districts and their individual schools will be called upon to become more innovative in order to educate learners for a complex world. Leaders at all levels of the system will be challenged to

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foster cultures of innovation. At the school level, this significant endeavour will rest with the principal.

The role of principal is fraught with complexity. Principals are saddled with the responsibility of being the "visionary" who will lead the school community on a shared journey in order to provide a better future for all learners. Gary Marx (2006) in his book, *Future Focused Leadership* asserts that:

> At its best, education is majestic, touching every aspect of human endeavor. That pervasiveness means that educators who hope to prepare their schools and their students for the future must be connected to the complex, fast moving world around them. Pursuing this noble and never-ending goal will require all the visionary leadership we can muster. (p.11)

Aside from being the "big picture" thinker, the principal is charged with a myriad of other responsibilities. Hannon (2007) provides a brief glimpse into the principal's world,

> Educational leaders are beset on all sides by conflicting priorities. They are exhorted to raise standards and to foster creativity; to focus on learning, but also attend to the needs of the whole child; to be future focused, but also to ensure that the imperatives of today's demands are met. (p. 77)

However, Marx (2006) notes that regardless of these specific responsibilities, "true leaders need to see the bigger picture" if they are to lead the way into the future for their schools (p. 5). This means that the current education system will need to become more responsive to the dynamic changes thrust upon it by the various global forces. It will need schools to become innovative in order to meet the challenges of the 21st century. The principal must take the "lead" to initiate the journey toward innovation if schools are to prepare all learners for the future.

As change agents school principals are expected to be purveyors of new ideas or innovations. Hallinger's (2003) study found that it is a perceived expectation that principals keep abreast of new ideas, initiate or facilitate innovation. Saha and Biddle (2006) conducted a study to determine whether research knowledge "affects the thinking and actions of school principals" (p. 29). They conducted in-depth interviews with 120 elementary and secondary school principals from the United States and Australia. A part of the study examined whether "principals' notions about innovation would play a key part in their utilization of research knowledge" (p. 29). One of the questions explored principals' perceptions regarding whether they felt external pressure to be innovative. More than 50% of the participants reported strong or weak pressure to be innovative. A quarter of the sample reported that they did not feel any pressure. Similarly, less than a quarter of the participants responded that they felt pressure to avoid innovation. Interestingly, sources of pressure to innovate came mainly from other principals, followed by the school system, then the superintendent and lastly state and federal governments.

Another aspect that Saha and Biddle (2006) examined concerned the positive or negative views of principals regarding innovation. Results indicated that approximately 75% of the sample from both countries indicated that they felt mild to strong favourable views toward innovation. Only 5% of American principals and 0% Australian principals held negative views concerning innovation. Results of the study indicate that principals in general felt pressure to be innovative; however, they also viewed innovation as a positive way to bring about change to schools.

Change and organizational complexity

Change is a complex process that permeates all facets of society from politics

to life in general. The complexity of change can no longer be viewed as a linear process akin to the mechanistic assembly line production of Henry Ford's "Model T" automobile. Wheatley, (2005) believes that the complexity of the educational system cannot survive meaningful change using a mechanistic lever. Standardization in the current and future education systems will be difficult to sustain. Instead, the education system must be viewed from a non-linear or "complexity lens" if it is to be transformed into a relevant and sustainable enterprise for the future. Applying this theory to educational change, Mason (2008) states,

> what it might take to change a school's inertial momentum from an ethos of failure to learning excellence is massive and sustained intervention at every possible level (including even those factors that, from a knowledge of initial conditions, appear trivial) until the phenomenon of learning excellence emerges from this new set of interactions among these new factors and sustains itself autocatalytically. (p. 46)

Clearly, transformation of the education system will require a radical departure from paradigms that rely on past practices to improve schools. Clayton Christensen (2011) a noted scholar of the *disruptive theory of innovation* is quick to point out that the school system has improved throughout its history. However, he adds that, "society has moved the goalposts" and "asked schools to pursue the new metric of improvement from within the existing organization, which was designed to improve along the old performance metric" (p. 51).

Hence, change of any form to an education system is often met with skepticism as the history of failed reform efforts demonstrates. Much of the demands for change are delivered from external societal forces that have various political, economic, religious and technological motivations. The latest "call" for schools to embrace innovation in order to compete in the global economy may yet be another change that draws the ire of educators.

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Too often those closest to the change impact are the ones that have had little or no input as to how it will be accomplished. To meet this challenge will require complexity leadership and the urgency to embrace innovation as a key "driver" to system wide improvement.

Purpose of the study

The purpose of this mixed methods study was to investigate public school principals' perceptions of innovation in relation to individual and organizational characteristics. In addition, principals' perceptions of individual and organizational characteristics related to innovation were analyzed in order to identify if there were any differences between them. The theoretical underpinning of this study is based on Rogers' (2003) diffusion of innovations framework. For the quantitative phase of this study, I administered the *Communication Research Measures: Individual Innovative- ness (II) & Perceived Organizational Innovativeness Scale* (PORGI) developed by Hurt and Teigen (1977), Hurt and Cook (1977) and later used by McCroskey et al. (2006). Results from both instruments were then converted into one of the five *innovativeness categories* based on Rogers' (2003) innovativeness classifications of *innovator, early adopter, early majority, late majority and laggard or traditionalist* (See Table 1 below). These two measurement instruments were administered to a purposive sample of 47 school principals in a school district located in a suburb of Vancouver, British Columbia. The quantitative data collected from the two instruments was analyzed and findings used to design the qualitative phase for the interview protocol of the study. The purpose of this phase was to expand on principals' views and experiences toward their own and school's innovativeness characteristics. These qualitative data was collected through face-to-face interviews using a stratified purposive sample of 13 school principals.

Table 1: Adopter categories based on classification of innovativeness. Rogers (2003)

Innovators	Individuals in any social system will be the *innovators* (risk takers) who adopt an innovation.
Early adopters	Individuals who are viewed as opinion leaders or influencers. They are often quick to adopt an innovation and persuade the majority to adopt an innovation. They are often seen as "championing" an innovation.
Early majority	Individuals are more deliberate in their decision to adopt an innovation. They are not considered as influential as early adopters.
Late majority	Individuals are considered to be cautious or skeptical of adopting new innovations.
Laggards	Individuals who usually resist or reject an innovation.

Research questions

I used the following question to guide my mixed method research: *How are the perceptions of principals toward innovation related to individual and organizational characteristics?*

By examining school principals' perceptions toward innovation, I hope to facilitate and promote greater understanding among school principals, senior school personnel, researchers, policymakers and teachers of how the change process happens when a new idea, curriculum or other educational process is introduced into a school system. More importantly, it provides school principals with important insights into understanding the leadership characteristics required to promote and facilitate the adoption of innovations necessary to meet the challenges of 21st century teaching and learning.

The following questions guided the quantitative phase of my study:

1: What are public school principals' perceptions regarding their own individual innovativeness?

2: What are public school principals' perceptions regarding organizational innovativeness?

3: Is there a difference between individual perceptions toward innovation and organizational perceptions toward innovation?

4: Are differences in perceptions of public school principals regarding innovations related to organizational variables including school enrolment, financial resources, and professional development capacity?

5: Are differences in perceptions of public school principals regarding innovation related to demographic factors including age, gender, and professional development practices?

The purpose of the qualitative phase of the study was to further explore the views of principals' as they relate to fostering innovation in their schools. More specifically, the interview process investigated principals' beliefs and experiences toward the concept of innovation. The following question guided this phase of the study:

1. *What are principals' perceptions, views, and experiences toward innovation?*

Significance of research

> [T]he "need to innovate" is growing stronger as innovation comes closer to being the sole means to survive and prosper in highly competitive and globalised economies. - *Innovation in the Knowledge Economy: Implications for Education and Learning,* (OECD, (2004)

The demand to be innovative is not only becoming important in our competitive world economies but also within public education systems (Sahlberg, 2006). For economies to become competitive, students will need to be educated for a world that requires "knowledge, skills and attitudes necessary for civic success and the knowledge-based economy" (p. 259). Conversely, Sahlberg (2006) believes that school systems that focus on the standardization of teaching and learning may in fact be contrary to global

education reform thinking. Wagner (2012) adds that public education has long been "risk aversive" to reform and this has only been further exacerbated by the current punitive accountability system (p. 69). Hence, it is clear that the forces of globalization are exerting tremendous pressure to innovate on worldwide systems—from the economy to public education. Public education urgently needs leaders who will take up this cause and transform a system that embraces innovation as a way to educate all students for the present and the future. It will take bold action system wide to meet this challenge, however, the important work will take place at the "ground level" – at every school (Fullan, 2010; Hargreaves, 2009; OECD, 2008; Wagner, 2012). This is where the principal as leader must lead by championing innovation as the way to a relevant public education system for all students.

Senge (1998) posed this thought and question regarding public school reform, "A machine has no self-determined purpose. Its purpose is that conceived of by its designer(s). What is the purpose of the machine called school?" He concludes with this wish for schools, "we dedicate ourselves to allowing them to be what they would naturally become, which is human communities, not machines. Living beings who continually ask the questions: Why am I here? What is going on in my world? How might I and we best contribute?" (p. 58). The significance of this study rests with belief that if we are to create a public school system that aspires to be a living, breathing and thriving community of learners it will require educational leaders (principals) to lead the innovation process. They will need to be leaders who will help bring about the needed change to public school systems. More importantly, results from this study will be significant in providing school principals both current and prospective with a crucial understanding of the innovation process and how as leaders they can foster innovation within their schools and school

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districts. As well, this study has the capacity to inform superintendents and policymakers on how the diffusion of innovations (Rogers, 2003) process can be better understood to bring about meaningful change to the education system. Gilley, Dixon, and Gilley, (2008) suggest that, "a primary reason for an organization's inability to change and innovate lies with its leaders—the individuals who are responsible for leading change efforts—and their lack of skill or will, impeding successful implementation" (p. 155). The data gathered from this study will be integral in supporting the role of principal in their quest to embrace and lead innovation.

Organization of dissertation

Chapter one provides an introduction to the study with an emphasis on the challenges facing public school systems worldwide in regards to educating students for the 21st century. More importantly, it discusses the complexity of leadership and the notion of change as it relates to innovation and the school as an organization. Chapter two includes a review of relevant literature related to organizational change and capacity as well as the leadership required to manage change. It also includes a discussion of Rogers (2003) *diffusion of innovations* theoretical framework that underpins this study.

Chapter three describes the methodology and research design of the study. This includes a description of the mixed methods research design. In addition, the strength and weaknesses of mixed method research are discussed. It also discusses my reasons for partially replicating other research studies for the quantitative phase of this study. As well, the chapter describes the background of participants along with the data collection methods and analysis. Chapter four gathers and analyzes the results of collected data from the quantitative phase. Data are analyzed using Microsoft Office Excel Software. Findings are analyzed and differences are discussed in terms of principals' perceptions of

individual and organizational innovativeness. In addition, the analysis also examines whether there are any statistically significant differences uncovered within the variables tested.

Chapter five consists of the analysis of the qualitative phase findings gathered from interviews of principals who volunteered from the previous quantitative survey phase. Findings from this phase are used to further expand upon the quantitative results and provide a richer context of the innovation phenomena. Chapter six synthesizes the quantitative and qualitative phase findings in an effort to link the two distinct aspects of the mixed method study in a way that further supports the focus of the research.

Lastly, chapter seven concludes this study. Practical implications are discussed. As well, limitations of the study are discussed along with its potential contributions. Suggestions for further research are put forth from the findings of both phases. The final words are my thoughts regarding what I have discovered from this research process.

Chapter Two
Review of the Literature and Research

Introduction

"Toto, I have a feeling we're not in Kansas anymore." (spoken by Dorothy in the Wizard of Oz)

This often quoted famous line from the 1939 movie has become a cultural metaphor and is taken to mean that the world we once knew is unfamiliar. What we were once accustomed to has changed—there are "different rules, different customs, and few, if any familiar objects or activities" (oxSegfault, 2012). The new century is unlike past centuries. Presently, public education continues to struggle to break away from its past. Marshall McLuhan (1964) commented on the outdated fragmentary nature of school curriculum as separate subjects. He likened it to "the medieval trivium and quadrivium after the Renaissance". He adds, "[c]ontinued in their present patterns of fragmented unrelation, our school curricula will insure a citizenry unable to understand the cybernated world in which they live" (p. 460).

Reinventing schools will require a new way of thinking about the purpose of this institution. Innovation will be integral to schools being able to not only survive, but also thrive in the "new world". It is a world that is complex and requires a different approach to understanding its complexities. Thus, a different paradigm of leadership will be vital for current and future school leaders. Complexity leadership theory offers an approach "that focuses on enabling the learning, creative, and adaptive capacity of complex adaptive systems (CAS) within a context of knowledge-producing organizations" (Uhl-Bien, Marion, & McKelvey et al., 2007, p. 298).

Literature Review

This section presents a review of the literature related to public school principals' perceptions of leading innovation. Moreover, it seeks to analyze the innovation aspects of: 1) individual innovativeness, and 2) organizational innovativeness from the perceptions of public school principals. Importantly, this study can inform principals, district leaders, superintendents, and policymakers about potential strategies and processes for developing innovation in schools.

To define terms and present the research on relevant themes, the literature review will be organized as follows: 1) innovation, 2) organizational change, 3) leadership and managing change, and 4) diffusion of innovations.

The innovation phenomenon

Innovation is considered to be important to the social and economic growth for the industrialized and developing countries of our world (Fagerberg, Martin & Andersen, 2013). These scholars argue that most innovation research focuses on "how society can derive the greatest benefit from innovation and what needs to be done to achieve this" (p. 1). Conversely, they believe, it is important to study innovation processes from the perspective of how society, and the organizations within them, interact with the broader social, institutional, and political constructs. Innovation is important to public school education and more specifically the schools that comprise its system. Throughout the history of public schooling calls for reform have been a familiar lament broadcast from the various sectors of society. The 2006 OECD study, *21st Century Learning: Research, Innovation and Policy* is clear in linking educational reform and the notion of innovation as critical to bringing about necessary change. It states that, "if a school is to change so that

its approach to learning is significantly different from what went before it will often need innovation" (p. 7).

Since the advent of public schooling each successive generation has bemoaned the need for schools to better educate its students to take their rightful place in society. From ancient philosophers to present day scholars, the importance of an educated citizenry has been touted as paramount to the advancement of civilization. Given that our current knowledge and technology-based society continues to accelerate the speed in which change occurs, it is imperative that public schools keep pace and prepare students for a vastly different future. As previously stated, reform and the concept of innovation are integral to bringing about change in the school context. Critical to understanding the notion of innovation, and the ongoing debate of its definition by innovation scholars, a brief discussion and a broad definition may be appropriate for clarification purposes.

What is innovation?

According to Adair (2009), *innovation* is the introduction of new ideas, procedures, or products. However, he adds that the term "new" is relative in that it can be new to some and familiar to others. Innovation, as defined by Rogers (2003) "is an idea, practice, or object that is perceived as new by an individual or other unit of adoptions" (p. 45). His emphasis on "perceived as new" he stated had little to do with whether the innovation was actually "new" in the objective sense and more to do with when it was first used or discovered by the user. Conversely, Rogers (2003) asserts that innovations can be perceived as harmful or undesirable to individuals and social systems. He uses the example of how an innovation may be seen as detrimental because of cultural values that view it as contrary to their religious beliefs. As with any change effort, the introduction of

an innovation can be seen as positive or negative by its social system, which in turn can cause an innovation to be adopted or rejected.

Many of the current innovation theories evolved from Schumpeter's (1934) creative accumulation model which consisted of five basic types of innovation. These five types of innovation were defined as: 1) product innovation – a new product or service is added to existing system, 2) process innovation – new technology for existing product, 3) organizational innovations – economies of scope and scale involving changes to organization, 4) market innovation – changes to market structure through globalization of trade, and 5) input innovation – a new raw material or good is introduced into the economic system (Sengupta, 2014, p.64,). From an education perspective, innovation can be viewed as the creation and diffusion of new educational tools, technologies, teaching practices, and organizational structures, (OECD, 2016). Organizational structures in education and organizational innovations as defined by Schumpeter (1934) are regarded as changes to business/education practices, workplace organization or external relations (OECD, 2016).

Christensen, Horn and Johnson (2011) in their ground-breaking book, *Disrupting Class: How Disruptive Innovation Will Change the Way the World Learns,* champion the theory of "disruptive innovation" as a way to improve the education system. Disruptive innovation is something that does not currently exist within the infrastructure of a school. An example would be students being able to take an online course because their school is not able to offer it due to the school's limited course offerings. This is not seen as replacing teacher instruction but rather providing something where nothing previously existed. In addition, these new technologies are able to adjust to a student's learning pace in a "personalized" manner. Christensen et al. (2011) believe that innovation must be implemented "disruptively" to transform an organization. However, simply knowing the

broad definition of innovation is but one aspect of understanding this phenomenon, it is also equally important to understand how innovation occurs.

Hence, it is important that leaders understand the concept of innovation. They must be able to understand that innovation is change that is deliberate and new and is "aimed at accomplishing the goals of the organization more effectively" (Adair, 2009, p.346). Adair (2009) adds, a leader must be able to manage the change process as this is often where resistance can occur, particularly if the innovation requires a major change to an organization. This he states, is where people can feel challenged or threatened by the change and strongly resist it. Thus, Euchner (2013) emphasizes, that it is important for a leader to learn change management in order to foster the change and innovation process. Public education, like many institutions, is continually exposed to new ideas in an effort to bring about change for the purposes of enacting system wide improvement.

How does innovation occur?

Much like the scholarly debate to define innovation, a similar argument can be made for explaining how innovation occurs in organizations. There are many differing views offered by researchers regarding how the innovation process occurs as there are accompanying theories. Van de Ven and Angle (2000), of the Minnesota Research Innovation Program, argue that the innovation process is often viewed by scholars and managers alike from a sequential developmental stage perspective (i.e. idea invention, design, testing, implementation and diffusion). They add, that these stage models often lack empirical validity in terms of the innovation process being tracked over time. Instead, they offer an innovation process theory that examines "how and why innovations actually emerge, develop, grow, or terminate over time" (p. 4). Importantly, they believe that having

creative ideas and inventions are just one part of the innovation process and that it requires managers [leaders] to have the skill and talent to implement these good ideas.

Utterback (1971) posited a process of innovation theory that consisted of three overlapping phases or stages. The phases were defined as: 1) idea generation, 2) problem-solving, and 3) implementation, with the possibility of diffusion (p. 78). He viewed the first two phases as the process that developed the invention and the third stage results in the innovation being implemented and diffused within the organization or marketplace. Desouza et al. (2009) describe a five stage innovation process consisting of: 1) idea generation and mobilization, 2) screening and advocacy, 3) experimentation, 4) commercialization, and 5) diffusion and implementation. The authors believe that too often innovation in organizations fail due to a lack of a formal innovation process. They add that organizations that have repeated success with the innovation process rely on a well-defined framework that critically evaluates and screens ideas.

Other researchers have examined how innovation occurs from the perspective of the adoption of an innovation. The adoption of an innovation occurs through a decision making process that ultimately determines whether an organization will adopt an innovation based on a sequential stage process (Rogers, 2003). Rogers' (2003) adoption of innovations model described a five-stage process that individuals and organizations traverse in order to decide whether to adopt an innovation. These stages consisted of: 1) awareness, 2) interest, 3) evaluation, 4) trial, and 5) adoption of an innovation. He defined these stages as the *innovation-decision process.* This is when an individual or decision making unit "passes from first knowledge of an innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision" (p. 356).

Hall, Wallace, and Dorsett (1973) developed a Concerns Based Adoption Model (CBAM) for examining innovation in schools. Hall and Hord (1987) used the CBAM to observe the adoption and implementation phases of educational innovations in public schools and higher education institutions. They believed that teachers and professors passed through seven developmental stages as they became more involved and skilled in using a new program or instructional practice process. The seven stages of concern consisted of: 1) unconcerned, 2) informational, 3) personal, 4) management, 5) consequence, 6) collaboration, and 7) refocusing.

Looking across these studies, the innovation process seems to occur through general decision-making stages that include the generation of an idea, its development, and finally its implementation and diffusion. The adoption phase is part of the innovation process and examines the stages of how an innovation is accepted and eventually spread throughout an organization. However, some innovation process theories believe it is important to track innovations over time and that it requires a skillful leader to put the innovation into motion.

The importance of innovation in schools

The imperative of innovation in education cannot be understated. The seismic changes in our globalized world have compelled public education to reexamine the way that it educates students for the future, (Zhao, 2010). This urgency will require schools to embrace innovation as a critical process for preparing learners to contribute to the economic, social, and political growth and well-being of their societies (OECD, 2016). Innovation in schools is not a new phenomenon as it has seen a litany of instructional practices, organizational paradigms, technologies, and research theories scattered throughout its history.

As Zhao (2010) points out, the "shrinking" of our globalized society has brought an increasingly competitive workforce that demands higher skills, knowledge, and abilities. He adds that developed countries are competing with developing nations such as China and India for highly skilled workers, such as computer programmers and engineers, for a fraction of the cost to employers. This, he believes, is the challenge that schools are faced with: preparing students with those sought after skills that justify a higher cost to employers in our developed nations.

The 2016 OECD report, *Innovating for Education and Educating for Innovation*, concurs with Zhao's (2010) study in regards to not only the importance of innovation in education but also for the future well-being of society in general. The authors of this study posit that indeed innovation in education matters and offer four reasons for its importance. They assert that fostering innovation in schools can lead to improvement of teaching practices, as well as promoting processes such as personalized learning which in turn can create a new organizational paradigm. Secondly, they assert that education in most countries is viewed as enhancing equality and equity, which they believe schools could reinforce through the innovation process. In addition, they suggest schools, as a public entity, face pressure to be productive and efficient. Thus, by becoming more innovative schools can address these public pressures. Lastly, they believe that innovation in schools is important in order to remain relevant to societal needs. The authors assert that, teaching, learning, and organizational structures of schools must strive to foster the skills needed by students for innovation.

The value of innovation?

Innovation studies have sought to examine the impact a new product or process has on an individual or an organization as part of the change process. When one considers

the term "innovation" it immediately brings to mind the thought of something new and good. Soete (2013) asks the question, is innovation always good? He posits that "at the broader societal level, innovation does not always represent a Schumpeterian process of 'creative destruction' renewing society's dynamics and hence leading to higher levels of economic development and welfare – destroying a few incumbents to the benefit of many newcomers" (p.134). Instead, he adds, it can have the opposite effect of what he calls "destructive creation" where it benefits a few at the expense of the many members within the social system. In addition, he believes that the main reason for this "destructive creation" is the widespread diffusion of Information and Communication Technologies (ICT) which has created a fragmented service delivery. He admits that these new technologies have benefited productivity and increased welfare-growth and allowed consumers to have choices not previously available to them, such as cheap flights. Yet, it has also spawned a vast array of service delivery that demands selective choices such as network services. This "cherry picking", as he defines it, has led to abandonment of full service delivery for more profitable gains that in turn has resulted in lower quality or discontinuation of services. In the end, he laments that this universal delivery of network services has made it "expensive to be poor" (p. 135).

Similarly, Rogers, (2003) points out that all research should be critically examined to expose the blind spots that are synonymous with its theoretical constructs. To illustrate his point, in regards to criticisms of diffusion of innovations research, he discusses four potential blind spots, *pro-innovation bias:* the innovation is spread rapidly and not re-invented or rejected, *individual blame bias:* the individual is held responsible for problems associated with the diffusion of an innovation, rather than the system which he/she is a part, *recall problem:* where individuals are asked to recall the time they adopted an

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innovation, which can lead to inaccuracies if the time period has been significant, and *the issue of equality:* where socio-economic gaps can widen between members of a social system due to the result of the diffusion of an innovation.

Organizational change

Civilization is based on the premise of progress through change. Each successive era attempted to advance its society from that which came before. Change is inevitable whether good or bad. Our postmodern world has witnessed unprecedented change which is the new "normal". The speed of change and its accompanying technological advances continue to change the way we live. The explosion of information is well beyond what any human is capable of processing. The rapidity of change has organizations in every sector of society scrambling to keep pace.

Organizational change is a broadly defined phenomenon with a variety of theoretical perspectives. For example, change can be viewed as being *episodic* or *continuous*, *planned* or *unplanned*, *temporal,* or *technological* (Weick & Quinn, 1999). Change can be examined through the lens of the actors or change agents within an organization or from the broader perspective that entails various internal (for example, established hierarchies, and internal politics) and external forces (public legitimation of organizational activity), (Alvesson & Sveningsson, 2016 and Hannon & Freeman, 1989). Institutional and evolutionary theorists view change from the perspective of organizations that have firmly established routines and structures and thus are more inclined to have incremental rather than radical change permeate their organizations (Lam, 2005, and Nelson & Winter, 2002).

Conversely, complexity theorists view organizational change as a more "organic" or non-linear process. Burnes (2005) defines complexity theory "as an umbrella term for

a number of theories, ideas and research programmes that are derived from scientific disciplines such as meteorology, biology, physics, chemistry and mathematics" (p. 73). He adds that academics and practitioners are increasingly using these theoretical frameworks "as a way to understand and change organizations" (p. 73). Organizations are seen as dynamic systems that are in a state of unpredictability. They exist in a precarious balance between chaos and stability.

Organizational change theories offer many differing viewpoints regarding the change process. Poole (2004) points out, that this multifaceted phenomenon comprised of these partial views lends itself to providing a broader understanding of organizational change. Change in most organizations usually reinforces or reforms its existing archetypical structures. This is seen as incremental change or modifications that often have a short term effect on the organization (Lam, 2005). Innovation, although an important part of change, involves the introduction of a new technology/product or process that has the potential to radically alter the existing structure of an organization (Greenwood & Hinings,1996).

Organizational impetus for change

The pace of change has necessitated that organizations be nimble and adaptable in order to remain competitive and profitable in the global economy. However, simply enacting change for change sake has not guaranteed success for organizations. In fact, the complexity of organizational change has often led to mixed results. Wheatley (2005) points out that in surveys conducted in the 1990s "CEOs reported that up to 75 percent of their organizational change efforts did not yield the promised results" (p. 83).

As discussed previously, organizational change occurs because of internal or external pressures. In fact, organizations can change due to both internal and external

pressures being exerted simultaneously. Alvesson and Sveningsson, (2016), suggest that often organizational change is a result of external demands. They add that these external demands usually come from political, technological, cultural, demographic, economic, and market forces (p. 16). These external forces can be seen as being large scale or often referred to as global pressures for organizations to change. For example, the political forces of deregulating international trade agreements on goods and services expose a nation's economy to global markets. Similarly, advances in technologies affect organizations in a variety of ways. These developments allow for changes in work practices such as being able to work from home or distance work. Technology also reduces the need to physically go to the bank to complete transactions that can now be completed electronically, thus reducing the need for bank offices (Alvesson & Sveningsson, 2016, and Dawson, 2003).

Internal pressures can also be influenced by a variety of factors. Again, the introduction of new technology can be a factor that contributes to changing the structure of operations within an organization (Alvesson & Sveningsson, 2016). Former tasks are changed by the new technology, or new personnel are brought in to operate or manage the technology. This in turn can also lead to pressure being exerted on changing the administrative structures of the organization. As well, change can happen when rapid growth within an organization requires reorganizing of its infrastructure (Dawson, 2003; Hage, 1999; Poole, 2004).

Making Change

Regardless of whether the forces of change are external, internal, or a combination of both, it is important to note that change is a complex process for organizations to initiate. There are a multitude of factors for an organization to consider before embarking on a

journey of change. Foremost is understanding the scale of change that an organization is being asked to undertake. Large scale or radical change involves a complete transformation of an organization's structures and processes. It introduces new technologies or processes that require organizational members to learn and work in completely different ways (Christensen & Horn, 2010; Cote & Mayhew, 2014; Greenwood & Hinings,1996; Wedell, 2009). This type of change is more difficult to initiate due to the radical departure from an organization's previous structures and processes. Change of this nature also takes a longer period of time to initiate, implement and sustain. Conversely, most organizations with established structures and routines are prone to small-scale change. Eventually attempts to introduce change to the organization lead to a "search for new practices in the neighborhood of an organization's existing practices, that is, a 'local search,' and thus organizational routines and skills change only slowly and incrementally" (Lam, 2005, p. 134).

Much of the literature on organizational change is presented from a macro-perspective which examines the totality of a system. Often overlooked is what Poole (2004) cites as the "the least common denominators of change and innovation theory—people, space, and time" (p. 16). These factors he asserts are critical to understanding how the social enterprise plays an important role in terms of "human agency in change and innovation" (p. 17). Woodman and Dewett (2004) add, that unless people within an organization begin to believe, think, or behave differently there is little hope for change to occur. Their belief is that individual and organizational behaviour are interrelated in that "the behavior of a person at any point in time is a complex mixture of person and situation" (p. 32). Hence, regardless of the theoretical perspective, the importance of human agency is a key contributing factor to organizational change and innovation.

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Initiating and sustaining organizational change is an immensely complex endeavour that requires a network of human interaction to be successful. Often this task is difficult due to the diversity of these human networks. Organizational scholars view this process as building organizational capacity for change (OCC). Judge (2011), in his book, *Building Organizational Capacity for Change: The Strategic Leader's New Mandate*, defines organizational capacity for change "as the overall capability of an organization to either effectively prepare for or respond to an increasingly unpredictable and volatile environmental context" (Organizational Capacity for Change Defined). He believes that a leader must be cognizant of the three multi-dimensional capability components of, (a) human skill sets and resources, (b) formal systems and procedures, and (c) organizational culture, values, and norms in order to facilitate the change process within an organization.

Noted organizational scholar, John Kotter (2008), in his book "*a sense of urgency",* discusses how organizations often come at the change process from a purely "intellectual" or "mind" approach. He asserts that to build capacity for change the way to affect behaviour is through the "heart not the head". Kotter adds, that "feelings are more influential than thoughts" when dealing with change. Additionally, he states that, "this is a perspective that is rarely acknowledged in the classroom or the boardroom" (p. 45).

Kotter (2008) suggests two strategies that can help build capacity for change: 1) giving people important facts: Follow this with "emotionally compelling experiences involving other people, [and] information". "Walk the talk" by consistent behaviour and actions. Look at crises as both a threat and opportunity to create disequilibrium in the organization. Confront the "No Nos", those people who constantly reject new ideas, 2) winning hearts and minds: Present a "logical case that is part of a heart-engaging experience". Communicate change that is emotionally compelling, that excites and

arouses determination (pp. 57-59). It becomes evident from Kotter's suggestions that in order to build capacity for change a leader needs to nurture the relationships within the organization. The relational element is key for a leader to understand if they are to introduce a compelling reason for change.

What is clear is that a systemic approach is needed to facilitate the change process. This involves a collaborative effort of the organizational collective. The power of the social infrastructure and the intrinsic motivation of its members are crucial to enacting change. Wenger, McDermott, and Snyder (2002) in their book, *Cultivating communities of practice: a guide to managing knowledge*, present the communities of practice theory as a way of building organizational capacity for change. They define a community of practice as "groups of people who share a concern, set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis" (p.9). This is where the formal leader must seek the opportunities to invite, inspire, and compel the emotions of the collective toward embracing change.

From an educational perspective, Fullan, in his book, *Change Leader,* (2011) asserts that, "you can't make people change…the only thing that works is people's intrinsic motivation, and you have to get at this indirectly" (p. 51). He expands on this point by emphasizing the need to tap into individual's intrinsic motivation to change by allowing them to experience the reality of it. He adds, "it is the actual experience of being more effective that spurs them to repeat and build on the behavior" (p.52). Thus, he believes, the principal's role as a lead learner is to create the conditions necessary to develop the collective capacity of a school working together to achieve success.

Cote and Mayhew (2014) believe that a systems thinking approach holds potential for leaders to understand and facilitate organizational change. Their theoretical approach to organizational change is based on organizational development pioneers Kurt Lewin and

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Edgar Schein. Building on this foundation, organizational theorists then developed a general systems theory, that sees, "organizational behavior [as] determined by a complex array of forces and pressure operating within a delicate equilibrium vulnerable even to a small shift in tension between variables (Smith & Graetz, 2011, p. 125). Cote and Mayhew (2014) assert that successful change is dependent upon a leader "creating the structures, strategies, and organizational conditions necessary to accomplish organizational change objectives" (p. 284). They believe that a systems thinking approach with an emphasis on analyzing the events, patterns, and structures that occur in an organization provides a holistic understanding for potential change. This holistic view allows leaders to: 1) see events as single occurrences and thus be able to react quickly, 2) recognize the pattern from the events, which allows for anticipating, planning and preparing for change over a longer period of time, and 3) by identifying structures by asking why patterns occur, which then leads to designing and creating new patterns for sustained change (p. 284).

Across these theories, there are many approaches that organizations, and more specifically the leaders within them, may use to facilitate the change process. Conversely, organizational change initiatives can fail to be implemented due to both internal and external actions exhibited by policymakers, and leaders within the different organizational levels. Research literature abounds with numerous studies of failed organizational change (Fullan, 2001, 2011, 2014; Gardner, 2006; Greenwood & Hinings, 1996; Judge, 2011; Kotter, 2008; Poole, Dooley & Holmes, 2004).

Resistance to Change

Dawson (2003) states that one of the main reasons that people resist organizational change is that it disrupts their current work environment and creates "a climate of uncertainty and ambiguity" (p. 19). He adds, that most reasons for resistance

can be attributed to five factors, either individual or in combination. These factors are, 1) substantive change in job requirements (new skills needed), 2) reduction to economic security (employment threat), 3) psychological threat (perceived or real), 4) new work arrangements, and 5) lowering of status (redefinition of authority relationships) (p. 19). Kotter (2008) adds that often resistance is due to people not having a compelling reason as to why change is needed. This he states is the reason that most organizations are content to remain in a complacent state. Thus, he believes it is incumbent on the formal leader to create a true sense of urgency where opportunities and hazards are viewed as important by members of an organization.

Further, research studies on the effect of change on people have found that change causes a sense of loss and mistrust and therefore can evoke strong resistance (Alvesson & Sveningsson, 2016; Cote & Mayhew, 2014, Dawson, 2003, Fullan, 2008). As Cote and Mayhew (2014) stress, "when people are resisting change they are making a statement about who they are and what they stand for" (p. 292). They offer suggestions on how resistance to change can be reduced in organizations. For example, resistance can be reduced by scaling down the size of the change by introducing it in manageable phases. As well, accepting change with the proviso that it is on a "trial" basis with the opportunity to revert back to previous structures if it is not successful. Further by taking out the "winners and losers" factor also lessens resistance. Lastly, providing people with support and training for the new skills required can also reduce resistance to change.

Similarly, organizational scholars have found important change processes that can also help leaders with new initiatives being introduced to organization members. A key factor is involving members in the planning of the change in an open participatory fashion. As well, regularly communicating important information pertaining to the impending

change in order to reduce some of the uncertainty surrounding it. In addition, the leader can foster member commitment by welcoming risk taking and experimentation with aspects of the change process (Alvesson, & Sveningsson, 2016; Andriopoulos, & Dawson 2009; Burnes, 2005; Cosner, 2009; Cote & Mayhew, 2014).

Thus, it can be argued that fostering organizational change is more about getting people to be a part of the change process than it is about the financial, technological or political aspects. The emphasis here is that the human element is of greater importance in terms of motivation for understanding and potentially accepting change. This requires a leader to understand the human need to collaborate, interact, and foster meaningful relationships in order to embrace the change process.

Innovation theory and understanding organizational change

Research literature has examined organizational change and innovation through a symbiotic lens. According to Euchner (2013) innovation is inextricably linked to organizational change. He posits, that innovation is something that is introduced as "new" to organizations and by accepting "something new requires some level of change" (p. 10). Similarly, Hare (1978) views innovation as "a purposeful change of some significance but with the further implication that the change is a change which we value to some extent" (p. 69). Further, Damanpour and Aravind, (2012) view innovation as a sub-process of organizational change. They suggest that the link between the two phenomena usually occurs when an innovation is adopted by an organization. This, they add, is the result of old behaviours, prior to the introduction of an innovation, being changed to new behaviours due to the adoption of the innovation. It must also be understood that innovations do bring change but not all change is innovation (Adair, 2007 and Pratte, 1974).

Thus, it becomes evident that the innovation phenomenon has broad implications for schools and their systems at large in regards to reformation efforts. It is overwhelmingly clear that before any form of innovation is introduced into schools or school districts that stakeholders from policymakers to students are made aware of, or become an integral part of, the impending change process. Wedell (2009) points out that most large scale change efforts falter or fail due to the lack of consideration by policymakers of the wider environment that extends beyond the school walls when thinking of educational change. At the local level, and specifically those in formal leadership roles at school and district levels, having knowledge of innovation and change processes is essential to meeting the challenges for preparing students for the future. More importantly, because change in any organization or society is a human endeavour, it requires what Fullan (2007) calls a "reculturing of people". Wedell (2009) defines reculturing, as the process of changing or adjusting established professional and sometimes personal behaviours and beliefs in terms of their roles and responsibilities. As Fullan (2007), Hargreaves (2009), Wedell, (2009), and many other scholars of educational change point out, if we want people to be part of this process then it is imperative to understand how they actually experience it.

Leadership and managing change

The frenetic pace of our world continues to bombard us with the urgency to innovate if we are to remain relevant and competitive in the global economy (Zahra, & Das, 1993). This of course means that some form of change is needed to accomplish these ends. It also means that the various sectors that comprise society must heed the call for innovation and change. Through this cacophony and clutter, organizations of various stripes are asked to meet this challenge. Yet, an organization does not simply

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become innovative on a whim. Harnessing the diverse collective of an organization and guiding this coalition through the innovation journey requires leadership.

Leadership is integral to the innovation process. Hunter and Cushenbery (2011) suggest that leaders have both direct and indirect influence on fostering innovation in organizations. They are quick to add that leaders are often faced with the complex task of overcoming the inertial forces of the "well worn path" in an effort to facilitate innovation toward a new route. For example, an indirect influence would have a leader nurturing an environment of risk-taking that potentially has other organizational members willing to engage in similar activities. A direct influence exhibited by a leader could entail such activities as allocating resources for innovative exploration.

Due to the complexity of organizations and leading change and innovation, Cote and Mayhew (2014) suggest that excellent leaders of innovation are individuals who are able to fluidly adjust to the contexts of their organizations (situational leadership). They offer four styles that they believe "enhances organizational climate" thus increasing performance. Two of the styles have a short-term benefit to organizational performance. The *commanding* style is an authoritative approach which is usually used in a crisis but has a diminishing effect on performance. A *pacesetting* style asks organizational members to do more but is prone to be challenging if overused, and it diminishes performance as well. A *visionary* style invites members to "come along" for the innovation journey—a style that works best for leaders during the change process and raises performance better than the other styles. The final style, *affiliative,* is one that sees leaders focused on building relationships in order to create harmony which also increases the likelihood of participation in innovation efforts.

From the educational leader perspective, transformational leadership has been an influential model (Berkovich, 2016; Bush, 2014; Hallinger, 2003). The model was based on James MacGregor Burns (1978) transforming leadership theory of the "leader-follower" relationship in pursuit of a common end or goal. Burns (1978) believed that this form of leadership ultimately becomes a moral union between leader and followers. Importantly, he saw it as a way for leaders to inspire followers by "challenging them to be innovative problem solvers, and developing followers' leadership capacity via coaching, mentoring, and provision of both challenge and support" (Bass & Riggio, 2006, p. 4). Bernard Bass (1985) then extended Burns' theory from transforming leadership to transformational leadership for business leaders. Bass' theory was organizationally based "where authority, management and leadership blend" (Couto, 1995, p. 106). Educational scholars soon saw the potential for Bass' theory to be applied to the many challenges that school principals face. Current education trends continue to highlight the need for transformational leadership as an important process for fostering innovation to better educate students for the 21st century (Berkovich, 2016).

Recently, scholars of organizational change have begun to examine the leadership phenomenon from an "organic" or holistic theoretical perspective. More specifically, researchers are examining the field of complexity science and its application to change, innovation and leadership. Complexity science has its roots based in general systems theory along with the characteristics and principles of living systems such as self-renewal and self-organization (Dooley, 2004).

Nicholas Clarke (2013), a complexity leadership scholar, posits that, "the term complexity captures the greater levels of uncertainty, ambiguity, interdependencies and interrelatedness that now characterize the environments in which organizations operate" (p. 135). This he suggests is due to the instability of society as a result of rapid changes

in the social, economic and technology areas. These conditions, he adds, have put considerable pressure on the traditional leadership models. He asserts that, "leadership is the property of relationships, no longer residing in one individual. Instead of human capital, the focus in leadership development shifts towards the development of social capital" (p. 136). As Hargreaves and Fullan (2012) point out, "groups, teams, and communities are far more powerful than individuals when it comes to developing human capital" (p. 3).

The theoretical underpinnings of complexity leadership are indeed complex, yet at its most fundamental level it can be understood as "shared leadership" (Pearce & Conger, 2003). Pearce and Conger (2003), define shared leadership as, "a dynamic, interactive influence process among individuals in groups for which the objective is to lead one another to the achievement of group or organizational goals or both" (p. 282). Uhl-Bien, Marion and McKelvey (2007) state that complexity leadership theory provides a different framework for understanding leadership as a complex interrelated and "interactive dynamic from which adaptive outcomes" such as, "learning, innovation, and adaptability emerge" (p. 298). Thus, complexity leadership theory holds promise as a new paradigm for fostering organizational innovation for a vastly different society.

Much scholarly debate has ensued over the decades regarding leadership theory and its relation to fostering innovation and change in organizations. As with any theoretical construct each has its strengths and limitations which have been built upon and advanced from the work of previous scholars.

Rost (1997) laments that much of today's leadership paradigms are based on the 20th century industrial age. He asserts that the industrial paradigm has been the dominant leadership theory found in most of the 20th century research literature. In fact, he states, that because of the dearth of leadership research during the 20th Century, James

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MacGregor Burns was prompted to publish his seminal book, *Leadership* in 1978. However, Rost (1997) was also critical of Burns' book as he felt that he largely ignored the "wisdom" of the previous two decades of leadership research and created his own transformational change paradigm. He adds that even though Burns' (1978) transformational leadership theory offered some "new" ideas, it was basically an industrial age model where one person (formal leader) influences the followers of an organization to achieve his/her vision. Rost (1997) argues that this longstanding leadership paradigm of the heroic/superhero leader (Fonseca, 2001 et al.; Fullan, 2001, 2014; Uhl-Bien & Marion, 2009; Uhl-Bien, Marion, & McKelvey, 2007) is not a good fit for the complexities of the postindustrial age. Instead, he posits a leadership model based on relationships where formal leaders and followers (which he defines as "collaborators") are bound in a symbiotic relationship where they influence one another in creating change and innovation.

Similarly, Berkovich (2016), states that recent management studies have taken to criticising transformational leadership theory, while educational leadership literature continues to embrace this theory. As an example, he uses Van Knippenberg and Sitken's, (2013) research that claims that there is a "lack of a clear conceptual definition of transformational leadership" (p. 610), which leads to unclear methods for measuring transformational leadership effectiveness in empirical studies. He adds that the common measurement instrument used in general management (and in education research), the *Multifactor Leadership Questionnaire (MLQ)*, takes several dimensions of transformational leadership and sums it up as an overall transformational leadership index that usually results in high intercorrelations. An example of this was a study led by Hsai and Chang (2011), who studied principals and teachers in Taiwan using the MLQ to measure five dimensions of transformational leadership. Results indicated high intercorrelations of

above .75 between the five dimensions (p. 610). However, Berkovich notes that subsequent studies replicating this multi-dimension factor analysis were unable to replicate the results.

Despite the call from some critics to abandon transformational leadership theory research, Berkovich (2016) argues, particularly for the education field, that it may be hasty to do so. He points out that all theoretical constructs have limitations that will always be a topic of debate among scholars. However, with constructive discussion and modifications to analysis instruments transformational leadership theory can become more effective in its application. More importantly, educational leadership research does "not attempt to meaningfully fit it to other theories in the field of educational administration, thereby missing valuable contributions of this theory to the understanding of education as a unique arena" (p. 617).

Regardless of the shortcomings of transformational leadership theory much of the leadership research literature has focused on the individual in relation to change and innovation. Current theoretical research has begun to present different leadership models such as shared, distributed, and adaptive leadership as new ways of orchestrating change and innovation in organizations. Despite variations between these leadership theories, there is a commonality of collaborative decision making as the underlying framework for enacting change and innovation within an organization. According to Ford and Ford (2012), "Complexity in the leadership of change resulting from multiple leadership forms is compounded by the realization that no single approach to change, set of leader behaviors, or pattern of change activities is clearly dominant across leadership forms or change situations" (p. 27). Thus, with a diverse "flavour" of theoretical choices it is difficult to determine which leadership model is best suited for the organizational complexities that arise when initiating, implementing, and sustaining change and innovation.

Yet, complexity leadership theory holds promise as an overarching framework for understanding how organizational change and innovation occurs. Uhl-Bien, Marion, and McKelvey (2007), assert that leadership theories are outdated and urgently need to move from the industrial age to the knowledge era. These researchers propose a conceptual framework that integrates the leadership roles of adaptive leadership, administrative leadership, and enabling leadership, "that reflect[s] a dynamic relationship between the bureaucratic, administrative functions of the organization and the emergent, informal dynamics of complex adaptive systems (CAS)" (p. 298). They add that leadership should not be viewed solely as a position of authority, "but also as an emergent, interactive dynamic—a complex interplay from which a collective impetus for action and change emerges when heterogeneous agents interact in networks in ways that produce new patterns of behavior or new modes of operating" (p. 299).

Accordingly, the application of complexity leadership within the school or school district context could provide an effective process for understanding change and innovation. More importantly, fostering an understanding of this theory at the school leader (principal) level as well as school district leader level could provide the knowledge necessary to manage and facilitate the change and innovation process in a more comprehensive manner. Critical to this endeavour is understanding the nature of the dynamics of a social system and how the interrelatedness, interactions and networks of individuals that comprise an organization experience, react, and change due to the innovation process (Clarke, 2013; Burnes, 2005; Fonseca, 2001; Lichtenstein, & Plowman, 2009 et al.; Uhl-Bien, Marion and McKelvey 2007). As Rost (1997) exhorts, "It is time to move from an understanding of leadership centered on the individual to one centered on relationship" (p.16).

Theoretical framework

Diffusion of innovations

Like any significant change, introducing and implementing innovation into an organization, is a complex non-linear process. From its inception to adoption, innovation takes considerable time (Rogers, 2003). Rogers conducted extensive research on the innovation adoption process. He found that the problem for individuals and organizations was finding ways to "speed up the rate of diffusion of an innovation" (p. 29). Rogers described four main elements in the diffusion of innovations: 1) the innovation, 2) communication channels, 3) time, and 4) the social system. He found that these four elements were prevalent in any diffusion research (p. 44).

Rogers (2003) and other diffusion scholars studied important questions related to innovation adoption. They are: 1) how early adopters differ from later adopters of innovation, 2) how the perceived attributes of an innovation affect its rate of adoption, and 3) why diffusion "takes off" once interpersonal networks become activated and the critical mass of adopters reaches a 10 to 20 percent adoption (p. 441).

Rogers (2003) viewed diffusion as a process "in which an innovation is communicated through certain channels over time among the members of a social system" (p. 36). He stressed that communication is important in that it "is a process in which participants create and share information with one another in order to reach a mutual understanding". More importantly, it's about communicating "new ideas" (p. 36). The communication aspect of diffusion is what Rogers emphasized as the "essence" of the innovation process.

A *communication channel* is the means by which messages get from one individual to another. The nature of the information exchange relationship between a pair of individuals determines the conditions under which a source will or will not transmit the innovation to the receiver and the effect of such a transfer. (p. 57)

Organizations, such as schools, are social systems made up of intricate networks of individuals engaged in daily interactions. It is this complex web of social interaction that can decide the fate of diffusion of innovations.

The third element of *time*, Rogers (2003) considered to be the strength of the diffusion process. Its importance is correlated to three time-dimension factors: 1) when an individual initially knows of the innovation through to whether it is adopted or rejected, 2) individual innovativeness or other unit of adoption relative to whether the innovation is adopted early or late in the process in comparison to others in the organization's system, and 3) the rate of an innovation's adoption correlated to the number of individuals who adopt the innovation over a given period of time (p. 60). These three time elements were important, Rogers (2003) believed, to understanding the *innovation decision process* from first knowing of it, to formulating an opinion toward it, to deciding whether to adopt or reject it, then to implement or use the innovation, and finally to confirm the decision.

The fourth element involves innovation and the *social system*. Rogers (2003) defines this "as a set of interrelated units that are engaged in joint problem solving to accomplish a common goal" (p. 63). These "units" consist of individuals, groups, subsystems or organizations. This is a common definition that would describe the social system of most organizations. Rogers emphasizes that the "system's social structure affects diffusion, the effect of norms on diffusion, the roles of opinion leaders and change

agents, types of innovation-decisions, and the consequences of innovation" (p.63). Rogers (2003) adds that the structure of the system (i.e. hierarchal or not) can foster or impede the diffusion of innovation. "[I]ndividual innovativeness is affected both by an individual's characteristics and by the nature of the social system in which the individual is a member" (p. 67). See table 2 below for an overview of the four main elements of the diffusion process.

Table 2: **Four main elements of Rogers (2003) diffusion process**

Element	Definition
Innovation	An innovation is an idea, practice, or object perceived as new by an individual or other unit of adoption. The perceived newness of the idea for the individual determines his or her reaction to it.
Communication channels	The essence of the diffusion process is the information exchange through which one individual communicates a new idea to one or several others. The nature of the communication transmission between two individuals determines whether the innovation will or will not be transmitted to the receiver and the effect of such transfer.
Time	The element of time is one aspect of the diffusion process which examines the dimension of time from the 1) innovation-decision period, to the 2) innovativeness of the individual or unit of adoption, and lastly to 3) an innovation's rate of adoption by members of an organization over time.
Social system	A set of interrelated units that are engaged in joint problem solving to accomplish a common goal. The social structure of the system affects the innovation's diffusion in several ways. The social system constitutes a boundary within which an innovation diffuses.

Adapted from Rogers (2003) (pp. 52-63)

Adoption of Innovation

Another important aspect of the diffusion process is the rate of adoption, or speed with which members of a social system adopt an innovation over time (Rogers, 2003). The rate of adoption is inextricably linked to how members of a social system perceive the attributes of an innovation. There are five attributes of an innovation that an individual perceives as important which has the effect of determining the rate of its adoption. These five attributes are: 1) relative advantage, 2) compatibility, 3) complexity, 4) trialability, and 5) observability (Rogers, 2003).

Prior to adopting an innovation, individuals and organizations would be wise to examine it from the perspective of the five attributes: Will the innovation be better than the one it is replacing? — relative advantage. Does the individual/organization see it as an advantage consistent with the values and norms of the social system? — compatibility. Is the innovation difficult to understand or use? — complexity. Will the innovation be able to experimented with in small increments on a trial basis? — trialability. Are the results visible to other organizational members thus fostering conversations and interest in the innovation? — observability (Rogers, 2003). As Rogers (2003) succinctly puts, "the individuals' perceptions of an innovation, not the attributes as classified objectively by experts or change agents, affect its rate of adoption" (p. 366). See table 3 below for summary of 5 attributes.

Table 3: **Perceptions of characteristics of an innovation**

Relative advantage: degree to which an innovation is perceived as being better than the idea it supersedes

Compatibility: the innovation is seen as being consistent with the existing values, past experiences, and needs of potential adopters
Complexity: degree to which the innovation is perceived as relatively difficult to understand and use
Trialability: degree to which an innovation can be experimented with on a limited basis. New ideas that can be tried incrementally are adopted more rapidly
Observability: degree to which the results of an innovation are visible to others in a social system

Adapted from Rogers (2003)

The history of modern diffusion of innovations research began in the 1940s and 1950s. Studies ranged from sociologists studying diffusion of agricultural innovations to those of educational researchers investigating the diffusion of teaching ideas within schools. As Rogers notes, although researchers were from different disciplines their findings were remarkably similar in terms of the diffusion process. He cites examples such as, how the diffusion process follows a S-shaped curve over time and those who are "innovators" tend to have higher socio-economic status in comparison to "late adopters" (Rogers, 2003, p. 89). As Rogers (2003) explains, any adoption of an innovation will usually follow a normal bell-shaped curve "when plotted over time on a frequency basis. If the cumulative number of adopters is plotted, the result is an S-shaped curve" (p. 440). Hence, the innovation diffusion process represented by an S-shaped curve would show adopter distribution starting slowly at the beginning due to fewer adopters, and then steadily increasing until approximately one half of the social system has adopted the innovation. This is followed by a slower gradual rate as the smaller remaining number of individuals adopt the innovation (Rogers, 2003).

Individual responses to innovation

Diffusion studies have consistently found that individuals adopt innovations at different rates and times in any given social system. Rogers (2003) placed individuals into five "adopter" categories which classified "members of a social system on the basis of innovativeness": 1) innovators, 2) early adopters, 3) early majority, 4) late majority, and 5) laggards or traditionalists (p. 63). According to Rogers (2003), "the criterion for adopter categorization is *innovativeness,* the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a social system" (p. 458). Using the standard bell curve (see Figure 1 below) beginning on the far left, Rogers illustrates that 2.5% of individuals in any social system will be the *innovators* (risk takers) who adopt an innovation. Next (moving to the right), the category of *early adopters* (opinion leaders – influencers) comprise 13.5% of a total system to adopt a new idea. To the left of the mean 34% of this category is the *early majority* (not as influential as early adopters, more deliberate) to adopt an innovation. To the right of the mean are 34% of individuals who adopt as the *late majority* category (skeptical and cautious). Finally, on the far right of the curve are the *laggards* who usually are the individuals who resist or reject the innovation (p. 460).

Figure 1: Adopter categories of innovativeness
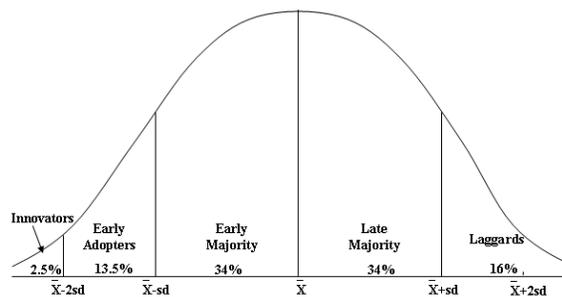
Adopter Categorization on the Basis of Innovativeness (Source: Diffusion of Innovations, fifth edition by Everett M. Rogers)

Interestingly, the extensive research conducted by Rogers (2003) on the variables of innovativeness has uncovered these three generalizations related to 1) socio-economic status, 2) personality values, and 3) communication behavior. (Rogers, 2003)

Socio-economic status: generally, there is no difference in age from early to late adopters. Earlier adopters usually have more years of formal education than later adopters. In addition, earlier adopters generally are more literate than later adopters, have higher social status and greater degree of upward mobility. Lastly, earlier adopters usually have responsibility of larger-sized farms, schools, and companies etc. than later adopters.

Personality Variables: (research not as extensive as it is difficult to measure in diffusion surveys) generally, earlier adopters have greater empathy than later adopters. Earlier adopters may be more open to new ideas than later adopters. As well, earlier adopters have greater rationality and may have more intelligence than do later adopters. Earlier adopters are more accepting of change and deal with uncertainty and risk better than do later adopters.

Communication Behavior: generally earlier adopters are more accepting of scientific research in regards to innovation than are later adopters. Earlier adopters have a much more widespread social/interpersonal network within their system than do later adopters. Further, earlier adopters are interconnected beyond their immediate social systems than are later adopters. Importantly, for innovation purposes, earlier adopters have more contact with change agents and knowledge of innovations than later adopters. (pp. 470 - 476)

Hite, Williams, Hilton, and Baugh, (2006) conducted a study of the role of public school administrator characteristics on perceptions of innovativeness. A network methods and descriptive statistics process was used to explore the structure of "a public school

administrator network, highlighting the relationship of administrator characteristics (personal demographics, position, experience) on three different types of perceptions of innovativeness: (a) being perceived by others as innovative, (b) perceiving others as innovative, and (c) mutually perceiving each other as innovative" (p. 160). The researchers used a mixed methods approach consisting of completing a network survey within the parameter of a two-hour interview.

Results indicated that there was a strong correlation between the demographics of age and experience in relation to being perceived as innovative among the administrators. Administrators who were older, more experienced, and had been in fewer schools, were perceived by their peers as being more innovative. The authors of this study suggest that being in fewer schools gives these administrators opportunities to see innovations through to completion. In addition, the network analysis found that being perceived as innovative by one's peer network holds promise in galvanizing and spreading innovation reforms within individual schools as well as district wide.

Organizational innovativeness

Organizations are a complex hierarchical network of individuals, groups, teams and leaders who work together in the hope of achieving of a common goal. Their goal may be to provide a product or service that will benefit the citizen/consumer of society. Ultimately, the rapid changes that are part of society today force organizations to search for new ideas or ways to remain competitive, current and responsive to these demands.

In short, organizations are relatively stable enterprises with clearly defined roles, responsibilities, authority hierarchy, cultural norms, and a focus on collectively working

toward predetermined organizational goals (Rogers, 2003). Rogers (2003) asserts that over time individuals in an organization become content with the status quo or its structures and will challenge and resist change. Yet, this does not prevent an organization from engaging in the innovation process. Indeed, Rogers (2003) adds, "that innovation is one of the fundamental processes under way in all organizations" (p. 646).

Early diffusion research focussed on the individual as the decision maker. Later studies shifted to such individuals as medical doctors and teachers. Yet, as Rogers (2003) notes, researchers did not place these individuals as part of the larger organization. It was not until much later that diffusion studies viewed the organization as the unit of adoption rather than the individual. Still, Rogers (2003) notes, that the data collected was usually from a single organizational perspective such as the top executive. This he believes oversimplifies the research as it equates the unit of analysis back to a single individual. Many of the studies using individual methods of investigation were applied to examining organizational innovativeness in the 1970s (Rogers, 2003, p. 651).

Later diffusion studies of organizations began to focus on the innovation process over time within the organization (Rogers, 2003). This was a departure from earlier studies that focused on variables related to determining more or less innovative organizations. However, earlier studies helped to highlight characteristics of innovative organizations albeit that they were somewhat similar to those of innovative individuals (i.e. larger organizations are generally more innovative which is similar to individuals with higher incomes and socioeconomic status) (Rogers, 2003).

Conversely, certain organizational characteristics are not correlated to individual characteristics. Rogers (2003) found that some of the organizational structures such as

system openness – (member linkages external to system)*, and *formalization* – (organizational emphasis on following rules, procedures etc.) were not linked to individual innovativeness processes. Instead, they "were found to be related positively and negatively, respectively, to organizational innovativeness" (p. 658).

Organizational innovativeness is very much linked to its structural characteristics. Rogers (2003) correlated innovativeness to independent variables such as 1) individual (leader) characteristics, 2) internal organizational structural characteristics, and 3) external characteristics of the organization (p. 657). For example, the independent variable of individual leader characteristics *attitude toward change* is found to be positively related to the dependent variable of organizational innovativeness. Similarly, the independent variable of organizational structure of *interconnectedness* (degree of which units in a social system are linked by interpersonal networks), is found to be positively related to organizational innovativeness. Conversely, the *centralization* (degree of which power and control in a system is concentrated in the hands of a few individuals), is said to be negatively related to organizational innovativeness (Rogers, 2003, pp. 657-658). See (Figure 2) below for a review of organizational innovativeness correlations.

Figure 2: Independent variables related to organizational innovativeness

Independent Variables   Dependent Variable

INDIVIDUAL (LEADER) CHARACTERISTICS
      1.   Attitude toward change (+)

INTERNAL CHARACTERISTICS OF ORGANIZATIONAL

STRUCTURE
      1.   Centralization (-)
      2.   Complexity (+)
      3.   Formalization (-)   ORGANIZATIONAL INNOVATIVENESS
      4.   Interconnectedness (+)
      5.   Organizational slack (+)
      6.   Size (+)

EXTERNAL CHARACTERISTICS OF THE ORGANIZATION
System openness (+)   Adapted from Rogers (2003)
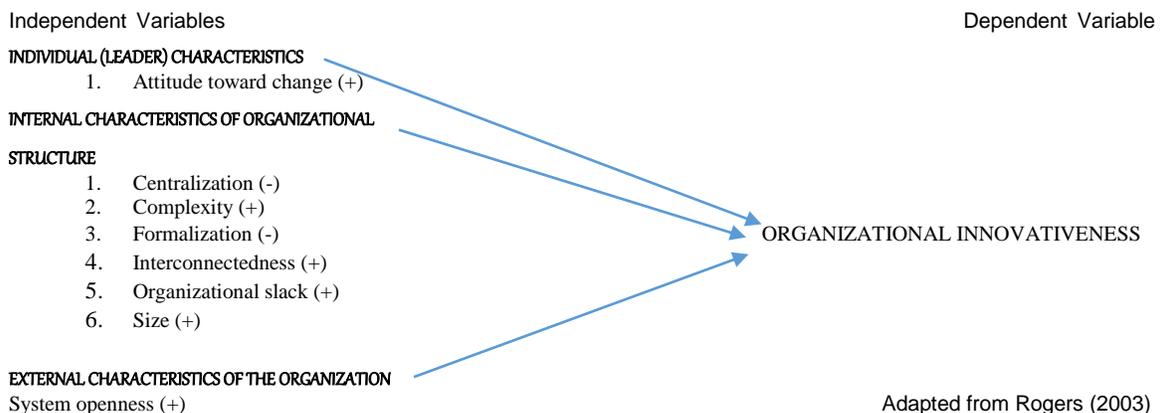
Rogers (2003) adds, that several hundred organizational studies on innovativeness have generally found a low correlation between the independent and the dependent variables of innovativeness. Zaltman et al., (1973), found that, "each of the organizational structural variables may be related to innovation in one direction during the initiation phases of the innovation process and in the opposite direction during the implementation phases" (as cited in Rogers, 2003, p. 659). For example, if an organization has low centralization, coupled with high complexity (organizational member's high level of knowledge and expertise), and low formalization (degree of organizational asking members to follow rules and regulations), this generally results in the initiation of innovation, but difficulties of implementation due to structural organizational characteristics (Zaltman et al.). Rogers (2003) concludes that including the initiation and implementation subprocesses of the innovation process has helped to better explain how the variables from past research relate to organizational innovativeness (p. 665).

A study of organizational innovativeness of the banking industry in Mid-West United States by Subramanian, and Nilakanta, (1996), applied a multi-dimensional construct to measure organizational innovativeness. The researchers argued that previous studies had produced conflicting results due to the "narrow definition of the construct of innovativeness" (p. 631). They asserted that because of the complexities of measuring organizational innovativeness that a multi-dimensional construct was needed. Specifically, their aim was to explore "the relationships between innovativeness of firms, their organizational characteristics, and organizational performance" (p. 632). Their theoretical construct to measure for innovativeness consisted of three dimensions, 1) mean number of innovations adopted over time, 2) mean time of adoptions of innovations, and 3) the consistency of time of adoptions of innovations" (p. 634). Importantly, they used

a dual typology to define *innovativeness* for the study. The first was *administrative innovations* defined as "those that occur in the administrative component and affect the social system of an organization" and secondly, *technical innovations* defined as "those that occur in the operating component and affect the technical system of an organization" (Damanpour et al. (1989) as cited in Subramanian, & Nilakanta, (1996), p. 637).

Their findings indicated that high degrees of administrative innovativeness are related to a centralized organizational system as well as to the size of the organization as previous research found. Conversely, they found that "centralization and size do not affect all three dimensions of administrative innovativeness equally" (p. 642). Highly centralized systems are quicker at adopting innovations but not necessarily more innovative than a decentralized organization. Also, organizational size in conjunction with centralization leads to quicker adoptions of innovations because fewer individuals are needed to make decisions in comparison to a decentralized system. The researchers also posited that, "if administrative innovativeness were measured based on the time of the adoption, one would find a significant association between centralization and administrative innovativeness" (p. 642).

Similarly, their findings related to the *technical innovations* dimensions showed a "statistically significant negative association between the degree of organizational specialization and the two dimensions of administrative innovativeness − namely, time of adoption and consistency of time of adoption" (p. 643). They cite an example of when more technical specialists are involved because of the complexity of an innovation the slower the rate of adoption due to the many individuals involved. The researchers concluded that innovativeness in organizations is complex and if unidimensional constructs are used for research purposes that conflicting results will occur. However,

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using a multi-dimensional construct lends itself to unearthing different effects in relation to organizational innovativeness.

The notion of *innovation* and its relationship to organizational improvement has been studied for decades from a multiplicity of approaches and fields. An electronic search of digital dissertations on the topic of "perceptions of innovation" numbers well over 300,000 results. Organizations of every stripe will be challenged to innovate or they will cease to exist. It will take organizational leadership at all levels of society to nurture the innovation phenomenon. Schools are not immune to this pressure. School systems are large organizations with a myriad of complexities. Individual schools are a part of this complex system.

As noted, numerous studies have been conducted examining the innovation phenomenon. Many studies have examined innovation from the perspective of how innovations are communicated and spread by individuals and organizations. The underlying theory for much of these studies has been Rogers (2003) diffusion of innovations. Few studies have examined school principals' perceptions toward innovation and its relationship to individual and organizational characteristics. It is the aim of this study to examine principals' perceptions of innovation with the purpose of contributing new knowledge to the education field.

Synthesis

The force of change has always been present in all facets of life. Gardner (2006) in his book, *Five Minds for the Future,* exhorts that, "at the start of the third millennium, we live at a time of vast changes—changes seemingly so epochal that they may well dwarf those experienced in earlier eras…These changes call for new educational forms and

processes (p. 11). Change, be it a school or any organization usually involves some form of innovation (i.e. new idea, process, or product) as an integral part of the process. Although, change and innovation are often understood as being inseparable, not all change involves innovation. However, it is important to note that innovation can occur in many different forms and can include new organizational models or management practices (Fagerberg, Martin, & Andersen, 2013).

Organizational change and innovation literature, like many research theories, offer several competing constructs in an effort to explain the particular phenomenon under study. As Poole et al. (2004) suggests, this is difficult due to the numerous "contested concepts" that lead to "no generally agreed upon definitions" (p. 9). He adds, that through this "tapestry" of theories it is becoming evident that there are distinct patterns and central themes emerging regarding change and innovation. For example, Hage (1999) in his research on organizational change found three consistent findings relative to innovation— a complex division of labour, an organic structure, and a high risk strategy (p. 597). Importantly, he adds, that the complex division of labour is vital to innovation because of its penchant for fostering "organizational learning, problem-solving, and creative capacities of an organization" (p. 597). In many respects this has led scholars of organizational change to suggest that a more integrated theoretical approach to change and innovation is needed (Brazzel et al., 2014; Poole, 2004; Wedell, 2009; Weick & Quinn, 1999; Van de Ven, Angle, & Poole, 2000).

Similarly, with the complexities in our rapidly changing world and the demands placed on the various sectors of society for change and innovation this will require a radically different form of leadership. Current theory and research in the leadership field is beginning to advance the notion of an integrative theoretical approach to fostering

change and innovation. Organizations are viewed as being dynamic entities of human relationships, interactions, and experiences, changing and adapting to the various internal and external pressures related to organizational change and innovation efforts (Allen, Maguire & McKelvey 2011; Banathy, 1988; Burnes, 2005; Cilliers, 1998; Clarke, 2013; Dooley, 2004; Uhl-Bien & Marion, 2009) assert that traditional leadership models such as the "top-down" hierarchy are in need of "re-conceptualizing" in order to support change and innovation. "Complexity leadership theory asks if there are alternative ways to understand how change, [innovation], and influence, hence leadership, occur" (p. 386).

Based on the literature review of innovation, organizational change, leadership, and the diffusion of innovations framework this study will examine the phenomenon of innovation as it pertains to public schools. This study will focus on:

1. How do school principals perceive their own and their school's innovativeness?

2. What do school principals identify as major internal and external sources of innovation within their school and school district?

3. What structures, or processes do school principals identify as facilitating and encouraging innovation in their schools?

4. What are the major obstacles internally and externally that school principals identify as obstacles to innovation?

Research questions

The following questions are based on a study conducted by Williams (2013). Based on the context and review of the literature and previous dissertation of Mitchell (2008) and Williams (2013) the following question is used to guide this research study:

How are the perceptions of principals toward innovation related to individual and organizational characteristics?

Examining public school principals' perceptions of individual innovativeness, and organizational innovativeness could provide insight into principals' views and orientations toward innovation and its relation to fostering change in schools. More importantly, having a better understanding of these two innovation attributes can help school principals with the facilitation of the innovation process.

To guide the quantitative phase of this study I used the following questions:

1. What are public school principals' perceptions regarding their own individual innovativeness?

2. What are public school principals' perceptions regarding organizational innovativeness?

3. Is there a difference between individual perceptions toward innovation and organizational perceptions toward innovation?

4. Are differences in perceptions of public school principals regarding innovations related to organizational variables including school enrolment, financial resources, professional development capacity and school demographic data?

5. Are differences in perceptions of public school principals regarding innovation related to demographic factors including age, gender, and professional development practices?

Qualitative research questions:

For this part of the mixed-method study I conducted semi-structured interviews using a stratified purposeful sampling. Participants were selected from the quantitative survey of this study. They were chosen from returned survey responses that indicated respondent willingness to participate in an interview. Researchers replicate others' studies for a variety of reasons. These can consist of confirming or disconfirming outcomes from an earlier investigation. Conducting interviews further enhanced and strengthened the quantitative results and linked both aspects of this mixed-method study into a more cohesive understanding of the innovation process.

Chapter Three
Methodology and Research Design

To live in a quantum world, to weave here and there
with ease and grace, we need to change what we do.
We need fewer descriptions of tasks and instead
Learn how to facilitate process.

—Margaret Wheatley

During the 1970's a new field of research emerged in the area of human communications and diffusion of innovations. Communication scholars focused on identifying adopter categories of individuals or their innovativeness within social systems (Hurt, Joseph & Cook, 1977). Hurt et al. (1977) found that the research literature on the attributes of innovativeness had been somewhat inconsistent due to the lack of agreement on the definition of the concept. Similarly, they found that the research literature also lacked agreement on the definition of "risk taking" which was considered an important aspect of the innovativeness concept. Hurt et al. (1977) suggested that if, "an innovation is perceived by the social system as having some reward value, then there will generally emerge those individuals who are more willing to abandon traditional behaviors and attempt some change" (p.58). Further, the researchers gleaned data from Rogers and Shoemakers' (1971) research that indicated that innovativeness "is a normally distributed unidimensional characteristic of individuals in any given population" (p. 59). More importantly, Hurt et al. (1977) felt that this focus on individual characteristics in relation to determining degrees of innovativeness provided several advantages over previous post-facto interview research techniques. One major advantage was that the self-reporting techniques allowed researchers to better predict innovativeness across a variety of diffusion studies. They cited ten disadvantages to the post-facto interview process such as relying on the faulty memory of respondents or biases due to misconceptions of past events.

As a result, Hurt et al. (1977) developed a self-report instrument using a Likert-type scale to measure innovativeness in individuals. They based the instrument's items on Rogers and Shoemaker's (1971) five adopter characteristics of innovativeness. The characteristics were defined as; 1) innovator, 2) early adopter, 3) early majority, 4) late majority, and 5) laggard (traditionalists). The initial 53-item Likert-type scale measure was administered to 231 college students enrolled in a communications course. Data obtained from responses were submitted for factor analysis using various tests for reliability. Subsequently, the identical measure was administered to 431 public school teachers again with the same factor analysis testing. Both samples showed a normative distribution of scores. However, the student sample ranged from a low innovativeness score of 28 to 159 for high innovativeness compared to the teacher sample that had a low innovativeness score of 75. Regardless, both samples displayed a normative distribution of scores. A final factor analysis of both samples was applied with 20 of the 53 items meeting the criteria to be considered loaded on a factor. In addition, the reliability test yielded an alpha of .94 for the 20-item scale. Trocki and Hurt (1976) "were able to replicate the unidimensionality, normality, and reliability of the scales with upper-lower, and lower-middle class, public school students" (p.63 as cited in Hurt et al., 1977). Thus, Hurt et al. (1977) concluded that the 20-item instrument measuring innovativeness had "the potential to predict willingness to adopt innovations across populations which differ in terms of age and socioeconomic status" (p. 63).

Hurt and Teigen (1977) developed the *Perceived Organizational Innovativeness Scale (PORGI)* to measure the perceived willingness of an organization to adopt innovations. They adopted 20 of the original 37 survey items from Hurt, Joseph and Cooks', *Individual Innovativeness Scale.* Rogers (2003) described organizational

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innovativeness as the degree that an organization is early at adopting new ideas. The *PORGI* also had the same unidimensional construct as the *Individual Innovativeness* measurement scale developed by Hurt et al. (1977). Hurt and Teigen (1977) used teachers and administrators to develop the PORGI measurement scale. Through rigorous testing Hurt and Teigen refined the measurement to 25 items using a positively and negatively worded 7 - point Likert scale. Data gathered from the original normative group produced a range of scores from 25 to 160 with the higher scores indicating the likelihood of organizational innovativeness within an organization. Importantly, the split-half reliability of the instrument was reported as .96. As well, the correlation of construct and predictive validity produced a positive measure of organizational innovativeness (Hurt & Teigen, 1977).

For his doctoral dissertation entitled, *South Dakota Public School Superintendents' Perceptions of Innovation,* Mitchell (2008) adapted both the *Individual Innovativeness (II)* and the *Perceived Organizational Innovativeness Scale (PORGI)* developed by Hurt et al. (1977) and Hurt and Teigen (1977). He also developed an additional instrument to measure superintendent's perceptions of their districts' innovation behaviours related to hypothetical situations based on recent educational initiatives in South Dakota. Williams (2013), using much of Mitchell's (2008) research method and McCroskey's (2006) measurement instruments, researched South Carolina's superintendents' perceptions of innovations for his doctoral dissertation. Both researchers used the *Individual Innovativeness* and the *PORGI* measurement scales without altering the original surveys. Mitchell (2008) surveyed 165 superintendents across the state of South Dakota and Williams (2013) surveyed 83 superintendents in the state of South Carolina. With a larger number of participants and the geographical area of their states to consider each

researcher employed quantitative survey instruments that were mailed or e-mailed for data collection purposes. Although their studies focused on different population samples than Hurt et al. (1977) and Hurt and Teigen (1977) their findings did not differ markedly from the original studies.

Although Mitchell (2008) and Williams (2013) measured slightly different independent and dependent variables their findings were similar. They found that 1) the majority of superintendents perceived themselves and their districts as innovative, 2) superintendents in districts with larger enrolments and financial resources tended to rate their districts as more innovative, 3) there was a positive relationship between innovative public school district superintendents and innovative public school districts (Mitchell suggests a "strong positive relationship" whereas Williams states a "weak positive relation-ship"), 4) there were no significant differences regarding superintendent perceptions based on demographic factors related to age, gender, and experience, 5) superintendents rated themselves and their districts as highly innovative, yet rated themselves to be more innovative than their school district.

Replication of previous studies

For the quantitative portion of my research, I decided to use the same survey employed by Mitchell (2008) and subsequently Williams (2013) as a way to partially compare results. In addition, the survey instrument was found to be reliable and thus I felt it was not necessary to develop my own. The main difference is that I studied school principal's perceptions of innovativeness within a given school district. The survey instrument developed by McCroskey et al. (2006) was used to obtain measures of principal's perceptions of individual and organizational innovativeness. Data collected

from this instrument was analyzed using descriptive statistics such as frequencies, percentages and standard deviations. In addition, inferential statistics were used to draw conclusions from the data collected. Mitchell (2008) and Williams (2013) used *t*-tests, analyses of variance (ANOVAs), Pearson product-moment correlation coefficient, and Tukey's Honestly Significant Difference (HSD) post-hoc tests to analyze their quantitative results. My sample size was much smaller in comparison to the studies mentioned above. As a result, I decided to use Microsoft Office Excel's *, t-test: Two-Sample Assuming Unequal Variances* statistical function to analyze all my quantitative data throughout my study. My purpose for partially replicating these studies was to compare the generalizations the researchers found from the superintendents' perceptions of individual and organizational innovation to those of school principals' in relation to their school's orientation toward innovation. As well, another important aspect was to discern whether there were any significant differences that may occur between the two levels of school leadership. Much of this is connected to affecting large-scale school improvement through the promotion of innovation. While the superintendent is the leader of innovation system wide, it is the school principal that is integral to encouraging and fostering innovation at the school level.

The relationship between superintendent and principal is inextricably linked in the mutual pursuit of improving schools. Hence, the importance of principals' perceptions of individual and organizational innovativeness is a critical factor in bringing about meaningful change to schools. Equally important, this study is an opportunity for senior leaders at the district level to gain an overall perspective of principals' perceptions of innovativeness and how it aligns with that of the school districts vision. In addition, research results can better inform leaders at the school and district level as to how to

allocate resources, professional development and personnel in an effort to develop and sustain innovative practices. Finally, the results of this study can provide policymakers at the provincial education policy level with a better understanding of the complexities and obstacles that a school principal and school district face in the struggle to foster innovation.

Replication or partial replication of studies can also be undertaken to review if the earlier studies results have remained stable over the passage of time. In addition, it provides an opportunity to analyze what may have caused any changes from the original studies. Or, researchers can alter one aspect of the original methodology in order to see if it effects or alters a particular outcome. Lastly, using elements of previous studies affords the opportunity to apply earlier methods to a different group or events to see if similar conclusions can be ascertained for these different variables (Thomas, 2003).

Replicating or partially replicating studies can offer both positive and negative outcomes for researchers. Park (2004) adds that one positive aspect of using this process is that it can "strengthen the foundation of a theory so that it too will become a part of our general knowledge system" (p. 190). She asserts that it is also a way to "test its veracity or truth to determine if it should be supported as knowledge at all" (p. 190). When replication is successful in strengthening a theory it benefits the reputation of the researcher (Park, 2004). Similarly, as Tsang and Kwan (1999) assert, the rapidity of change in our world makes it difficult to precisely replicate research. Despite this difficulty, they further stress that it is increasingly important, especially in the field of social science. They add that due to the fallibility of social science research it is a matter of degree in terms of its successful replication. Park (2004) also adds that, "it is a wonder that any research in the social sciences would even be considered a true replication" (p. 191). Yet, because of its impreciseness, it in effect, protects the reputation of the original researcher.

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Conversely, as Park (2004) points out, if either precise or imprecise replications are unsuccessful, results can be negative. Unsuccessful precise replications can damage the original investigation's theory and the reputation of the investigator. If imprecise replications are unsuccessful the research has the potential of limiting the original theory. Yet, it is important to note that although negative results of a replicated study can suggest that the internal validity of the original study is flawed it is not necessarily the case. Indeed, there can be several factors related to the replicated study that lead to different results in comparison to the original study. For example, methodological issues of the replicated study such as the preparation of the research instruments, sampling of subjects, procedure of the study or the analysis of results has the potential for negative results in comparison to the original study (Amir & Sharon, 1990). Thus, issues such as those described must be taken into consideration when reviewing the results of replicated and original studies for reproducibility and generalizations. Rosenthal (1990) adds, that "at the very least, the subjects and the experimenters themselves are different over series of replications" (p. 2). More importantly, a critical examination of replicated and original studies is needed in order to confirm and extend the research theories of any given study (Rosenthal, 1990; Bronstein, 1990; Neuliep & Crandall, 1990). As Lamal (1990) notes, "replication is necessary because our knowledge is corrigible" (p. 31).

This section of this mixed method study describes the research methodology. Included with the introduction is the purpose statement, research questions, research design and methodology, a description of population, instrumentation, data collection methods, plan and timeframe, ethical responsibilities, and permissions. In addition, an overview of the quantitative and qualitative methodology will be described. The quantitative research design is a partial replication of previous doctoral dissertations

(Mitchell, 2008; Williams, 2013). As such, much of the quantitative design is adapted from these studies.

Purpose statement

The purpose of this mixed methods study was to investigate the perceptions of school principals in relation to the attributes of individual innovativeness and organizational innovativeness. In addition, these two innovation attributes were analyzed in order to identify any differences in perceptions between school principals. The theoretical underpinning of this study is based on Rogers' (2003) diffusion of innovations framework.

Research design

Use of mixed methods to conduct research is beneficial when full interrogation of the research question(s) require both quantitative and qualitative data. When these two forms of data are combined and linked they can provide greater understanding than they would if examined on their own (Creswell, 2012). Creswell (2012) adds that, "[m]ixed methods research is a good design to use if you seek to build on the strengths of both quantitative and qualitative data" (p. 535). According to Greene and Caracelli (1997), "[t]he underlying rationale for mixed-method inquiry is to understand more fully, to generate deeper and broader insights, to develop important knowledge claims that respect a wider range of interests and perspectives" (p. 7). Although there has been much recent debate by scholars of mixed method theory as to a clear definition, Tashakkori and Creswell (2007) "define mixed methods here as research in which the investigator collects and

analyzes data, integrates the findings, and draws inferences using both qualitative and quantitative approaches or methods in a single study or a program of inquiry" (p. 4).

Mixing quantitative and qualitative data

Garwood (2006) defines quantitative research as "the collection of data in numerical form for quantitative analysis" (p. 251). She adds that this numerical data can be obtained from various environments ranging from the natural to laboratories, or special populations to a sample from a general population. More importantly, is that the "numbers result from the process, whether the initial data collection produced numerical values, or whether non-numerical values were subsequently converted to numbers as part of the analysis process, as in content analysis" (p. 251). Daly (2003) emphasizes that quantitative study involves a structured approach that seeks to find relationships between divergent explanations of small variables. Ultimately, the goal is to formulate a generalization "by establishing relationships [that] demonstrate that these are general features of social life" (p. 193).

Qualitative research affords the opportunity to explore a phenomenon in which the variables are unknown. In comparison to quantitative research, the qualitative researcher aims to gather information that "produce[s] richly and relevantly detailed descriptions and particularized interpretations of people and the social, linguistic, material and other practices and events that shape and are shaped by them" (Sandelowski, p. 894). As Creswell (2012) states, "the literature might yield little information about the phenomenon of study, and you need to learn more from participants through exploration" (p. 16). This method is appropriate for studying the human dynamics of school organizations in conjunction with exploring the broad concept of innovation.

Thus, a mixed-methods research approach has been used to explore quantitative and qualitative aspects of the broad concept of innovation attributes. These innovative concepts are necessary for a public school principal to understand and further develop in order to nurture a culture of change within schools. Greene and Caracelli (1997) believe that by exploring both research aspects that this can develop a picture of the complexity of a social phenomenon.

This study utilized a two phase mixed-methods research design analysis. The first phase sought to obtain innovation perceptions using a quantitative research design survey. The second phase utilized a qualitative approach to conduct interviews from a selected sample of the research population. In addition, a *sequential explanatory design* process was used to collect data. This format collects quantitative and qualitative data "sequentially in two phases, with one form of data collection following and informing the other" (Creswell, 2012, p. 542). The sequence was as follows:

Quantitative data collection & analysis ⟶ follow up with ➝ Qualitative data collection ➝ and analysis interpretation (adapted from Creswell, 2012, p. 541)

Creswell (2012) explains, that "the rationale for this approach is that the quantitative data and results provide a general picture of the research problem; more analysis, specifically through qualitative data collection, is needed to refine, extend, or explain the general picture" (p. 542).

The first phase consisted of a quantitative research design with a self-administered survey distributed to all school principals of the selected suburban school district in December 2015. This included elementary (K- 5), middle (6-8), and secondary levels (9-

12) as well as one alternate choice Kindergarten to grade 12 school. Data collected provided general demographical data as well as statistical differences between the participants completing the survey. This information also allowed for statistical analysis of data to determine whether there were any differences between participants. The results also categorized participants into Rogers' (2003) five innovativeness adopter categories. It was hoped that a cross section of innovativeness adopter categories would emerge from this data that would provide representation from the five categories for the qualitative design. In addition, the survey phase provided a general overview of participants perceived innovativeness and that of their schools. This allowed me to develop questions and further explore participants' views, lived experiences, and the challenges they face in fostering innovation in their schools through the interview phase of the study. It provided a much more in-depth understanding of participants' realities with the complexities of enacting change through innovation to improve teaching and learning in schools. Thus, the interview qualitative phase added a further holistic interpretation of the collected data that enriched both research designs for a better understanding of the innovation phenomenon.

Strengths and weaknesses of mixed-method research design

One of the main advantages of mixed-method design is that the qualitative and quantitative aspects are clearly delineated. This is beneficial to both the readers and the designers of the study. In addition, the researcher does not have to converge the data from each specific method (i.e. first phase gathers the results from population sample and the second phase further refines it through the in-depth interview process) (Creswell, 2012). Axinn and Pearce (2006) add, "that mixing multiple methods afford opportunities to use the strengths of some methods to counterbalance the weaknesses of other methods"

as all methods do have weaknesses (p.2). Another advantage is the opportunity to use *triangulation* as part of the research design. Hesse-Biber (2010) points out, that triangulation allows the researcher to look for convergence of the data collected which enhances the credibility of the results found.

Hesse-Biber (2010) adds that one of the challenges to using mixed-methods design is that it requires training in both quantitative and qualitative research methods. She states that most researchers have training in one discipline, which leads to an "uneven" knowledge gap. Further, Creswell (2012) asserts that mixed-methods design can make it difficult to determine which aspects of the quantitative part to pursue in the qualitative phase. He also adds that "this design is labor intensive and it requires both expertise and time to collect both quantitative and qualitative data" (p. 543).

Connecting quantitative and qualitative phases

The purpose of the quantitative phase of this study was to examine public school principals' perceptions related to their attitudes toward individual and organizational innovation. Specifically, it investigated the relationship between public school principals' perceptions of individual and organizational "innovation behaviors associated with organizational variables and demographic factors" (Williams, p.15). Thus, the self-administered survey provided the research evidence necessary to conduct the statistical analysis for identifying potential differences between school principals' perceptions regarding individual and organizational innovativeness and the different demographic variables.

The data analysis phase of the quantitative survey classified school leaders and their organizations into five different categories based on Rogers (2003) *Diffusion of*

Innovations. These categories are: 1) Innovators, 2) Early Adopters, 3) Early Majority, 4) Late Majority, and 5) Laggards or Traditionalists. Participants' categories were determined by the scores calculated on the *Individual Innovativeness and Perceived Organizational Innovativeness Scales (PORGI).* For the qualitative phase of the study, I was able to draw from a pool of surveyed school principals who, as discussed later in this section, indicated they were willing to participate in a follow-up interview. These selected principals were a diverse group based on factors such as age, gender, experience, school enrolment, school demographics and grade level configurations (elementary, middle & secondary). Patton, 2002, and Gall et al., (2003) note, that having diverse representation in a qualitative study can reveal patterns and themes that provide a deeper understanding and a richness for potential discoveries to research questions.

I hoped that participants would be available based on the statistical results from the quantitative phase that categorized participants into one of Rogers' five adopter categories: 1) Innovators, 2) Early Adopters, 3) Early Majority, 4) Late Majority, and 5) Laggards or Traditionalists. This would have provided a pool of principals with diverse perceptions regarding innovation in public education, however, the sample of 13 interview participants did not have representation from each of the five adopter categories.

Once data were collected and analyzed separately for each study phase the next step involved interpreting the findings from each phase and then synthesizing the results. This synthesis of results provided a richer context in helping to answer the research question. In addition, it also revealed new insights that provided a further holistic understanding to answering the research question. Figure 3 depicts a model of this process (adapted from Creswell, 2012).

Figure 3: Mixed methods - sequential explanatory research design

Quantitative

Quantitative

Qualitative

Qualitative

Interpretation & Synthesis Quantitative & Qualitative Phases
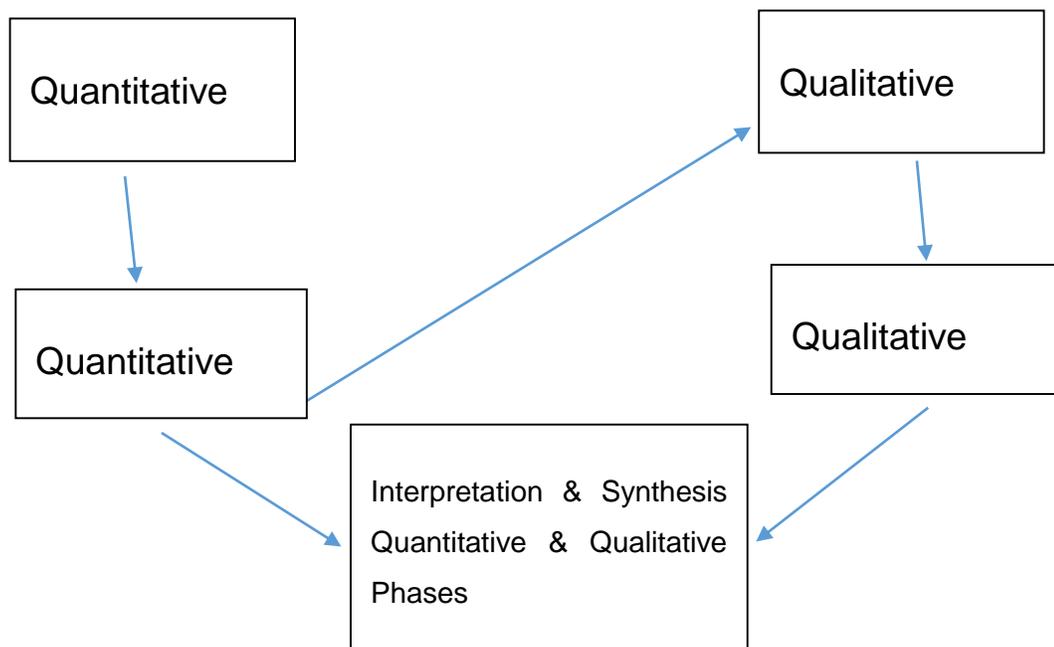
 (adapted from Creswell, 2012)

Description of school district population

The chosen site for this study is a mid-sized suburban school district in the province of British Columbia, Canada. The district has a student population of approximately 19,000 full and part time students. There are more than 40 schools in the district, 65% elementary with middle and secondary schools making up the remaining 35%. There is also a district distributed learning school for kindergarten to grade 12 students. In addition, the district offers an International program. There are also schools of choice offered such as various sports academies as well as Integrated Arts schools. There are also alternative elementary, middle and secondary schools. The school district population is also comprised of approximately 11% Aboriginal and English Language Learners (ELL), 9%

Special Education, and 7% French Immersion students. As well, over 20% of the school population had another language other than English as their home language.

The district employees approximately 2,000 teaching and support staff personnel. There were approximately 1,000 teachers and over 70 school based principals/vice-principals employed in the district for the 2014/2015 school year. The proportion of female educators was more than twice that of male educators. In terms of principals and vice-principals they are approximately equal in terms of female and male administrators.

The School District Plan lists two goals for 2015-2016: 1) to improve student achievement; and 2) improve student graduation rates. In addition, the Board of Educations' *Strategic Plan* lists six strategies for its 2014-2018 focus. The Board of Education states that their strategic direction is aimed at making the school district a leader in education.

Study population

Creswell (2012) defines a *population* "as a group of individuals who have the same characteristic", for example, school principals within a school district. The *target population* is defined as "a group of individuals with some defining characteristic that the researcher can identify and study". The researcher then selects a *sample* or subgroup from this population that he/she will formulate generalizations for this target population (p. 142).

The population chosen for the quantitative phase of this study included all school principals within the chosen suburban school district. This population consisted of 47 elementary, middle and secondary school principals. The inclusion of participants from all district schools provides a broad sample of demographic data that includes socioeconomic

factors, school size, teaching and support staff size, and the diversity of student/employee population. More importantly, the inclusion of all principals also provides a broad representation of age, gender, and administrative experience in relation to the purpose of this study. Their diverse perceptions of innovation are crucial to understanding the likelihood of bringing about and leading meaningful change in schools. A self-administered survey sent to participants will gather their perceptions of individual and organizational innovativeness. From this collected data participants were categorized into Rogers' (2003) five adopter categories (innovator, early adopter, early majority, late majority and laggard). My main reason for choosing this population was based on convenience sampling — the availability and willingness of principals in my school district to be a part of this study. As well, data collected from the quantitative phase will provide important information as to potential participants for the second qualitative phase, the interview follow-up.

Purposive sample

As Daniel (2012) notes, using purposive sampling allows researchers to select elements from a target population that fits with "the purposes of the study and specific inclusion and exclusion criteria for participation in a study" (p. 9). Therefore, the purposive sample was drawn from the quantitative phase survey where participants can consent to participate in a follow-up interview. While the quantitative phase determined the innovativeness adopter categories of participants, the interviews provided a richer elaboration of their perceptions toward innovation from an individual and organizational perspective. Importantly, interviews provided a better understanding of the views and challenges of a school leader in fostering the phenomenon of innovation.

Strength and weaknesses of purposive sampling

The nonprobability sampling method used for any particular study will have its strengths and weaknesses. However, according to Daniel (2012) purposive sampling has several strength and weaknesses not typically found in other forms of nonprobability sampling methods. In comparison to *availability/convenience sampling*,

> Purposive sampling provides more control over who is selected to be included in a sample than availability sampling, and, as particular elements of the population are purposely selected, it is more appropriate than availability sampling for research focused on particular segments of a target population. (p. 93)

As well, due to the specific sample being targeted, although limited in terms of generalization, purposive sampling may be more appropriate for a particular study than availability sampling (p. 93). Further strengths of this sampling method include: 1) less selection bias, 2) homogeneous sampling and matching may control for extraneous variables, thereby increasing internal validity, and 3) less bias due to under or over representation. (p. 92)

On the other hand, purposive sampling requires greater resources in terms of time, money and availability of participants in comparison to other availability sampling procedures. In addition, the researcher "must be knowledgeable about the population, the sites, and the conditions of the research" (p. 93).

Researcher's role and bias

As a school principal in the district of this study site, it can be assumed that I will have biases based on the knowledge of the operation and infrastructure of this system.

Having been an educator in the capacity of teacher and school principal/vice-principal for over 25 years has afforded me the opportunity to view the education system intimately. I have seen the evolution of schooling as it navigates its way through the tides of change initiatives continually demanded by various sectors of society. My role, in many respects is that of change agent. With the latest call for schools to become innovative in order to prepare learners for the 21st century in an era of high accountability has only made this challenge more difficult. As a school principal, the complexity of our world is intricately intertwined with that of the school system. Bringing about change to schools through innovation is a complex endeavour that I believe is necessary. This is no easy task for those at the "ground level" charged with the responsibility of initiating or facilitating the innovation "movement"— the school principal.

Having had the experience of being a school principal/vice-principal in three different districts over 17 years has provided many insights into how education systems deal with change. Right or wrong, my biases cannot help but be part of my role as principal and researcher. My first assumption is that the role of principal is to embrace and lead change. Second, that fostering a culture of change and the likelihood of a school adopting an innovation looks different from school to school. Third, a school principal must have a good understanding of the dynamics of human organizations and their interplay with innovation as change. Last, a school principal must be a champion for innovation. Therefore, it is important that I maintain a sense of neutrality with colleagues during the various phases of the research process. This is especially important during the qualitative phase when I am conducting personal interviews with principals. To minimize bias, I have used a journal to record questions and thoughts regarding my assumptions prior to beginning the interview process for the purpose of "checking them at the door".

As well, at the start of an interview I began with a preamble of the purpose of the interview. I assured participants that the interview was in no way an evaluation of them or their school. I added that the design of the interview consisted of open ended questions with no right or wrong answer. Next I stated that I was looking for their candid opinions and views regarding the topic of innovation. Lastly, I invited participants to freely express their thoughts and opinions and informed them it would be held in strict confidence. In addition, after each interview I replayed the recordings carefully listening to my questions and responses to participants' answers. My intention was to listen for any signs of asking leading questions or comments that I considered as demonstrating my bias. I did not find any instances that I thought were leading questions or revealed my bias.

Another aspect that allowed for maintaining neutrality was my relationship with each of the participants. As principal colleagues we consider each other to be equal in terms of the assigned roles in our schools. Further, having known most of the participants for several years both professionally and socially there is an unspoken level of relational trust. Importantly, I believed that the trust and respect we held for each other allowed participants to speak candidly to the interview questions.

Phase 1: Quantitative data collection

The first phase consisted of a quantitative research design with the self - administered survey, *Communication Research Measures: Individual Innovativeness and Organizational Innovativeness* (McCroskey, 2006)*.* Self-administered surveys allow for numerous or complex questions to be asked (Fowler, 2009). As Corbetta (2003) states, "the only way we can explore motivation, attitudes, beliefs, feelings, perceptions and expectations is by asking" (p.117). Survey research is a way to gather information from

participants using a standardized procedure. Accordingly, all participants are asked the same questions and in the same way. Similarly, their answers to the survey are also categorized in a standard format. This ensures that participant responses "can be compared and analyzed statistically" (Corbetta, 2003, p. 118). It also helps the researcher maintain a sense of neutrality during the survey phase.

Corbetta (2003) points out that the study of social phenomena poses a dilemma when viewing survey research design from a "standardized" objective lens. First, "the researcher is 'in this world; and of this world' he has his reactions, perceptions, angle of vision and mindset, which will necessarily condition him and prevent him from playing the role of 'neutral' recorder" (p. 121). Another criticism of survey research design centers on the issue of it being homogenous in that all participants have similar levels of maturity, sensitivity and poise. Third, that it limits participant responses to the "average" individual, which prohibits an "above or below" response to questions (Corbetta, 2003, p.122). However, for the purposes of my study the survey approach provided a systematic and standardized form of data that allowed for: 1) statistical analysis and comparisons of principal's perceptions of innovation, and 2) background information that informed the second qualitative phase of this study.

The survey was distributed to all 47 school principals only of the selected suburban school district through an electronic survey. This included elementary (K- 5), middle (6-8), and secondary levels (9-12) as well as an alternative learning school (Kindergarten to grade 12). Information collected provided general demographic data as well as statistical differences between the participants completing the survey. Results also provided a way of categorizing participants into Rogers' (2003) five innovativeness adopter categories. This provided information relating to statistical differences (and similarities) among the

participants. More importantly, the quantitative data collected of principals' perceptions of innovation provide a cross section of "innovativeness adopter categories" for the second phase of selecting participants for the qualitative research design—personal interviews.

Survey instrument

The survey instrument used in this study to collect data pertaining to principals' perceptions of innovation was developed by the work of Dr. James McCroskey and other researchers at West Virginia University based on Hurt and Teigen (1977) and Hurt and Cook (1977) communication research measures. They developed a set of communication research measures for a variety of social phenomenon. For the purpose of this study on principals' perceptions of innovativeness, I used the *Communication Research Measures: Individual Innovativeness (II) & Perceived Organizational Innovativeness Scale* (PORGI). These instruments are permission free for the purposes of research and instruction (http://www.jamescmccroskey.com/measures/).

The premise of the *Individual Innovativeness* scale was to measure individuals' orientation to change. According to McCroskey (2006), research indicates that "this orientation is associated with several communication variables" and has high reliability and good predictive validity (*Individual Innovativeness,* 2006). Similarly, the *Perceived Organizational Innovativeness Scale* was meant to "measure a member of an organizations perception of the organizations orientations toward change**"** (*Perceived Organizational Innovativeness Scale* (PORGI), McCroskey, 2006). McCroskey (2006) adds that this scale is highly reliable with an alpha score of .90 along with good predictive validity. These instruments were adapted to the context of my study with the substitution of "principal" for "superintendent" as the participant (Mitchell, 2008).

The survey was comprised of two sections (See Appendix A, p. 250). First were the sections pertaining to *individual innovativeness and organizational innovativeness* as perceived by school principals. There were 45 statements in total to measure individual and organizational innovativeness. Using a 5-point Likert scale, where 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, and 5 = strongly agree, principals recorded their level of agreement. A numerical value was assigned to each answer that corresponds to the number assigned to each category. Both measurements (individual & organizational innovativeness) have a three step process which calculates the aggregate score that, in turn, is converted to an innovativeness category based on Rogers' (2003) classifications of: 1) innovative; 2) early adopter; 3) early majority; 4) late majority and 5) laggard or traditionalist.

The last section of the survey instrument pertains to the demographical information of the principal participants. There are four statements and questions for response from participants. Information to statements/questions were related to participants, age, gender, years of experience and professional development practices, (adapted from, Mitchell, 2008 and Williams, 2013 partially replicated studies).

Pilot test of survey

My purpose in the first phase was to partially replicate the previous studies of Mitchell (2008) and Williams (2013) substituting school principals as study participants in place of school superintendents. Thus, it was important to maintain the integrity of the original studies as well as to use the *Communication Research Measures: Individual Innovativeness (II) & Perceived Organizational Innovativeness Scale* (PORGI) survey instrument, which was deemed to be reliable from the previous studies. Since my survey

was to be administered as a computer based online format it was also important to test it for technical functionality purposes.

My first step was to send an email to four school principals in two neighbouring school districts explaining the purpose of my study and asking if they would be willing to participate in a pilot test. The sample consisted of four male elementary school principals with varying years of principal experience ranging from three to over ten years. The main reason for choosing this sample was that I had known them as colleagues from previous principal positions that I had held in their respective school districts. Two of the four principals agreed to participate in the pilot test.

The next step consisted of emailing instructions along with a website link needed to complete the survey. As part of the instructions I included a brief "Pilot Survey Letter & Critique" (see Appendix D, p. 257) document to be completed in order to provide me with feedback regarding the survey. The first statement of the critique requested information regarding the amount of time needed to complete the survey. The choices ranged from "less than 5 minutes" to "more than 15 minutes". This would be important in regard to a potential drawback if the survey was too lengthy to complete time wise. The second statement was related to whether the directions for completing the survey were clear and easy to follow. Again, this was important to know so that the appropriate understanding of the statements would be critical to the final analysis of the actual findings from my study with principals in District X. The third question of the critique asked if the survey accurately reflected the views of the survey pilot principal. This information is important in terms of obtaining a sense of whether the principal was forthright with their responses. Lastly, the fourth question provided principals an opportunity to add any further comments or suggestions.

The two principals who participated and completed the survey responded that: a) they found it took approximately 20 - 25 minutes to complete b) they did not have any difficulties understanding the questions and statements, and c) they found that the survey was interesting and caused them to reflect on their perceptions of the innovation process. I later confirmed the feedback with one of the principals when I discussed it with him in person.

Instrument reliability and validity

Campbell and Russo (2001) ask, "When measuring an unseen attitude or personality trait, then, how can the social scientist be sure that the measure actually reflects the trait?" (p. 1). What they are saying in effect is how can a newly created measure such as a survey be deemed to be valid? Researchers have constructed several methods to test for or establish validity over the years. One of these is *face validity* better known as *content validity*. This is described as when an instrument gathers data that appears to measure the trait (Campbell & Russo, 2001). The original instrument design used by Hurt and Teigen (1977), and Hurt, Joseph and Cook (1977) was tested and demonstrated to have good validity. In addition, the previous two studies that I am replicating indicated similar results. I used Microsoft Office Excel 2016 statistical functions to test for relationships regarding innovativeness.

According to Juni (2007), reliability of instrument has two primary aspects: it is "(a) a reliable tool [that] will give similar results when applied by different users (such as technicians or psychologists). (b) It will also yield similar results when measuring the same object (or person) at different times" (p. 834). For the purposes of my study I will be using the survey instrument that Mitchell (2008) and Williams (2013) used in their studies. As previously mentioned researchers (Hurt & Teigen, 1977, and McCroskey et al., 2006)

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established an alpha of .90 suggesting the instrument was internally reliable. Due to the small sample of my application I did not try to establish reliability within this context.

Data analysis

The first stage of this mixed-method research was to compile and analyze the data collected from the survey instrument. I used descriptive statistics for this process utilizing Microsoft Office Excel for Windows. This software is suitable for analysing data obtained by surveys. A *p*-value of .05 was used for statistical significance analysis. (adapted from Mitchell, 2008)

Research question 1: What are public school principals' perceptions of their own individual innovativeness? Survey items 1 - 45 were calculated based on the responses from public school principals. Items 1 - 20 of the survey provided information on their perception of individual innovativeness. Composite means were calculated to determine central tendency and standard deviations were calculated to determine the dispersion of data.

Research question 2: What are public school principals' perceptions of their organization's innovativeness? Items 21 - 45 of the survey provided information on principals' perceptions of organizational innovativeness for their schools. Composite means were calculated to determine central tendency and standard deviations were calculated to determine the dispersion of data.

Research question 3: Is there a difference between individual perceptions toward innovation and organizational perceptions toward innovation? Composite mean scores and standard deviations for the principals' perceptions of individual and organizational

innovativeness were calculated for each respondent. The *t*-test: Two-Sample Assuming Unequal Variances was used to determine if a difference existed between individual perceptions toward innovation and organizational perceptions toward innovation.

Research question 4: Are differences in perceptions of public school principals' regarding innovations related to organizational variables including school enrolment, financial resources, and professional development capacity? A *t*-test was used to determine if there were differences in the perceptions of public school principals regarding individual and organizational innovativeness related to school enrolment, financial resources and professional development capacity.

Research question 5: Are differences in perceptions of public school principals' regarding innovation related to demographic factors including age, gender, professional development practices? *T-tests* were computed to determine if there were differences in the perceptions of public school principals regarding individual and organizational innovativeness related to age, gender, and professional development practices. (adapted from Williams, 2013, pp. 62-65)

Phase 2: Qualitative data collection

The overarching theoretical framework that guided my interview protocol is based on *Rogers Diffusion of Innovations* as well as the literature review that is related to the complexities of leadership and leading innovation. My interview design was a semi-structured *face to face* format with the aim of probing principals' perceptions of individual and organizational innovativeness. More specifically, it is "designed to obtain information about [principals'] views, opinions, ideas and experiences". (Arksey, & Knight, 1999)

related to fostering innovation in schools. Hence, the interview questions were designed to invoke school principals' thoughtful introspections regarding their attitudes and beliefs toward the phenomenon of innovation. I utilized Willis' (2007) guiding principles for qualitative research as a general guideline for the interview process. These principles begin with the premise that each interview is based on the context of the interviewee, (i.e. each individual school principals' reality in my study). Further, as the interviewer, I must be open to multiple sources of influence and principal's perspectives regarding innovation. As well, the interview should have a natural flow to it rather than a mechanistic feel that can hinder gathering important information. I collected data in a consistent manner but was also open to emergent data that participants may reveal during the interview. Lastly, as an interviewer it was important to structure interviews in the most natural contexts and to conduct them with sensitivity and respect for the participants. Similarly, as the interviewer I viewed this process as an opportunity for reflection from the data gathered while being cognizant of my biases during the process.

Qualitative data were collected and analyzed from this suburban school district in March and April 2016. Bauer and Gaskell (2000) emphasize that qualitative interviewing has much to offer in terms of a research method.

> Beyond the broad objectives of description, conceptual development and the testing of concepts, qualitative interviewing may play a vital role in combination with other methods. For example, insights gained from qualitative interviewing may improve the quality of survey design and interpretation. (p. 39)

Bauer and Gaskell (2000) add that survey research design often uncovers unexpected results or phenomena that qualitative interviewing can help to explain.

Kvale (2007) succinctly puts that the qualitative research interview "is a uniquely sensitive and powerful method for capturing the experiences and lived meanings of the subjects' everyday world. Interviews allow the subjects to convey to others their situation from their own perspective and in their own words" (p. 11). McCracken (1998) states that "Without a qualitative understanding of how culture mediates human action, we can know only what the numbers tell us. The qualitative interview is useful because it can help us to situate these numbers in their fuller social and cultural context" (p. 9).

Sandelowski (2000) defines descriptive research design as a method of inquiry that is both descriptive and interpretive, with the interpretive aspect playing a lesser part than the descriptive part of qualitative research. However, she adds that interpretation cannot be avoided because as humans we filter events through our perceptions. More importantly, she observes, "Researchers conducting qualitative studies want to collect as much data as they can that will allow them to capture all of the elements of an event that come together to make it the event that it is" (p. 336). As such, I conducted open-ended interviews on an individual basis with the aim of gathering the personal accounts of school principals' perceptions related to the multiple elements of innovation as a change process in schools. In addition, this qualitative descriptive study used purposive sampling to capture this data. Qualitative descriptive studies can use any form of purposive sampling techniques, however, particularly useful is maximum variation sampling. This sampling technique "allows researchers to explore unique manifestations of a target phenomenon across a broad range of phenomenally and/or demographically varied cases" (Sandelowski, 2000, p.338).

Data collection method

Data collected for this qualitative study used a semi-structured interview format with open-ended questions and responses. Creswell (2012) states that by asking open-ended questions participants can "voice their experiences" somewhat free of researcher perspectives and "past research findings" (p. 218). This format is structured so that the interviewer establishes the topic and guides the conversation toward the aims of the research (Corbetta, 2003). This also allows for the interviewer to probe for deeper understanding of the phenomenon being studied from the participants' real world perspective. My study consisted of personal interviews conducted on an individual basis with the participant and myself.

Like any research method, the interview approach has both strengths and weaknesses. Creswell (2012) notes:

> Some advantages are that they provide useful information when you cannot directly observe participants, and they permit participants to describe detailed personal information. Compared to the observer, the interviewer has better control over the types of information received, because the interviewer can ask specific questions to elicit this information.
>
> Some disadvantages are that interviews provide only information "filtered" through the views of the interviewers (i.e. the researcher summarizes the participants' views in the research report). Also, similar to observations, interview data may be deceptive and provide the perspective the interviewee wants the researcher to hear. (p. 218)

Study sample

Twenty-three principals completed the previous quantitative survey and of those

returned 13 volunteered to participate in the interview portion of this study. As a result of having a small pool of participants I decided to interview all 13 principals. I had also hoped that the 13 participants would represent a stratified sample of Rogers' (2003) five adopter categories: 1) Innovators, 2) Early Adopters, 3) Early Majority, 4) Late Majority, and 5) Laggard or Traditionalists. Unfortunately, the 13 principals' individual adopter categories were that of *innovators* and mainly *early adopters.* I was also hoping that the 13 participants would represent a balance of gender, age, administrative experience and work in different demographic areas of the school district. This sample did provide a broad representation of these factors in relation to the exploration of innovation as change in schools. More importantly, it provided in-depth explanations and understanding of the broad concept of innovation as experienced by individual principals' accounts.

As Bauer and Gaskell (2000) comment, "The real purpose of qualitative research is not counting opinions or people but rather exploring the range of opinions, the different representations of the issue" (p.41). The authors caution that the notion of interviewing many participants does not necessarily translate to richer data or a better understanding of the phenomenon being studied. Instead, the quality of interviews relies on the process of reaching a point where a common set of themes starts to emerge. This they say does not require a specified number of interviews for this to happen (Bauer & Gaskell, 2000).

Importantly, Bauer and Gaskell (2000) stress prior to beginning the interview process it is necessary to prepare a framework or interview guide. A guide acts as a framework of potential topics related to the research issue to be discussed with the interviewee. They are not necessarily a set of specific questions to be asked. Instead, they are paragraph headers that act as prompts for the interviewer. For this study I used these categories as my guideposts during the interview: 1) Understandings – of the broad

concept of innovation as it relates to personal views associated with its importance or not for transforming schools. 2) Challenges & Barriers – perspectives related to difficulties of bringing about change through innovation 3) Individual/organizational characteristics – discussion of innovation leadership skills principals possess as well as what is needed to be an innovative leader. There was also discussion of principals' perceptions regarding innovation and the organization – i.e. school and district (see interview protocol Appendix C, p. 256).

Principals interview protocol: Perceptions of innovativeness

The purpose of the interview was to explore the dynamics of innovativeness as it pertained to school principals and their school as an organization. Innovativeness has to do with how early in the process of adoption of new ideas, practices, etc. that the individual or organization is likely to accept a change (Rogers, 2003). The online survey from the quantitative phase provided an overview of principals' characteristics in relation to their perceptions toward individual and organizational innovativeness. More specifically, the individual innovativeness survey results measured principals' orientations toward change and the organizational innovativeness survey results measured principals' perceptions of their school's orientations toward change. Survey results ranked principals' individual and organizational innovativeness in accordance with Rogers (2003) five adopter categories. This provided a general picture that the interviews could explore further.

More importantly, interviews provided an opportunity to gather specific examples of some of the key aspects regarding innovativeness as experienced by principals. Interview questions asked for principals' insights into how they experienced the change process and how they understood and fostered innovation in their schools. Survey results and the

ensuing adopter categories assigned to principals' based on their responses also led to further exploration of whether their adopter categories were congruent with their interview responses. Moreover, the interview process afforded principals the opportunity to provide additional information and meaningful context to survey statements such as, *I seek out new ways to do things or My school is receptive to new ideas,* as a way of understanding their interpretation of the innovation phenomenon. Critically, principals' opinions, beliefs, and challenges regarding the innovation process provided deeper insight into answering the major research question of this study.

I developed my interview protocol by adapting the framework of St. Clair (2008). His interview protocol was designed specifically for research in a higher education setting. Although my research setting was public schools several of St. Clair's questions were applicable to what I wanted to ask in my interviews with appropriate modifications. For example, I adapted his questions pertaining to rating a school's and district capacity for innovation using a 1-10 scale. In addition, I modified questions regarding unexpected successes and failures stimulating innovation initiatives as well as new technologies enhancing innovativeness in schools. Conversely, my framework or interview guideposts differed significantly from St. Clair's (2008) protocol in that the categories I generated were linked to further expanding upon the results of the quantitative phase of my study. As such, my questions focused extensively on the perceptions of innovation from the principals' viewpoint in comparison to St. Clair's (2008) organizational innovation focus at the higher education level.

Interview procedure

Prior to conducting the first interview I decided that I would ask each participant all

questions from my protocol. I wanted to collect my data in a consistent manner by asking the same questions in the order of the protocol. However, I did not prevent any participant from diverging from the original question as this potentially could lead to new insights of the innovation phenomenon in the school context. I noted any of these additional responses during the interview as well as those related to the designated question. I was able to ask each participant all the questions from my interview protocol. As well, after each interview I reviewed the audio recording and made further notations regarding potential themes emerging, insights, and additional questions that I could use for the subsequent interviews. The interviews ranged from approximately 20 to 50 minutes in duration. (see Table 4, p. 93)

The first set of questions was a way to recheck background information gathered during the quantitative survey phase of the study. These were general questions related to years of experience as a school principal as well as the number of years at their current school. Further questions related to the school's context in terms of its demographics, culture, climate and other general information. It was also a way to make principals comfortable by talking about their schools before delving into the remainder of the interview.

The second set of questions examined principals' perceptions regarding how they viewed their schools on the innovativeness continuum. I felt that first it was important to gain an understanding of how they defined innovation in regards to school improvement. This would prove valuable in understanding how principals viewed this phenomenon for purposes of fostering change in their schools. Questions also explored principals' perceptions for their school's capacity to innovate.

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The third set of questions focused on how principals' perceived themselves on the innovativeness continuum. More specifically, it examined how they promoted and supported innovation in their schools, or whether they had lead innovation efforts. An important aspect to their perceptions included whether they saw themselves as being innovative. Questions also focused on gaining insights into the challenges principals face in fostering the innovation process.

For the fourth set of questions principals were asked for examples of successful or failed innovation endeavours that led to further initiatives. Questions also explored principals' views of the ubiquity of technology in regards to whether it has enhanced innovativeness in their schools.

The last question provided principals with the opportunity to discuss any insights regarding leadership and innovation. This allowed for an open discussion on a wide range of topics from challenges faced systemically to foster innovation at the school level, to that of nurturing a culture that is open to the inevitably of a changing world. More importantly, were principals' views on the urgency to embrace the change for the sake of relevant and meaningful student learning.

Table 4: Summary of interview process, participants, & duration

Interview #	Name (pseudonyms)	Interview Date	Interview Duration	# Transcribed pages
1	Shelia	March 1/16	0:31:22	10
2	Patricia	March 3/16	0:20:07	7
3	John	March 9/16	0:27:32	9
4	Allan	March 10/16	0:35:50	14
5	Jason	March 31/16	0:31:55	11
6	Beth	March 31/16	0:26:45	8
7	Brian	April 1/16	0:54:11	16
8	April	April 4/16	0:36:45	18
9	Debbie	April 4/16	0:46:27	13

10	Don	April 7/16	0:22:49	8
11	Jack	April 7/16	0:41:08	11
12	Ron	April 11/16	0:24:35	9
13	Daphne	April 12/16	0:30:55	12

Pilot test of interview

To obtain a better feel for the questions I would be asking I sought out a principal from a neighbouring district to pilot test my interview protocol. It was also a way for me to get comfortable with the interview process as a first time interviewer The participant was a principal with over ten years of experience having served in this role in several schools during his current tenure.

My main focus was to listen to the responses offered to the questions I posed as well as to observe if the questions were understood. It was also an opportunity to reflect on my interviewing techniques in terms of the flow of the process, how I asked questions, wait time for the interviewees responses as well as to monitor my biases. Importantly, the feedback provided by the volunteer principal allowed me to review my questions for clarity and possible revision.

I digitally recorded the interview using a Sony IC recorder. The interview was approximately 25 minutes in duration. After the interview I debriefed the process with the volunteer principal. First, I asked if the questions were easily understood. The principal indicated that the questions were clear and he did not have any difficulty responding to them. I then asked if any of the questions could be improved to be more specific and less ambiguous. He suggested that two of the questions could be revised to be more specific by including a rating scale that interviewees would respond to as part of the question. I agreed with his suggestion and made the revisions to the two questions. I then asked what

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his overall experience was with the interview. He felt that the questions were thought provoking and led him to examine his assumptions of how he perceived the notion of innovation in relation to his school.

Lastly, the interview pilot allowed me to review the audio recording to better prepare me for the upcoming interviews for my study sample. I listened to the recording focusing on the responses given to the questions asked. My focus was to understand how each question was being interpreted by the interviewee. Moreover, it allowed me to reflect on how I might look for ways to ask additional questions to delve further into and expand upon each topic being discussed in relation to my research question. I noted potential questions that I added to the questions regarding rating participants' school capacity for innovation and their self-assessment of whether they saw themselves as innovative. I did use these additional questions if I needed the participant to further expand upon their responses. For example, for the question "*Do you see yourself as innovative?"* if they replied with a "no" response I would then ask them to further explain their reasons for this.

Analysis of qualitative data

Once interviews were completed the next step in the process was to gather the data and prepare it for analysis. Cohen, Manion, and Morrison (2007) state that, "Qualitative data analysis involves organizing, accounting for and explaining the data; in short, making sense of the data in terms of the participants' definitions of the situation" (p. 461). There is no one best way to analyze qualitative data due to its highly interpretive nature. Rather it is important to look at the *fitness for purpose,* i.e. what the researcher wants to do with the data (Cohen et al., 2007, p. 461).

Initial preparation of text data

According to Creswell (2012), the first step is to develop a way to organize the large amount of data in an organized manner. When the semi-structured interviews were completed the audio recordings were sent to a transcription service. The transcribed audio recordings were then imported to NVivo 11 Plus software program for further analysis. This software program helps with organizing, and managing qualitative data. NVivo also allows researchers to use the query function to analyze words, text, participant demographic information for additional insights and possible connections. More importantly, it provides a way to easily manipulate data and code it into *nodes*. A *node* is like a container where coded sources are stored for future analysis. Nodes represent themes/categories, topics, concepts, ideas, opinions or experiences. Creswell (2012) defines the coding process as making sense of the data (text) and eventually reaching a "redundancy" point in the coding process where the researcher can then begin to narrow it down to broad themes or categories.

I began the data analysis process by listening to the audio recordings of the interviews after their completion in April 2016. I checked the quality of the audio recordings for each participant as well as to get an initial sense of the overall interview process. Upon receiving transcribed interviews, I again listened to the interview recordings a second time with the purpose of correcting any errors or omissions of the transcribed documents. I was able to correct a few omissions of dialogue due to the transcriptionist not being able to clearly hear what the participant or myself were saying. As well, I corrected a few words that were incorrectly transcribed. Reviewing audio recordings and transcriptions also provided me with a reorientation to all interviews as well as a getting a feel for potential categories for later coding purposes.

Data analysis: From coding to categorizing

With large amounts of data to organize and interpret it is important to apply a systematic approach in order to analyze the data into a coherent narrative to answer the research question (Flick, 2014; Creswell, 2012; Payne & Payne, 2004; Gibbs, 2007). This process involves categorizing the qualitative data looking for patterns or commonalities from participant responses that could lead to potential themes to further explore the research phenomena. Saldana (2011) describes this categorizing process as a way to organize and order the large amounts of data from a study so that one can "better grasp the particular features of each one, and the categories' possible interrelationships with one another" (p. 92).

Similarly, in order to analyze the data to answer the research question it was necessary to reduce the amount of data by using a content analysis approach (Flick, 2014; Graneheim; Lindgren, & Lundman, (2017). Flick (2014) explains that, "content analysis helps with reducing the amount of material…it requires the researcher to focus on selected aspects of meaning, namely those aspects that relate to the overall research question" (p. 170). He adds, that this is accomplished by assigning the selected data passages to a coding frame, which he emphasizes is the "heart of the method". More importantly, Flick (2014) asserts that this coding frame "contains all those aspects that feature in the description and interpretation of the material" (p. 170). For the purposes of my study I used an inductive or data driven approach (Schreier, 2012) to identify emerging categories. As well, I used *a priori* categories from my interview protocol. For example, I used the interview topic guide of *barriers and challenges*, as a preliminary category. According to Graneheim, Lindgren, and Lundman (2017), this process "is characterised by a search for patterns…[where] the researcher looks for similarities and differences in

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the data, which are described in categories and/or themes on various levels of abstraction and interpretation (p. 30). Rubin and Rubin (2005) describe this analysis process as breaking down interview comments into *data units*, which are "blocks of information that are examined together" in an effort to group common understandings into categories or themes. They add that the key to this process is to determine "appropriate data units, as they differ depending on what precisely is being analyzed" (p.203). Thus, the inductive process of content analysis can be viewed as a method of "searching for concepts, ideas, themes, and categories that help the researcher organize and interpret data" (Given, p. 86).

For my content analysis I used the main topics/categories of my interview questions as a framework to sort the text into four content areas. These areas were: 1) views toward the innovation phenomena; 2) barriers and challenges to fostering innovation; 3) leading and supporting innovation; and 4) perceptions of innovation characteristics. This initial step of sorting text into content areas provided a general way to what Gibbs (2007) describes as "linking sections of text with thematic ideas that reveal the person's experience of the world". He adds that this is a "deliberate and thoughtful process of categorizing the content of the text" (p. 39). In addition, Gibbs (2007) notes that during the content analysis process "there will be different examples of things in the text, but there are [also] different *types of* things referred to" (p. 40).

For my analysis of participant interview transcripts, I followed a systematic process of *identifying, coding, categorizing, classifying and labelling* the text as I searched for patterns in the data across all interviews (Given, 2008; Payne & Payne, 2004; Rubin, & Rubin, 2005; Schreier, 2012). The following sections describe the content analysis process I used to analyze interview transcripts.

Identifying

I first began by printing all participants' interview transcripts received from the transcriptionist in order to have physical copies for future analysis. I then read all the transcripts with the aim of reviewing and reacquainting myself with the interviews and the corresponding participants. During this initial reading of the text I noted various ideas and concepts for future exploration "without concern for how they relate" to one another or across all interviews (Given, 2008). I then conducted a second reading of the interview transcripts after importing them into the NVivo 11 Plus software program. My focus was to search for and select *data units*, described by Rubin and Rubin (2005), as blocks of information, or ideas that can be grouped and examined together. I was then able to use the NVivo program to select, highlight, and save *data units* to nodes with potential labels I initially coded from the physical copies of interview transcripts. These coded nodes would later be used for tagging.

Coding

Although I used NVivo to create nodes from the interview transcripts for later coding analysis, I decided to return to reading the physical transcript copies. I proceeded to read each interview transcript line by line while noting potential codes in the left margins and themes/categories in the right margins. This analysis process is described as *initial or open coding*. Given et al. (2008) defines open coding as, "identifying potentially interesting events, features, phrases, behaviors, or stages of a process, and distinguishing them with labels" (p. 86). Part of my reasoning for this was for the ease of reading from top to bottom of a page without the necessity to scroll up and down in the NVivo program. This would make it easier for me to locate the previously saved *data units* in NVivo and

label the codes that I noted from the printed copies of the transcript. According to Given et al. (2008), coding is a dynamic process that involves attaching code labels to identify "occurrences, meanings, activities, or phenomena" so that the researcher can "group instances or events that are similar and to distinguish those that differ" (p.87).

As mentioned, coding should not necessarily be viewed as a linear process (Given et al., 2008). Thus, during the initial coding stage I used a *focused coding* approach to refine the coded data units. Given (2008) explains that "it is through repeated reviewing and coding of the data that links between various codes are made and relationships among categories begin to solidify" (p. 88). During this process I also deleted some of the extraneous data from the chunked text for the labelled codes from all transcripts. This helped to reduce the text into more concise data units for further analytical purposes. Importantly, it helped to establish potential links between participant responses and emerging categories (Gibbs, 2007; Given, 2008; Graneheim, Lindgren, & Lundman, 2017; Huberman & Miles, 2002; Payne & Payne, 2004; Rubin, & Rubin, 2005).

In the next step of the focused coding process I analyzed participant responses to all interview questions. Again, this procedure was conducted using the functions of NVivo. As Rubin and Rubin (2005) state, "more important than borrowing concepts and themes from the literature is finding those that emerge from the interviews" (p. 210). They add that a good starting point is "by using common sense and looking at the explicit terms you asked about in your questions and include these on your coding lists" (p. 210). For example, I used *defining innovation* and *leading and promoting innovation* terms from my questions as labelled codes. As I read each participant's responses to the corresponding questions I would search for new data units that I felt were pertinent to my research and highlight the text. If the highlighted text fit into any of the existing coded categories, it was moved into the appropriate nodes. Some of the new data units became subcategories of

existing codes. For example, "leader as innovative" became part of the "leading innovation" node. Conversely, if the new data units were not a fit for these preliminary nodes then a new node was created and labelled.

As a result of conducting the initial and focused coding stages I was able to refine and finalize assigned codes. In the latter part of focused coding I renamed codes, added new categories, reworked codes and integrated some of them into sub-categories of major categories using the NVivo *nodes* function. This served to further reduce overlap and redundancy of codes (Creswell, 2012; Gibbs, 2007; Given, 2008; Payne & Payne, 2004). See Table 5 below for an example of how I refined codes. As well, using NVivo I was also able to highlight particular data units within given nodes and link memos to them indicating interpretive or abstract thoughts for later elaboration. (Graneheim & Lundman, 2004 and Huberman & Miles, 2002). As Huberman and Miles, (2002) emphasize, interpretive analysis "involves making judgements about meaning, about the relevance and importance of issues, and about implicit connections between ideas" (p. 315).

Table 5: Sample of refining codes

Data unit	Reduced data unit	Code
there are always new technologies coming through, as a school leader we have to be familiar with what is coming down the pipe and we have to be able to see, or have a vision, for how it fits within our school setting, how it improves performance results for our kids,	understanding how technology as innovation improves student learning	technology as improve-ment
my definition of innovation is some, something that's actually rather drastic I guess. A new thought and a new way of doing things and I find that true innovation within an institution is, is um, there are	innovation is a new thought, a new way of doing things	disruptive innovation

people that try new things, but I wouldn't call them innovative.		

Categorizing

My next step after completing the initial coding and the first part of the focused coding was to examine all participant interview responses for commonalities and differences. Saldana (2011) views this categorization process as an exploration of how the patterns and categories "interact and interplay" with one another in an "interrelationship" (p. 92). He emphasizes that this is one of the key steps where "interesting webs of connections may emerge" (p. 92). Using NVivo I reviewed participants' coded data units that had similar ideas being expressed on the same topic and then combined them into one related category (Gibbs, 2007; Kuckartz, 2014; Rubin & Rubin, 2005). By grouping similar codes of participants into appropriate categories helped to reduce the number of codes into manageable major categories. Creswell (2012) notes that it is better to provide detailed information for fewer categories rather than "general information about many [categories]" (p. 245). Using Creswell's (2012) "layering" coding strategy to regroup content into new or existing categories, and collapsing other categories, I was able to reduce the number of emerging categories from twenty to fifteen. Layering themes or categories is the process of interconnecting minor ideas with major ideas with the aim of reconceptualising concepts into broader, more abstract categories (Creswell, 2012 and Givens, 2008). This stage of the content analysis process is important in that all data has been coded, major and minor categories established and there is no new information to be added to new or existing categories/themes (Creswell, 2012).

Trustworthiness

Given (2008) defines trustworthiness as "the ways in which qualitative researchers ensure that transferability, credibility, dependability, and confirmability are evident in their research (p. 896). In this context of a qualitative study, it is a way of checking findings for accuracy or credibility using strategies such as triangulation or member checking (Creswell, 2012). For the purposes of my study I utilized both triangulation and member checking.

Triangulation is a multi-method approach often used in qualitative research to better understand a phenomenon (Rothbauer, 2008). It is a way of verifying the evidence of the study from different sources. I was able to use the quantitative survey and the interview transcripts for triangulation purposes. From this information I was able to use four sources of data analysis for my research. First, was the statistical data analysis from the principals' perceptions of individual and organizational innovativeness survey. As well, I used the demographic information from the survey to further strengthen the evidence of the qualitative phase. This was included as a third part of the online survey with the intent of gathering specific demographic and professional information for later statistical analysis.

Second, I did a *member check* from the data analysis of the interview transcripts. Member checking is a process where the researcher returns to the participants who were interviewed and asks for verification of information they provided in the interview (Creswell, 2012). I interviewed one of the principals asking if the transcription of the interview was an accurate reflection of his responses. He agreed with his overall responses to the content of the interview. I then reviewed the codes that I had assigned

to his interview transcript with him. For example, some of the assigned codes for text data were given titles such as *school as community, collegial staff, technology as innovation and rural school and change.* I asked if these codes were a fair representation of his responses for each particular section of text. In addition, I also asked if the potential themes that I had assigned for each code was an accurate reflection of the corresponding text. He felt that the potential themes I had assigned each code was a good summation of the correlating text. Although, he did mention that the theme I had assigned to the *rural school and change* code was not a generalized response that all rural schools usually have conservative minded teaching staff. Thus, I was confident that this process was a good source for confirming the validity of my qualitative data analysis. Because of time and resource restrictions, I did not continue to member check every transcript. If the participant in this initial member check had found problems with either my transcription or interpretation, I would have continued the member checking to better examine any challenges I was having documenting and/or interpreting their responses.

The third source for confirming validity was the synthesis of the quantitative and qualitative data, which provided a greater understanding of principals' perceptions in relation to the notion of innovation. The fourth source of validity confirmation involved the partial replication of the two previous studies quantitative survey. This comparative analysis of these findings across the three studies was another source for strengthening the validity of my research.

Reproducibility

Given (2008) views the notion of achieving reproducibility as a challenge for the qualitative researcher due to the nature of our ever changing social world. Instead she

asserts that the notion of *dependability* may be more realistic in the qualitative context

(p. 897). Given (2008) adds, that this allows the researcher to lay "out his or her

procedure and research instruments in such a way that others can attempt to collect

data in similar conditions. The idea here is that if these similar conditions are applied, a

similar explanation for the phenomenon should be found" (p. 898). In the context of my

study I followed a clearly defined process in terms of initial preparation for interviews

through to transcription of audio to text and finally to analysis and reporting of data. All

interviews had the same questions asked of participants following a sequential order. In

addition, as the sole interviewer this allowed for questions to be asked in a consistent

manner further strengthening the credibility of this study. A digital audio recorder was

used to record the interview conversation. I then coded and recoded transcripts on

printed paper copies as well as repeating this process with the Nvivo 11 software

package. This was another way to check for consistency of participants' responses and

reliability. As the interviewer, an important aspect was to maintain a sense of neutrality

when interviewing each participant (Kvale, 2007). This was accomplished by asking

interview questions and allowing participants to freely express their opinions without

interruption. Further, interview participants represented a broad demographic sample,

which further enhanced the reliability of this study.

I also emailed transcripts of the interview to each principal asking if they could read

it and reply with any comments. Ten of the 13 principals replied that they were satisfied

with their interview responses. The remaining 3 principals did not respond to my request

for their feedback. This was another approach that verified the accuracy of participants'

responses further strengthening the reliability of the study.

Researcher Reflections

There were many biases and assumptions to consider throughout my research. Keeping a journal and reflecting on various aspects of the research process, and in particular, during interviews was beneficial to my growth as a researcher. For example, pilot testing my interview protocol allowed for later examination and reflection of how the interviewee understood and responded to questions. More importantly, I was able to note whether my questioning was clear and also if I was asking any leading questions. This was one way of reducing potential bias as the researcher. In addition, as a researcher and a school principal with extensive knowledge of the role, it was important to understand how this duality required careful observance in order to minimize any potential biases from entering into the research process. As Stewart (2010) emphasizes, "Careful examination of this development as a contributing factor has implications for how scholars situate themselves in their research, as well as for how future researchers and practitioners are educated" (p. 292).

According to Stewart (2010) the importance of the growth and development of a researcher cannot be understated. She asserts that, "the evolving knowledge and skill of the researcher can lead to refinements in interview questions, data analysis, and interpretations" (p. 292). Further, Stewart (2010) states, that this is especially important if the researcher uses a constructivist methodological approach which views "the researcher as a central and vital instrument in the collection and interpretation of data" (p. 292). In addition, she adds that the extent of the researcher's skills determines the credibility of the qualitative research findings.

In retrospect as a novice researcher there were aspects of the research that I would approach differently in regards to methodologies used. For one, it would be interesting to have conducted the qualitative phase first. Gathering principals' experiences

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regarding their perceptions of innovation from interviews could have potentially led principals to respond differently on the subsequent survey phase in regard to their perceptions of individual and organizational innovativeness. This could have provided a better understanding and linkage of the two phases regarding the innovation phenomenon. As well, having discovered that the interview process was a much richer part of the research process in terms of the valuable insights and experiences gathered from principals, it may have been useful to conduct a qualitative inquiry only. Having experienced the interview process, I would also reduce the number of questions asked to allow for more open and candid conversations. This would include refining the types of questions asked that were more pertinent to my research questions. It would also be beneficial to extend this process to include teacher's perspectives of principal's innovativeness, their own innovativeness, and that of their schools. These approaches would provide further opportunities for triangulation which in turn would strengthen the credibility of the research.

Ethical responsibilities

Research studies raise various ethical issues that need to be considered by the researcher. Patton (2002) suggests general ethical considerations "such as reciprocity, assessment of risk, confidentiality, informed consent, and data access and ownership" (as cited in Creswell, 2012, p. 231). For my study, the first priority was to seek approval from the Simon Fraser University Ethics Approval Board. This involved satisfying the requirements that the study's purpose will do no harm to participants as well as guaranteeing confidentiality and informed consent. A similar process was followed in order to obtain permission from the school district research site. Written permission outlining the purpose of the study along with information pertaining to confidentiality and informed

consent was approved by the school district superintendent. The same holds true for obtaining permission and informed consent from participants for both the quantitative and qualitative aspects of this study. At all times confidentiality must be stressed to participants. In my study, a question asking for volunteers for the interview process was obtained from the first phase: quantitative survey research design. Selected participants were contacted to seek confirmation of consent and to arrange a time for the interview.

Prior to the commencing the research process participants were given a consent form. The purpose of the research study was explained through an informational letter sent electronically to each participant. Reassurance was given that the survey and interview would be conducted with sensitivity and strict adherence to confidentiality. Participant's honesty and openness was encouraged for the interview. Assurance was also given that recorded material would be kept and stored in a safe location by the interviewer only.

Summary

This section reviewed the methodology and research design of my mixed-method study. The purpose of this section was to describe and explain the framework that I used to conduct my research study with the aim of exploring principals' perceptions of innovation as it relates to individual and organizational innovativeness. The format of this study consisted of a survey research design replication from previous doctoral studies (Mitchell, 2008 and Williams, 2013) and an interview protocol as a follow-up. Descriptions and discussions of data collection, and data analysis methods were included along with validity, reliability and ethical considerations.

Chapter Four

Analysis of Findings Phase One – Survey Data Results

Whether an order is formed or not depends on whether or not information is created…the essence of creating order is the creation of information.
–Ikujiro Nonaka

This chapter summarizes survey data collected from the first phase of this study, which examined the overarching question of public school principals' perceptions and how their orientation toward innovation are related to individual and organizational characteristics. Specifically, the survey's focus sought to answer these research questions:

1: What are public school principals' perceptions regarding their own individual innovativeness?

2: What are public school principals' perceptions regarding organizational innovativeness?

3: Is there a difference between individual perceptions toward innovation and organizational perceptions toward innovation?

4: Are differences in perceptions of public school principals regarding innovations related to organizational variables including school enrolment, school budget and school demographic data?

5: Are differences in perceptions of public school principals regarding innovation related to demographic factors including age, gender, and professional development practices?

The following sections present data collected from the 23 survey respondents. Specific public school principals' characteristics and those of their schools were analyzed to determine individual and organizational characteristics. Individual principals' perceptions toward innovation were then compared with the individual and organizational innovativeness characteristics to determine if there was a difference.

Sample characteristics:

The quantitative sample for this mixed method study was gathered from K – 12 principals in District X who voluntarily completed the phase one online survey within the one-month time frame. An online electronic survey was distributed to 47 elementary, middle school, and secondary principals. From this sample of 47 principals, 23 respondents completed the online survey for a response rate of 47.9%.

Public school principals' perceptions of individual and organizational innovativeness

Research questions one and two examined public school principals' perceptions as they relate to individual and organizational innovativeness. Survey items 1 – 20 measured perceptions toward individual innovativeness. Composite mean scores and standard deviations were calculated for each respondent's answers to the survey items. Questions 21 – 45 measured perceptions toward organizational innovativeness. Mean scores and standard deviations were also calculated for each respondents' answers to these survey items. In addition, adopter categories based on Rogers (2003) innovation classifications were calculated for each respondent in regards to their perceptions of individual and organizational innovativeness.

Individual innovativeness

Composite mean scores were calculated for each respondent based on responses to survey questions 1 – 20 in relation to their perceptions of individual innovativeness. Survey questions were based on a five-point Likert scale. Principals were asked to indicate their level of agreement to statements that ranged from *Strongly Disagree = 1 point, Disagree = 2 points, Neutral = 3 points, Agree = 4 points and Strongly Agree = 5 points.* Principals were more supportive of the statements, *I seek out new ways to do things* (M = 4.47), *I find it stimulating to be original in my thinking and behavior* (M = 4.47*), I enjoy trying new ideas*, (M = 4.43), and *I enjoy taking part in leadership responsibilities of the group I belong to* (M = 4.34). Similarly, in keeping with the positive oriented statements, and more importantly aligning scores for a consistent statistical direction, I inverted the scoring scale for statements that were negatively worded. For example, least supportive statements such as, *I'm usually one of the last people in my group to accept something new* and *I tend to feel that the old way of living and doing things is the best way,* would have been scored as (M = 1.52) and (M = 1.73) respectively. Thus, with the inversion of the Likert scoring scale for these statements scores were reported as M = 4.48 and M = 4.26. I followed the same procedure when calculating scores for *organizational innovativeness.* Descriptive statistics of public school principals' perceptions of individual innovativeness are shown in order as they appeared on the survey below in Table 6.

Table 6: Perceptions of public school principals' individual innovativeness

	N	M	SD
My peers often seek out my advice	23	3.78	.902
Enjoy trying new ideas	23	4.43	.506
Seek out ways to do new things	23	4.47	.510
Cautious accepting new ideas	23	3.78	.850

Frequently improvise methods	23	4.13	.814
Suspicious of new methods/thinking	23	4.09	.596
Rarely trust new ideas	23	4.17	.576
Consider myself creative/original	23	4.04	.928
Usually last one to accept new ideas	23	4.48	.510
Inventive kind of person	23	4.08	.733
Enjoy taking part in leadership	23	4.34	.647
Influential member of group	23	3.91	.668
Stimulating to be original in thinking and behaviour	23	4.47	.510
Old way of doing things is better	23	4.26	.751
Challenged by ambiguity	23	3.60	1.03
Must see others use new innovation	23	2.08	.733
Reluctant adopting new ideas	23	4.00	.738
Challenged by unanswered questions	23	3.69	1.06
Skeptical of new ideas	23	4.26	.599
Receptive to new ideas	23	4.08	.848

Innovativeness adopter categories were assigned using the McCroskey (2006) *Communication Research Measures: Individual Innovativeness Survey.* This survey instrument was an adaption of Hurt and Cook's, (1977), *Scales for the measurement of innovativeness.* An Innovativeness Score and category were calculated based on responses from each respondent to survey items 1 - 20. This involved a 3-step process that calculated an innovativeness score and corresponding adopter category. The first step involved adding the scores of survey items 4, 6,7,10, 13, 15, 17, and 20. Step two consisted of adding the scores of items 1, 2, 3, 5, 8, 9, 11,12,14,16, 18, and 19. The final step involved completing the formula: Individual Innovativeness = 42 + total score from step two – total score from step one. Scores were then correlated to specific categories. Scores above 80 are classified as *Innovators*. Scores between 69 and 80 are classified as *Early Adopters*. Scores between 57 and 68 are classified as *Early Majority*. Scores between 56 and 46 are classified as *Late Majority*. Scores falling below 46 are classified

as *Laggards/Traditionalists.* Generally, scores above 68 indicate that individuals are considered to be highly innovative, and those who score below 64 are considered to be low in innovativeness. Descriptive statistics for District X public school principals are summarized in Table 7 below:

Table 7: District X public school principals' individual innovativeness adopter categories

	N= 23	%
Innovators	7	30.4
Early Adopters	15	65.2
Early Majority	1	4.3

Organizational innovativeness

Composite mean scores were calculated for each respondent based on responses to survey questions 21 – 45 in relation to their perceptions of organizational innovativeness. Respondents were more supportive of the statements, *My organization maintains good communication between supervisors and employees* (M = 4.00), *My organization is willing and ready to accept outside help when necessary* (M = 3.65), *My organization is receptive to new ideas* (M = 3.60), and *My organization is very inventive* (M = 3.56). As mentioned previously negatively worded statements were analyzed using an inverted scale for consistent statistical direction. The statement, *My organization rarely involves employees in the decision-making process* was calculated as (M = 4.43) from the original (M = 1.74), and *My organization never satisfactorily explains to employees the reasons for procedural changes* (M = 3.96) from the original (M = 2.04). Descriptive statistics of public school principals' perceptions of organizational innovativeness as it relates to their individual school's are shown below in Table 8.

Table 8: Perceptions of public school principals' organizational innovativeness

	N	M	SD
Leader among other schools	23	3.43	.945
Suspicious of new ways of thinking	23	3.70	1.25
Very inventive	23	3.56	1.07
Often consulted by other schools	23	2.82	1.19
Cautious about accepting new ideas	23	2.73	1.17
Creative in methods of operation	23	3.52	1.03
Last to change to a new method	23	3.48	1.08
Considered one of the leaders	23	3.34	.934
Receptive to new ideas	23	3.60	1.03
Skeptical of new ideas	23	3.30	1.14
Old way of doing things is the best	23	2.65	1.19
Original in its operational procedure	23	3.43	.895
Slow response to necessary changes	23	3.52	.897
Reluctant to adopt new ways	23	3.30	1.18
Is challenged by new ideas	23	3.08	1.04
Is slow to change	23	3.00	1.08
Rarely involves employees	23	4.43	.506
Good communication between supervisors & employees	23	4.00	.953
Is influential with other schools	23	3.00	.919
Seeks out new ways to do things	23	3.39	.988
Initiates new methods of operations	23	3.43	.843
Rarely trusts new ideas and ways	23	3.17	.936
Never satisfactorily explains changes	23	3.96	.705
Frequently tries out new ideas	23	3.52	.845
Willing to accept outside help	23	3.65	.775

Organizational innovativeness adopter categories were formulated using the McCroskey (2006) *Communication Research Measures: Organizational Innovativeness Survey.* An Organizational Innovativeness Score and category were calculated based on responses from each respondent to survey items 21 - 45. This involved a 3-step process that calculated an organizational innovativeness score and corresponding adopter category.

The first step involved adding the scores of survey items 21, 23, 26, 28, 32, 34, 35, 37, 38, 42 and 43. Step two consisted of adding the scores of items 22, 24, 25, 27, 29, 30, 31, 33, 36, 39, 40, 41, 44 and 45. The final step involved completing the formula: Organizational Innovativeness = 66 + total score from step two – total score from step one. Scores were then correlated to specific categories. Scores above 110 classified organizations as *Innovators*. Scores between 91 and 110 classified organizations as *Early Adopters*. Scores between 90 and 71 classified organizations as *Early Majority*. Scores between 70 and 50 classified organizations as *Late Majority*. Scores falling below 50 classified organizations as *Laggards/Traditionalists.* Generally, scores above 90 indicate that an organization is considered to be highly innovative, and those who score below 50 are considered to be low in innovativeness. Descriptive statistics for District X public school principals are summarized in Table 9 below.

Table 9: District X public school principals' organizational innovativeness adopter categories

	N=23	%
Innovator	2	8.6
Early Adopters	9	39.1
Early Majority	8	34.7
Late Majority	3	13.0
Laggard/Traditionalists	1	4.3

Relationships of public school principals' perceptions of individual and organizational innovativeness

The third research question asked if there was a difference between public school principals' perceptions of individual innovativeness and organizational innovativeness. Composite mean scores and standard deviations were calculated for the variables of individual and organizational innovativeness. A *t-test: Two-Sample Assuming Unequal*

Variances was used to determine the strength of the relationship between the two variables. Results of the t-test calculation indicated a significant difference (.000)* existed in regards to public school principals' perceptions of individual and organizational innovativeness. This finding is consistent with the studies I partially replicated, in that principals' perceived themselves to be more innovative than their schools. Table 10 provides a summary of the analysis of these results.

Table 10: Correlation between perceptions of individual innovativeness and organizational innovativeness

	Individual Innovativeness	*Organizational Innovativeness*
Mean	4.01	3.40
Variance	0.27	0.16
Observations	20	25
Hypothesized Mean Difference	0	
df	35	
t Stat	4.31	
P(T<=t) one-tail	0.00	
t Critical one-tail	1.69	
P(T<=t) two-tail	.000*	
t Critical two-tail	2.03	

Differences of public school principals' perceptions of innovativeness based on school variables

Research question four examined the potential of differences regarding principals' perceptions of individual and organizational innovativeness in relation to the specific school variables of school enrolment, school budget, professional development and capacity for the 2014-2015 school year. Composite mean scores were calculated for each

individual respondent from responses to the survey items. The mean scores were also calculated for each respondent's individual and organizational innovativeness.

School enrolment

Individual school enrolment for the 2015-2016 school year was used for calculating frequencies and percentages. Data was obtained from the 14 respective principals from the schools who indicated they would be willing to participate in an interview. This was an oversight on my part, since I had not included this question on the survey instrument I went back and asked these principals for this additional information. Had I included this question in the survey I could have obtained an additional eight responses from respondents who did not indicate a willingness to participate in an interview. Eight (57%) of the respondents' schools enrolled 400 or less students. Six (43%) of the respondents' schools enrolled 401- 800 students. A summary of school enrolment is shown in Table 11 below.

Table 11: School enrolment

Enrolment	N=14	%
0 - 400	8	57
401 - 800	6	43

Composite mean scores for public school principals' perceptions of individual and organizational innovativeness were calculated. School enrolment for 2015-2016 was divided into two categories: a) less than 400, and b) 401 – 800. The reason for these two groupings was that schools with less than 400 students do not have vice-principals and those over 400 do have one or two vice-principals depending on the size of school.

Results of the *t*-test indicated there was no significant difference in the composite mean scores of public school principals' perceptions of individual and organizational innovativeness in relation to school enrolment. Mean scores for individual innovativeness based on school enrolment less than 400 students was (M = 4.17), and for schools greater than 400 was (M = 4.03), *t = 2.23*, *p = 0.31*. Mean scores for organizational innovativeness based on school enrolment less than 400 students was (M = 3.40), and for schools greater than 400 was (M = 3.45), *t = 2.23*, *p = 0.87*. See Table 12 below for results.

Table 12: Enrolment and public school district principals' perceptions of innovation

Individual innovativeness - school enrolment	< 400	>400
Mean	4.17	4.03
Variance	0.05	0.07
Observations	8	6
Hypothesized Mean Difference	0	
df	10	
t Stat	1.06	
P(T<=t) one-tail	0.16	
t Critical one-tail	1.81	
P(T<=t) two-tail	0.31	
t Critical two-tail	2.23	

Organizational innovativeness -school enrolment	< 400	>400
Mean	3.40	3.45
Variance	0.28	0.37
Observations	8	6
Hypothesized Mean Difference	0	
df	10	
t Stat	-0.17	
P(T<=t) one-tail	0.44	
t Critical one-tail	1.81	
P(T<=t) two-tail	0.87	
t Critical two-tail	2.23	

Public school principal school budgets – 2015 - 2016

Fourteen respondents from the survey instrument indicated their annual operating budgets. Six (42.8%) public school principals reported annual operating budgets between $600,000 - 2 000 000. Eight public school principals reported annual operating budgets between $2 000 001 - 4 500 000. This small number of responses was due again to an omission of this question on the survey and then having to go back and ask respondents who were willing to participate in an interview for this additional information. I grouped the two budget categories according to school enrolment where the majority of the schools with budgets under 2 000 000 had enrolment no greater than 250 students and those with budgets over 2 000 000 were usually 300 or more in terms of student enrolment. Table 13 summarizes the frequencies and percentages of the annual operating budgets of the public school principals.

Table 13: School budgets

Budget $	N	%
600 000 – 2 000 000	6	42.8
2 000 001 – 4 500 000	8	57.1

Composite mean scores for public school principals' perceptions in relation to individual innovativeness was calculated. Principals operating budgets were divided into two categories: a) 600 000 - 2 000 000, and b) 2 000 001 - 4 500 000. A *t-test* analysis was conducted to determine if there were any significant differences in public school principals' perceptions of individual innovativeness in relation to annual operating budgets. No significant differences were found between principals' perceptions of individual innovativeness for school budgets less than 2 000 000 (M = 4.13) and for those schools with budgets greater than 2 000 000 (M = 4.09), t = 2.179, p=.815.

Composite mean scores for public school principals' perceptions were calculated using the *t–test* to determine if there were any significant differences in public school principals' perceptions of organizational innovativeness in relation to annual operating budgets. No significant differences were found between principals' perceptions of organizational innovativeness for schools with budgets less than 2 000 000 (M = 3.43) and those with budgets greater than 2 000 000 (M = 3.41), *t* =2.20, *p* =.96. Table 14 summarizes the results of this analysis.

Table 14: School budget and public school district principals' perceptions of innovation

Individual innovativeness-school budgets	< 2,000,000	>2,000,001
Mean	4.13	4.09
Variance	0.04	0.08
Observations	6	8
Hypothesized Mean Difference	0	
df	12	
t Stat	0.23	
P(T<=t) one-tail	0.40	
t Critical one-tail	1.78	
P(T<=t) two-tail	0.81	
t Critical two-tail	2.17	

Organizational innovativeness-school budgets	< 2,000,000	>2,000,001
Mean	3.43	3.41
Variance	0.29	0.34
Observations	6	8
Hypothesized Mean Difference	0	
df	11	
t Stat	0.06	
P(T<=t) one-tail	0.48	
t Critical one-tail	1.80	
P(T<=t) two-tail	0.96	
t Critical two-tail	2.20	

Professional capacity (pro-d days) and public school district principals' perceptions of innovation

There were 19 responses to question 53 of the survey which asked principals the number of professional development days allocated for their respective schools for 2015-2016. Data collected was divided into two categories: a) 1- 7 days, and b) 8 -15. I chose to group them in this way as the majority of the participants fell into the first category with the remaining four in the second category. Frequencies and percentages were calculated for each of the two categories. Fifteen (79%) of the participants indicated that 1-7 professional days were allocated at their schools. Four (21%) of the participants indicated that 8 -15 professional development days were allocated at their schools. Table 15 summarizes the data and calculations for professional capacity.

Table 15: Professional development days

Number of professional development days	N=19	%
1 – 7	15	79.0
8 – 15	4	21.0

Composite mean scores were calculated indicating public school principals' perceptions of individual and organizational innovativeness. A *t–test* was used to determine if there were any significant differences in public school principals' perceptions of individual and organizational innovativeness.

Results of the *t*–test indicated that there was no significant difference in the mean scores of individual innovativeness in relation to the allocation of 1 - 7 professional development days (M = 4.02) and 8 – 15 professional development days (M = 3.93), *t = 2.02, p = .53*. There was no significant difference found in the mean scores of organizational innovativeness in relation to the allocation of 1 - 7 professional development

days (M = 3.38) and 8 – 15 professional development days (M = 3.35), *t = 2.78, p = .93.*

Table 16 summarizes the results of the analyzed data.

**Table 16: Professional capacity (pro-d days) and public school district principals'
perceptions of innovation**

Individual innovativeness - PD days allocated	1-7 Days	8-15 days
Mean	4.02	3.93
Variance	0.07	0.05
Observations	15	4
Hypothesized Mean Difference	0	
df	5	
t Stat	0.68	
P(T<=t) one-tail	0.26	
t Critical one-tail	2.02	
P(T<=t) two-tail	0.53	
t Critical two-tail	2.57	

Organizational innovativeness - PD days allocated	1-7 Days	8-15 days
Mean	3.38	3.35
Variance	0.19	0.44
Observations	15	4
Hypothesized Mean Difference	0	
df	4	
t Stat	0.10	
P(T<=t) one-tail	0.46	
t Critical one-tail	2.13	
P(T<=t) two-tail	0.93	
t Critical two-tail	2.78	

**Financial resources – percentage of school budget expenditures dedicated to
professional development**

Question 54 asked public school principals to indicate the percentage of their

2014-2015 school budget that was allocated to professional development for their schools. Data was collected from the 21 participants who answered question 54. The percentage of the budget expenditures for professional development was divided into two categories: a) 0 - 7% allocation, and b) 8 -15% allocation. My reason for grouping principals into these two categories was that I was curious as to whether greater spending resulted in greater innovation in terms of percentage of budget spent on professional development. Thus, I arranged participants into low and high spending groups and compared their innovativeness. Fifteen (71%) public school principals indicated 0 - 7% of budget was allocated for professional development. Six (29%) of public school principals indicated 8 - 15% of their budget was allocated for professional development. See table 17 below for a review of budget allocations for professional development.

Table 17: Budget expenditures for professional development

% of Budget for professional development	N=21	%
0 – 7%	15	71.0
8 – 15%	6	29.0

Composite mean scores were calculated in relation to public school principals' perceptions of individual innovativeness. A *t*-test was conducted to determine if there were any significant differences in public school principals' perceptions of individual innovativeness in relation to the percentage of the budget allocation for professional development. No significant difference was found between public school principals' perceptions of individual innovativeness who allocated (M = 4.00) 0 - 7% of school budget to professional development, and principals who allocated (M = 4.00) 8 - 15% of school budget to professional development, $t = 2.14, p = .84$.

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Composite mean scores were calculated in relation to public school principals' perceptions of organizational innovativeness. A t-test was conducted to determine if there were any significant differences in public school principals' perceptions of organizational innovativeness in relation to the percentage of budget allocation for professional development. A significant difference was found between public school principals' perceptions of organizational innovativeness who (M = 3.18) allocated 0 - 7% of school budget to professional development, and public school principals (M = 3.69) who allocated 8 -15% of school budget to professional development, t = 2.14, p = .01*. It could be suggested that the schools with larger budgets are able to allocate more of their budgets to professional development. Table 18 below summarizes the results for individual and organizational innovativeness calculations.

Table 18: Professional capacity (% of budget for professional development) and public school district principals' perceptions of innovation

Individual innovativeness - % allocated to PD	*0-7% allocated*	*8-15% allocated*
Mean	4.0	4.0
Variance	0.1	0.0
Observations	15	6
Hypothesized Mean Difference	0	
df	14	
t Stat	-0.20	
P(T<=t) one-tail	0.42	
t Critical one-tail	1.76	
P(T<=t) two-tail	0.84	
t Critical two-tail	2.14	

Organizational innovativeness -% allocated to PD	*0-7% allocated*	*8-15% allocated*
Mean	3.18	3.69
Variance	0.23	0.10

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Observations	15	6
Hypothesized Mean Difference	0	
df	14	
t Stat	-2.80	
P(T<=t) one-tail	0.01	
t Critical one-tail	1.76	
P(T<=t) two-tail	0.01*	
t Critical two-tail	2.14	

Perceptions of individual and organizational innovativeness related to public school principals' demographics

Research question five investigated perceptions of public school principals regarding innovation related to demographic factors including age, gender, and professional development practices. Demographic data was collected from survey questions 46 – 48, 51 and 52. In addition, frequencies and percentages were calculated for each independent variable of individual and organizational innovativeness.

Age

Twenty-two respondents indicated their age on question 46 of the survey. A total of thirteen participants (59%) indicated their age to be between 40 - 50 years of age. The remaining nine participants indicated their age to be between 51 – 60+ (40.9%) years of age. I grouped participants into these categories using their years of experience as a principal to determine the appropriate age groups. The majority of principals with 1 – 10 years of experience fell into the 40 – 50 age category. Similarly, the majority of principals with 11 – 20+ years experience fell into the 51 – 60+ age category. A summary of public school principals' ages along with frequencies and percentages is presented in Table 19.

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Table 19: Principals' ages

Age	N=22	%
40-50	13	59.0
51-60+	9	40.9

Composite mean scores were calculated to determine public school principals'
perceptions related to individual and organizational innovativeness and its correlation to
their age. School principals' ages were divided into two categories: a) 40 - 50 years and
b) 51 – 60+ years. A *t*-test was conducted to investigate the relationship between individual
and organizational innovativeness and principals' age. There were no significant
differences found between public school principals between the ages of 40 - 50 (M = 4.07)
and principals between the ages of 51 – 60+ (M = 3.94) regarding their perceptions of
individual innovativeness, t = 2.12, p =.24. No significant differences were found between
public school principals between the ages of 40 - 50 (M = 3.26) and principals between
the ages of 51 – 60+ (M = 3.46) regarding their perceptions of organizational
innovativeness, t = 2.09, p =.32. The summary of the results of this analysis is shown in
Table 20.

Table 20: Age and public school district principals' perceptions of individual and

Individual innovativeness & principals' age	40-50 yrs	51-60+yrs
Mean	4.07	3.94
Variance	0.06	0.07
Observations	13	9
Hypothesized Mean Difference	0	
df	16	
t Stat	1.21	
P(T<=t) one-tail	0.12	
t Critical one-tail	1.75	
P(T<=t) two-tail	0.24	
t Critical two-tail	2.12	

Organizational innovativeness & principals' age	40-50 yrs	51-60+ yrs
Mean	3.26	3.46
Variance	0.33	0.11
Observations	13	9
Hypothesized Mean Difference	0	
df	19	
t Stat	-1.03	
P(T<=t) one-tail	0.16	
t Critical one-tail	1.73	
P(T<=t) two-tail	0.32	
t Critical two-tail	2.09	

Gender

Twenty-two respondents identified their gender to question 46 of the survey instrument. Responses indicated that eleven (50%) of respondents were male and eleven (50%) were female. A summary of frequencies and percentages of public school principals gender is shown in Table 21.

Table 21: Principal's gender

Gender	N=22	%
Male	11	50
Female	11	50

Composite mean scores for public school principals' perceptions of individual and organizational innovativeness as related to gender were calculated using the *t*-test. There was no significant difference found between public school principals that are female (M = 4.00) and male (M = 4.03) in relation to their perceptions of individual innovativeness, *t* =2.09, *p* = .81. There was a significant difference found between public school principals that are female (M = 3.13) and male (M = 3.56) in relation to their perceptions of organizational innovativeness, *t* = 2.12, *p* = .035*. Although it appears that females seem less likely to perceive their organizations as innovative, we cannot tell from this data *why*

that is, or even if there is a real difference between the *actual* innovativeness of the school.

Analysis of the results are shown in Table 22.

Table 22: Gender and public school district principals' perceptions of individual innovativeness

Individual innovativeness - gender	*female*	*male*
Mean	4.00	4.03
Variance	0.07	0.06
Observations	11	11
Hypothesized Mean Difference	0	
df	20	
t Stat	-0.25	
P(T<=t) one-tail	0.40	
t Critical one-tail	1.72	
P(T<=t) two-tail	0.81	
t Critical two-tail	2.09	

Organizational innovativeness - gender	*female*	*male*
Mean	3.13	3.56
Variance	0.29	0.10
Observations	11	11
Hypothesized Mean Difference	0	
df	16	
t Stat	-2.31	
P(T<=t) one-tail	0.02	
t Critical one-tail	1.75	
P(T<=t) two-tail	0.03 *	
t Critical two-tail	2.12	

Professional development practices and public school principals' perceptions of innovativeness

A total of 22 respondents indicated their responses to question 51 of the survey instrument. Composite mean scores were calculated for public school principals' perceptions of individual and organizational innovativeness in relation to their professional

development practices. Principals' professional development practices were divided into two categories based on the number of professional conferences/institutes attended in the 2015-2016 school year: a) 3 or less, and b) 4 or more. Since the majority of the 18 principals (82%) attended 3 or less conferences/institutes in comparison to the 4 principals (18%) who attended 4 or more I was curious to know whether attending more professional development conferences was conducive to being more innovative. A t–test was conducted to determine if there were any significant differences in public school principals' perceptions of individual and organizational innovativeness in relation to their professional development practices. See Table 23 for frequencies and percentages calculated.

Table 23: Number of professional development practices

Number of PD	N=22	%
0 - 3	18	82
4 >	4	18

Results of the analysis indicated that there was a significant difference in regards to principals' perceptions of individual innovativeness in relation to professional development practices. Mean scores calculated were (M = 3.96) for principals in the 0 – 3 category and (M = 4.26) for principals in the second category, $t = 2.57, p = .04*$. There was no significant difference found between the two categories and its relation to organizational innovativeness. Mean scores calculated indicated (M = 3.30) for the 0 – 3 category and (M = 3.53) for the 4 or more category, $t = 2.78, p = .49.$ Due to the small numbers of principals in the second category (and the potential for a Type II error), this analysis should be interpreted with caution. Analysis of results are summarized in Table 24.

Table 24: Professional development practices and public school district principals' perceptions of innovation

Individual innovativeness - # PD activities attended	0 -3	4 >
Mean	3.96	4.26
Variance	0.06	0.03
Observations	18	4
Hypothesized Mean Difference	0	
df	5	
t Stat	-2.77	
P(T<=t) one-tail	0.02	
t Critical one-tail	2.02	
P(T<=t) two-tail	0.04*	
t Critical two-tail	2.57	

Organizational innovativeness - # PD activities attended	0 -3	4 >
Mean	3.30	3.53
Variance	0.23	0.30
Observations	18	4
Hypothesized Mean Difference	0	
df	4	
t Stat	-0.76	
P(T<=t) one-tail	0.24	
t Critical one-tail	2.13	
P(T<=t) two-tail	0.49	
t Critical two-tail	2.78	

Summary and conclusions

The first phase of this mixed methods study examined public school principals' perceptions of individual and organizational innovativeness in relation to their school. This study was based on the five research questions that served as the guide for this first phase. Data was collected from the 23 school public school principals who completed the online survey, *Communication Research Measures: Individual Innovativeness (II) & Perceived Organizational Innovativeness Scale* (PORGI) developed by Hurt and Teigen (1977) and Hurt and Cook (1977).

Results from the survey were analyzed by the attributes of individual and organizational innovativeness for the purposes of determining if any differences existed between principals and their school characteristics. More specifically, *innovativeness* as defined by Rogers (2003) is how early an individual or an organization adopts an innovation relative to other members of a given social system. In addition, analysis of the data determined individual principals' and their school's adopter categories as well as their perceptions. Rogers' (2003) five innovativeness classifications are defined as *innovator, early adopter, early majority, late majority, laggard or traditionalist.*

Comparative analysis

As importantly, this phase of the study was an analysis and comparison to the previous studies conducted by Mitchell (2008) and Williams (2013). These researchers used the same survey instrument and analysis to determine superintendents' perceptions of individual and organizational innovativeness. My findings were similar to these two studies. Williams (2013) and my findings indicated that approximately 30% of respondents saw themselves as innovators. This was much higher than Rogers (2003) adopter classification standard bell curve which indicates that 2.5% of individuals will be innovators in any given group. In addition, Mitchell (2008) also found that approximately 7.5% of his superintendent respondents perceived themselves to be innovators. All three studies also recorded participants with higher percentages in the *early adopter and early majority* categories in comparison to Rogers' (2003) 13.5 % for *early adopters* and 34% for *early majority* as represented on the standard bell curve chart.

Conversely, principals and superintendents' perceptions of organizational innovativeness indicated much lower percentages for their school district and individual

schools in terms of being *innovators*. Williams (2013) and my study results indicated 2.32% and 8.60% respectively for the *innovator* category. Mitchell (2008) had no respondents perceive their districts as having innovators. I found this interesting as the data sample was gathered from 134 superintendent respondents. Overall, the three studies indicated that the majority of school leaders perceived their school district and schools to be in the *early adopter* category in terms of organizational innovativeness. Only Mitchell (2008), and my study had a school district or a school perceived to be in the *laggard/traditionalist* category.

The statistical analysis of the first two research questions regarding principals' and superintendents' perceptions of individual and organizational innovativeness indicated similar mean scores for "most" and "least" supportive survey statements between the replicated studies and my research. For example, in all three studies, respondents rated the statement for individual innovativeness, *I seek out new ways to do things*, as one of the higher supportive statements, with Williams (2013) mean score being M = 4.48, Mitchell (2008) M = 4.12, and my study's being M = 4.47 respectively. As well, responses for the least supportive survey statements were similar in terms of mean scores. For example, the statement, *I'm usually one of the last people in my group to accept something new*, was rated in all 3 studies as the least supported with Williams (2013) M = 1.79, Mitchell (2008) M = 1.98 and my study at M = 1.52.

Mean scores for principals'/superintendents' perceptions of organizational innovativeness revealed similar ratings for "most" and "least" supportive survey statements. All three studies rated principals'/superintendents' support for the statement, *My organization maintains good communication between supervisors and employers,* with Mitchell (2008) M = 3.96, Williams (2013) M = 4.00 and my study M = 4.00. The least

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supported the statement by respondents in the three studies was, *My organization rarely involves employees in the decision making process*. Mean scores were recorded as M = 2.07 for Mitchell (2008), M = 1.93 for Williams (2013) and M = 2.04 for my study. The statistical analysis of the third question regarding if there is a difference between individual perceptions toward innovation and organizational perceptions toward innovation suggested a positive relationship across the three studies. Mitchell's (2008) study indicated a strong positive relationship through a Pearson product-moment correlation coefficient calculation of (r) =.475. Williams' (2013) study indicated a weak positive relationship with a (r) value of .288. I found a significant difference which also indicated a positive relationship between the two variables. As leaders of school districts and schools, superintendents and principals would be seen as change agents who would embrace the notion of innovativeness as being key to enacting school improvement. Hall & George (1999) studied what happens in classrooms when teachers implement innovations. What became clear to the researchers was that teacher activity was "determined largely by what the leaders (e.g. principals) do" (p. 171).

The fourth question examined public school principals' perceptions for differences regarding individual and organizational innovativeness related to organizational variables including school enrolment, financial resources, and professional development capacity. Both Mitchell (2008) and Williams (2013) studies had much larger sample of participants. For this question I had a small sample size of 14 for some variables and 22 for others. As a result, I was unable to use some of the same analytic tests.

The first variable of my study examined if there were any significant differences for individual and organizational innovativeness in relation to school enrolment. Results indicated there were no significant differences for schools with 400 or less students in

comparison to schools with enrolment between 401-800 students for individual innovativeness. There was also no significant difference found between the two school enrolment categories for the organizational innovativeness variable. While the three studies analyzed the data differently, all three found that there was no difference between innovativeness based on school size.

The variable of individual school budgets was then analyzed to determine if there were any significant differences in relation to individual and organizational innovativeness. There were no significant differences found in relation to individual and organizational innovativeness and school budgets. Similarly, Mitchell (2008) also found no significant differences between school district budgets in relation to individual and organizational innovativeness. Interestingly, although my sample size was only 14 principal's school budgets compared to Mitchell's 134 superintendents many of the school district's budgets were not significantly larger in comparison. Hence, it could be suggested that the comparison was equitable and therefore the results were also similar.

The variable of professional capacity in terms of professional development days allocated by school principals was analyzed to determine if there was any significant difference between individual and organizational innovativeness and professional development capacity. Results indicated that there were no significant differences found in professional development days allocated in relation to individual innovativeness and organizational innovativeness. Mitchell (2008) found no significant differences in his study. An additional professional capacity variable analyzed was the percentage of school principals' budget expenditure that is dedicated to professional development. There were no significant differences found in relation to individual innovativeness. However, there was a significant difference found in relation to organizational innovativeness (p=.01*).

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Mitchell (2008) found no significant differences in his analysis in relation to individual and organizational innovativeness.

Overall, public school principals' and superintendents' perceptions of individual and organizational innovativeness in relation to school district variables found few significant differences.

The fifth research question was an analysis of public school principals' perceptions of individual and organizational innovativeness in relation to personal demographics. Demographic variables examined included, age, gender, and professional development practices.

The variable of age was analyzed to see if there was any difference between a school principal's age and that of individual and organizational innovativeness. There were no significant differences between the two age groups in relation to individual and organizational innovativeness. In the Williams (2013) study there were also no significant differences found between the two age categories. However, Mitchell (2008) found significant differences in his study for both individual and organizational innovativeness. It could be suggested that due to Mitchells' larger population sample compared to Williams' and my study that statistically significant results were more likely probable.

Public school principals' gender was analyzed to see if there was a difference in comparison to individual and organizational innovativeness. No significant difference was found between male and female public school principals' in relation to their perceptions of individual innovativeness. However, there was a significant difference found between the two genders and organizational innovativeness. Mitchell (2008) and Williams (2013) found

no significant differences in their analysis of gender in relation to individual and organizational innovativeness.

The last variable investigated school principals' professional practices and whether there was a difference between individual and organizational innovativeness. There was a significant difference found between the two categories and individual innovativeness. Due to the small numbers of principals in each category (and the potential for a Type II error), this analysis should be interpreted with caution. There were no significant differences found between the professional practices and organizational innovativeness. Mitchell (2008) found no significant differences for superintendents' in relation to their professional practices.

General Discussion

In general, the comparison of these 3 studies found similar results for the variables tested. All three studies had higher proportions of innovators in comparison to Rogers (2003) scale of 2.5%. Results were also similar for organizational variables such as enrolment, budget and financial expenditures.

These findings suggest that school principals and superintendents although at different levels of school and school district leadership roles have similar perceptions of individual and organizational innovativeness. More importantly, their views are positively oriented toward innovation. It becomes clear that as leaders they see their roles as being integral to nurturing and encouraging innovation in the school system.

All three studies saw principals and superintendents rating themselves to be more innovative than their organizations. While the vast majority of comparisons showed no significant difference in innovativeness, a significant difference based on the variables of

professional capacity, age, and gender, was identified. The lack of a significant difference on most comparisons suggests that superintendents and principals have similar positive orientations toward individual and organizational innovativeness. As well, the majority of differences found were mainly from my study. Note that the lack of significant findings in my study could be due to the small sample sizes of my study involved in the comparator groupings (Simmons, Nelson & Simonsohn, 2011).

The following chapter will present the second phase of this mixed method study. This qualitative phase will be an analysis of the personal interviews of public school principals' responses to their perceptions to innovation as it relates to the school system. It is also an opportunity to elaborate on the results from the prior quantitative phase of the study.

Chapter Five

Findings from Phase Two – Analysis of Interviews

*Each time a person stands up for an idea, or acts to improve
the lot of others, or strikes out against injustice, (s)he sends forth
a tiny ripple of hope… - Robert F. Kennedy*

The first phase of this mixed methods study utilized the online Select Survey instrument to survey public school principals' perceptions toward innovation and how they are related to individual and organizational characteristics. From this quantitative aspect interested participants were invited to participate in a follow-up one – to – one interview for further exploration of their lived experiences in regards to the concept of innovation in the school setting. A total of 14 participants indicated their interest in participating. Thirteen of the 14 participants were confirmed for interviews with one principal not responding after three attempts through email and personal contact with the researcher. I had hoped that the selected purposeful sample of participants would represent a cross section of Rogers' (2003) five innovativeness adopter categories ranging from *innovator to laggard* (Table 1, p.13) as indicated by the findings from the electronic survey. Survey results indicated that four principals were classified as "*innovators*" and the remaining participants were classified as *early adopters*. However, the sample represented a stratified distribution of typical school configurations of elementary, middle and secondary school levels. These included schools from low socioeconomic areas, very diverse populations, small rural schools, schools of choice, and a school in the process of a transformation. I conducted interviews to gather further insights regarding the following question:

1. *What are school principals' views, perceptions, and experiences toward innovation?*

The findings from the interview phase begin with a discussion of principals' characteristics and their relationship to perceived individual innovativeness adopter categories. This is followed by a discussion and description of the process of coding principals' interview responses for the purpose of revealing themes that explored their views, perceptions, and experiences regarding fostering innovation. As mentioned in the methods chapter of this study I utilized the qualitative analysis software, NVivo 11 Plus, to assist with the coding process. It enabled me to sort the large amount of interview data into content categories for potential emerging themes. Further, NVivo 11 Plus was able to quickly conduct searches and queries of specific words and phrases for possible links and relationships to emerging themes. This assisted with exploring and finding patterns for further analysis. I was also able to generate concept maps from the queries to show relationships or patterns for further investigation. As well, this software allowed for exploration of principals' sentiments regarding specific interview questions, which further enhanced a deeper understanding of their perceptions of the innovation phenomenon.

Sample characteristics

Interviews with the 13 school principals were conducted from March 1, 2016 to April 12, 2016 in District X. For each participant, demographic characteristics are detailed in Table 25, p. 140. Each participant was also assigned an adopter category according to Rogers (2003) innovativeness categories that were tabulated from phase one of the quantitative survey. This chapter focuses on principals' descriptive responses from the one-to-one interviews regarding their perceptions toward innovation.

Table 25: School principals' demographic characteristics

Participant	Gender	Age Range	Principal Experience (Years)	Years at School	Highest Degree	Adopter Category
Patricia	female	40 to 49	1-5	1-3	Masters	Innovator
John	male	50 to 59	16-20	7-9	Masters	Early Adopter
Don	male	40 to 49	6-10	1-3	Masters	Innovator
Debbie	female	40 to 49	11-15	4-6	Masters	Early Adopter
April	female	50 to 59	11-15	7-9	Masters	Early Adopter
Jason	male	40 to 49	1-5	1-3	Masters	Early Adopter
Daphne	female	40 to 49	1-5	4-6	Masters	Innovator
Beth	female	60+	6-10	10-12	Masters	Innovator
Jack	male	60+	16-20	4-6	Masters	Early Adopter
Ron	male	40 to 49	6-10	1-3	Masters	Early Adopter
Allan	male	50 to 59	1-5	1-3	Masters	Early Adopter
Brian	male	50 to 59	6-10	10-12	Masters	Early Adopter
Shelia	female	40 to 49	1-5	1-3	Masters	Early Adopter

* Pseudonyms are used in place of actual names

In reviewing principals' demographic characteristics, it is evident that all principals' perceived themselves to be in the upper range of innovativeness according to Rogers (2003) classifications. Three of the four principals' who perceived themselves to be *"innovators"* were in the 40 - 50 age category. As well, three of the four principals in this category were female. From this finding one might deduce that the female gender is perceived to be more innovative, however, with a small sample size this would be difficult to generalize across the sample population. The above discussion provided the background of principals' characteristics and perceived adopter category.

The aim of the qualitative analysis was to code the interviews and explore as Saldana (2011) says, "the ways [that the] patterns and categories *interact* and *interplay*" (p.92). He describes this as an "interrelationship" somewhat similar to a statistical correlation. To answer the research question I coded the transcripts into four interview content areas based on the interview questions. The four interview content areas identified were a) views toward innovation, b) barriers and challenges, c) leading and supporting innovation, and d) perceptions of innovation. From the interview content statements, I was then able to identify emerging categories that helped to further expand upon the analysis of the research question. Further, it allowed me to explore the interview content and analyze the meaning units gathered from principals' responses in order to help answer my research question. Graneheim and Lundman (2003), define a *meaning unit* "as words, sentences, or paragraphs containing aspects related to each other through their content and context" (p. 106). Table 26 below provides a summary of the interview content areas and emerging categories.

A general pattern of similar responses and common themes emerged from interviews across the different interview content areas eventually reaching a point of saturation where no new information occurred. I included many of these common responses from the different content area discussions only if they added or highlighted new insights. There were some outlier comments expressed by principals that I included in this analysis to further enrich the context of the innovation phenomenon.

Table 26: Emerging categories coded from interview content

Interview content	Emerging categories
Views toward innovation	- **understanding of innovation** - **importance of school to be innovative**

	-	**perception of whether they see self as innovators**
	-	**school's capacity for innovation**
Barriers & Challenges	-	**time & energy**
	-	**personnel**
	-	**other barrier/challenges**
Leading & supporting innovation	-	**resources, professional development & collaboration**
	-	**sharing good practices**
	-	**allowing risk-taking**
	-	**fostering relationships**
	-	**demonstrating leadership**
	-	**if you build it they will come**
Perceptions of innovation	-	**type of innovation-decision**
	-	**communication channels**
	-	**nature of social system**
	-	**extent of change agents' promotion efforts**

School principals' views regarding innovation

School principals expressed a variety of views regarding innovation and its impact on effecting change in schools. Their perspectives reflected the complexities of innovation and the many facets involved in fostering this process in schools. Principal responses included, a) how they defined innovation, b) importance of school being innovative, c) whether they saw themselves as innovative, and d) their school's capacity for innovation.

Defining innovation

The topic of innovation has been studied for decades by scholars and yet an agreed upon definition remains elusive. Adams, Bessant, and Phelps, (2006) state that "the term 'innovation' is notoriously ambiguous and lacks either a single definition or measure" (p.22). Similarly, Quintane et al. (2011) emphasize that it is important to have a definitive "understanding of what innovation represents" as it is imperative to being able "to assess the *innovativeness* of organizations" (p. 928). I felt that after the initial background information questions that it was important to begin each interview by asking

participants for their definition of innovation. This would provide context into how participants interpreted the concept of innovation and more importantly informed their thinking as leaders fostering this phenomenon.

Their definitions of innovation ranged from the introduction and use of technology, or new teaching practices, to "tweaking" something that improves a product or a process. In many respects principal responses mirrored the broad definition posited by innovation scholars. Schumpeter (1934) defined innovation as a new product, process, method or system that is first introduced to an individual or organization.

The majority of principals viewed innovation as something new to their school but not necessarily new to the world of education. Debbie stated, "I think innovation is not just sort of like coming up with those interesting totally new things...I think it also could be looking at something that already exists and making a slight change to it and approaching it in a slightly different way". Daphne shared a similar view, "we try and think of innovation more as something that's maybe new to us or different than how we have done it before and growing from there…" Sheila's view was, "It's not the traditional way and it's definitely thinking outside the box. Is it new? No, somebody else did it and we saw it and we're kind of copying it, but to our students and families and to our practice I think it's innovative…" Jason saw innovation in a metaphorical sense, "it's like a seedling, you drop a seedling it'll grow and innovation…whether it's technology or new ideas…"

Conversely, four principals viewed the definition of innovation differently. Their perspectives were more in alignment with the concept of disruptive innovation with the thought of it being something that is not merely an incremental improvement of an existing innovation. Noted innovation scholar Clayton Christensen (2010) defines disruptive

innovation as something "that transforms the complicated, expensive services and products into things that are so simple and affordable that you and I can use them" (p. 32). April defined innovation as "something that's actually rather drastic I guess. A new thought and a new way of doing things…". Brian elaborated on this definition by stating: "I'm looking at innovation in terms of taking the standard school model and disrupting it. Many students who [typical schools] don't serve well will come to a school like ours because they're looking for something that needs to be customized around them, and so I see us as fitting in to the innovation zone within our school district". Don's definition concurred with the previous principals' statements: "For me innovation is looking at a unique way to meet not only current student needs, but to meet the needs of where students are going to, are going to be or where education is going. It's doing something that already isn't being done in schools with the purpose of moving the school forward". Ron viewed innovation as, "…being on the cutting edge of new initiatives, new curriculum, new technologies, and trying to get with the times".

Principals' impact on leading innovation

> *I have to say, it's been in the last year that I've come to the conclusion that the principal has an incredibly huge impact on a school. Like I never used to kind of, I think attribute enough value to that. I really think the principal can have a massive difference, make a massive difference in how things are going. Debbie…*

The school system is a complex network linked by a tangled web of connections that somehow in its past and current state manages to educate the mass of students that pass through its halls. Without question, as research has shown, the classroom teacher has the greatest impact on student learning. Of course, this is only one aspect of a much more intricate system that involves a multitude of factors needed for educating students. At the school level the role of the principal is integral to leading a school community

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through the process of change that inevitably involves some form innovative endeavour. As Gilley, Dixon and Gilley (2008) note, "It has been suggested that a primary reason for an organization's inability to change and innovate lies with its leaders—the individuals who are responsible for leading change efforts—and their lack of skill or will, impeding successful implementation" (p. 155).

Importance for school to be innovative

Principals' responses to whether they felt it was important for their schools' to be innovative was overwhelmingly affirmative. One principal, April, responded with "no" but it can be deduced that her response was in connection to her original interpretation of *innovation* as being something that is radically different. In reviewing her response, it was evident that her views were aligned with an innovative mindset. "No. I think it's important for my school to be constantly learning and finding ways to meet the needs of kids and in there might be some little innovations, to meet that one child that hasn't been done before …but I would call that more risk taking…".

It was clear that the underlying theme for all principals was that whatever the strategy, process, or technological device used that innovation was important to improving their school environment. Beth put it bluntly, "We would die if we stopped moving forward and trying to find new and better ways to do things…whether it's through technology, different uses of technology, different ways of integrating the arts…". Ron had a similar view, "the world is dramatically changing as we speak, and all of the time, so I think we have to be always moving towards finding new ways of doing things and new ways of engaging kids in their learning". Jack concurred with Beth and Ron's comments in relation

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to his school. "We are less successful than we should be. There is certainly room for innovation, whether it involves technology or not really doesn't matter".

Brian saw it is imperative in his role as principal to impress upon his teaching staff the importance of being innovative. "I can basically walk over to any one of my teachers and say, you know we should be looking at trying to do this… yesterday I was actually speaking to one of our teachers about taking a portion of all of our [type of] courses and I said, you know what I think we need to consider a gamification idea on it". These three principals saw the importance of being innovative through the unique contexts of their schools. Don expressed this by creating a sense of urgency for his staff to consider, "[L]ast year when we began to look at this…I told the staff there are two options. We either buy plywood and we board up the windows, or we do something completely different that isn't already being done". Daphne related the importance of her school to be innovative through the lens of fostering a growth mindset, "the growth mindset is really important, especially when you're at a school like ours where you have the lower SES and it's so easy to say, the kids can't do it because you don't have the parental support, and you don't have this and they don't have that". Sheila saw it as important for all schools but more so for small schools like hers where innovation can be difficult to implement, "I think especially when we are this tiny little community, I think that we have to be [innovative]…And I push them to be [innovative]…".

Perception of principals as innovators

Principals were asked if they saw themselves as innovators. Again, a wide range of mixed responses were offered from being a facilitator to problem solver. The majority of principals did not see themselves as innovators, even though the phase one quantitative

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survey results indicated that all principals' rated themselves as either innovators or early adopters in terms of their innovativeness.

These principals saw themselves as facilitators or problem solvers, but not as being particularly innovative. Allan viewed his role as a facilitator who is "always curious about other ways to help my teachers and other ways to help our students learn better…". April viewed her role as facilitating, supporting, and encouraging innovation in a more of a shared leadership role, "I actually see myself as someone who maybe can spot and support good things and look for those, to lead the charge". Jason saw himself as "a good problem solver and innovative in a sense, like how do you make your school unique and serve the needs of your kids...try to mobilize my staff to say, okay how do we solve that problem?".

Interestingly, Jack's response was somewhat of a contextual interpretation of how he perceived his innovativeness. It was more of a situational interpretation, although he mentioned that he pushes "the barriers" which could be understood as willing to bring about change, "This is my fourth school and every school I have been [is] different. I learned early on what causes you to be successful in a given situation is not the same thing…The environment allowed that…".

These principals saw themselves as innovators with some of them a little uncertain as to whether they fit into that category. Three of these six principals who perceived themselves as "innovators" below also were categorized as such from the phase one survey of this study. Beth's perception of her innovativeness exemplifies classic characteristics of an innovator, "…I think it's important for someone who's in this kind of school…That they understand the whole creative process… I'm restless that way, I always

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want change…". Debbie's response also highlights characteristics of innovative thinkers, "I look at things in a different way. I feel at times it's kind of put me at odds…even with colleagues…the way I do things isn't kind of the same as everyone else…". Don initially felt that he was more creative than innovative, however, his response clearly demonstrated innovative characteristics, "…maybe creative, a different way to describe it…I get bored and I don't like the status quo because I know once I get to a point I can begin to rest on [my] laurels …". Interestingly, Daphne initially did not see herself as being innovative because of her interpretation of innovators being individuals who create and introduce disruptive ideas, products and processes (example of Steve Jobs the founder of Apple computers). However, as the interview progressed it became evident that her perception of her innovativeness changed, "I don't really see myself as someone who is innovative because I don't see that what I do is any different than anybody else…I am innovative because I'm willing to try things, I'm willing to fail forward…I see myself as more of a problem solver, if that's an innovator then I would call myself an innovator".

Patricia echoed similar sentiments that supported Daphne's responses in that the actions of an individual may not be perceived as being innovative, but indeed are, "I think the challenge of being innovative is when you do it, you don't actually realize that you are because it is just the way you do everything…". Sheila's perspective of her innovativeness focused on being innovative for a specific student population in order to foster an inclusive school community, "I am a pretty innovative outside of the box kind of thinker, especially for the kids on the periphery; whether they are on the high end of intelligence …or on the other end, how can we find a way to include them…"

School's capacity for innovation

The thirteen principals were asked how they rated their school's capacity for innovation on a scale from 1 to 10, with 1 being not innovative to 10 being highly innovative. As this researcher expected there would be a range of ratings as well as mixed and complex reasons for them.

Some principals discussed their school's capacity for innovation in terms of the diverse range within the teaching staff. Specifically, they spoke in terms of having teachers that were highly innovative to some that were entrenched in outdated teaching practices. Thus, their rating score reflected this by stating a range such as "2-9". Other principals had similar responses but then would roughly average their rating for their teachers as a whole.

These two principals discussed their school's capacity for innovation as a range within their schools. Others mentioned "pockets of brilliance" within their schools. Jack spoke of the different degrees of innovation or lack there of in his school, "I would say that our school is 2-9. In any given classroom, it can be as different as night and day... And yet, one of our most effective teachers is very much old school, … meeting that student's needs…You don't have to be innovative to be effective". Sheila rated her school a 6 to 7 accompanied by the following explanation, "[It] all comes down to the teachers…I'm rating different teachers… there's a teacher that's highly innovative, I'd give her almost a 10…And then I'm thinking of another teacher who hasn't really changed a whole lot in her classroom …she does from time to time creative innovative things…

The majority of principals rated their school's capacity for innovation in the 6 to 8 range.

Allan's rating of 6 was very much rooted in his feeling that in a rural school setting, the conservatism and personalities of the teachers was conducive to being more cautious with change. He qualified this by comparing it to his previous school which was more "urban" and open to new ideas. When asked by this researcher if he felt this to be true for rural schools in general he clarified this by stating, "I know that in this school I would say the personality types if we were to analyze them, are probably not as extroverted as ones I have worked with in an urban larger school environment…I think they're more introverted than I've used to been working [with], they're also more conservative in terms of taking risks". John rated his school in the 6 - 7 range and suggested his reasons for this were due to "teachers who are reluctant and the comment which irks me the most is, well they need to adapt to my style…We need to adjust to their style of learning and so I've had a couple who've struggled in that change". He did not elaborate as to whether this was the main reason for affecting their capacity for innovation.

Debbie, Daphne and Don, rated their school's capacity for innovation in the 7 to 8 range. For Debbie, it was not from a technology standpoint but more so with her teacher's willingness to move forward with the impending provincially mandated new curriculum implementation and especially with the aboriginal aspect of the curriculum. "[L]ike programs that we do for our aboriginal students, accepting and moving forward with the new curriculum. I mean, I think my staff is kind of like well ahead of many staffs, [they] have been presenting to different staffs…". Daphne regarded her teachers as always willing to try new things but with a measured approach to weighing both the potential positive and negative impact on students. More importantly, she believed that what was learned by their innovative endeavour was critical to moving forward as a school community. "…We'll have pockets of little brilliance where we'll really try something

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new…[we] worry like how many times can you be innovative and not have it work and then have it negatively affect kids... [We are] always weighing and balancing, going with what has sort of proven and what is new or unknown and just kind of balancing that…". Don's rating of 7- 8 for his school could be viewed as tentative in nature. The reason being that his school was in the process of a radical shift in its structure and education focus. "I think that you know that growth has to be people are tentative. When you make a significant change and you're asking people to change their practice in significant ways…the challenge is to continue to practice and not get to the point where you feel like you've reached where you want to be and then maintain status quo".

Beth's and Brian rating of their school's capacity for innovation was in the 9 -10 range. It should be noted that both of their respective schools were schools of choice that are in many respects based on innovative and creative ways of delivering learning. Beth spoke about how her staff generates ideas and collaboratively comes to a decision to enact a particular innovation, "an idea comes up that we're going to discuss…then this huge hubbub of a conversation…eventually you get to a conclusion… any new idea there's always those seed people that are willing to go with it". Brian's school had the advantage of being able to select the right personnel through their hiring process, "it comes down to sort of the people that you're able to hire into this environment…we actually made a stipulation 10 years ago that we would only hire people for this school that have had an [specific] certification…we're able to select people who have the right mind set".

Patricia and April rated their schools as a "5" for capacity for innovation. Patricia's school context was an important factor in her rating, "some of our staff members have equated [choice school] with not having to try new teaching strategies so, for example,

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guided reading is not widespread at my school, and it was discouraged by some staff members when others tried to do it… they didn't want to feel like they had to do it so sometimes strategies are squashed because of the face saving". April's rating was based on her interpretation of the definition of innovation which she believed the school system is not actually doing. April's response was interesting as she still clung to her belief that her school was in a transformation process rather than one of innovation. "I don't think they're innovative, but I think they're growing and learning and applying things so, transforming…or changing how they do things, then I would still put them at a 5 at this point in time". Ron's rating could be based on him being newly appointed to the school and going through the process of learning about the culture of the school. "It seems there is a willingness and some people are doing innovative things. There are a lot of great things happening in classrooms, but in terms of I think in the holistic school vision culture moving towards a common goal in terms of innovation isn't there yet".

Jason was the outlier of all principals rating his school as a "2" two for capacity for innovation. It should be mentioned that he was newly appointed to his school. However, he had strong feelings in his assessment of the teacher culture. "It's a stagnant culture here. My predecessors, they did a good job in trying to shift it to [type] school philosophy where we have teams collaborating…So they're having discussion, but before it was individual teachers, you know teaching and not much collaborating happening".

Barriers and challenges

When an innovation is introduced into any organization it has the potential to bring about change. The complexity of any successful change in schools is fraught with barriers and challenges, none more so for the school principal who is tasked with leading

innovation. The 13 interview participants generated 44 statements regarding their views of the barriers and challenges they face fostering innovation.

Time and Energy

Five participants made mention of time and, sometimes, energy being factors that are viewed as a barrier or a challenge to fostering innovation in their schools. Their perspectives examined time and energy from the point of view of teachers and themselves. More specifically, they spoke of it in terms of the complexity of a teacher's role which is already burdened with innumerable demands and expectations. Hence, the time required, along with the energy needed, above and beyond the rigours of a normal teaching day, week or month makes it difficult to introduce, adopt, and sustain implementation of innovations.

Allan saw the issue of time needed to get a critical mass of individuals moving toward accepting innovation as a positive change. "I think time is one factor. I think it's the reluctance of some teachers to look at change as a positive thing". Other principal responses seemed to reflect the complexity of the education world with its many mandates, school and community challenges as well as other demands of the profession. Debbie looked at it from the perspective of not only the teachers of her school but as well as herself in terms of time to build relationships for the purposes of fostering innovation, "[T]he time barrier is always the barrier…how much energy and time do you actually have, and there's a finite amount of time and energy we all have…".

Ron and April expressed similar views in regards to time as a barrier and the demands placed on personnel. Ron stated that, "time is huge, even more now than ever.

Everyone is busy, and just another thing to do…I feel like I would love to do way more than I am doing, but…". April added, "…when I say time and effort, I do find…that the teachers work really hard and to have that extra energy at the end of the day, or the time…that's where they might be totally for it…but you can only do so much…"

Sheila looked at time being tied to financial resources regarding innovation. Her perspective examined the long term process of sustaining innovation. "Well there is always a bit of finance involved in sustaining innovation because sometimes you need some time".

Personnel

Principals spoke of the issue of personnel as a barrier to innovation. Interestingly, comments ranged from having the right people, the culture of school staff, having the right mindsets, to teacher autonomy. It should be noted that staffing was also mentioned as a potential barrier. Principals' view of "staffing" refers to the process where teachers are able to transfer schools or are placed in schools through the human resources process. This takes place at the end of each school year in preparation for the following school year.

The staffing process was one of the barriers that principals felt had an impact on fostering the innovative process in their school. Part of this was due to the unpredictability of the transfer and placement process in regards to the teachers a school could receive. Principals have little control over this process, as it is part of the collective agreement between the teacher's union and school district. More importantly, principals' concerns centered on what the new teacher would bring to the culture of the schools that they had meticulously built. Debbie put it this way, "we had a new staff member who just started

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hasn't been the most positive influence…but is coming along, has kind of been positively culturized at the school… we have a third person who I've got worries…if she was in a building with a lot of negative people I think she'd go that way".

Daphne had a similar view in terms of a school's culture and when a new staff member is added to it, "some of the barriers are when we get newer staff coming in and they haven't been part of that journey…they really don't understand the "why" and how do you keep going back and redefining that "why" with the staff, especially when the culture and the climate in the school has changed so much…".

Beth put it succinctly, "Well sometimes it can be a staffing issue…Because you don't know who you're getting through the staffing process sometimes. I would say that's probably the biggest challenge". Although Don did not mention the actual staffing process as a barrier he strongly believed that having the right personnel in his school was important to being innovative. "You need to have the right people in the right place in order to do it. You need to have people with a mindset that they believe they can change and do things differently…and some individuals are at different points in their life where they don't want to change…because it's comfortable…". Allan's observations to barriers were from the viewpoint of being in a "rural" or smaller school setting in comparison to an "urban" or larger school in terms of student population and geographical location within the school district. This was based on his previous administrative experience at a larger middle school compared to his short tenure of three years at his current school. "We have a much more conservative staff that may have chosen to come to a rural setting because the amount of change that happens in a rural setting is less than it would happen in an urban setting…it has been a challenge for me to have them adopt new things easily until, as many school leaders understand, until you've earned their trust…".

Ron and Don shared a slightly different view of personnel challenges from the perspective of staff with long tenure and maintaining the status quo. "I think the longer you have been around, stereotypically, [one] can be more cynical or the more here we go again type of attitude you can have". Although Ron qualified this by stating that at his school staff had seen a "parade" of principals come and go over the last three years, "I think administrative or leadership movement is a challenge because a principal takes it one way and then another principal takes it another way, so staff I think get tired with change". On the other hand, Don believed that, "the longer you're at a building the more comfortable you become, the more in, the more you almost maintain the status quo because those routines become so similar…".

Three principals mentioned the fallout of the previous year's teacher job action and labour strike having an impact on their schools in terms of attitudes toward innovative initiatives. They felt that this was a hindrance to building or continuing the momentum that had previously begun in regards to some of the earlier innovations introduced. April saw it as putting up "a big, big wall on where you're going" (i.e. a momentum "*killer*"). Beth saw it as a severe blow to the culture and momentum of the school especially with two new teachers' mindsets as a negative influence, "it was just a different approach to the whole union and to how far people should go…two new people came to the school and kind of brought this new tone… making others feel guilty about the extra hours they were putting in…".

John felt that the job action hindered his ability to build a coalition and common understanding of working together to develop or implement innovative initiatives. "I think the biggest barrier right now is, is the job action hangover. I firmly believe it's still there because I keep getting this line, you can't tell me what to do with my Pro-D…". Jason had

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a similar view, however, it was more of a general observation not related to the job action theme, "the teachers don't think that they have to work with us. They think they can do their own thing…so I think that's the biggest hurdle in terms of that mindset. Are they part of the team, do they view themselves as a part of the team or a lone ranger?".

Patricia felt that the focus and philosophy of her school gave her teachers the mindset that it was permissible to avoid change and the innovations that come with it. "One of the barriers would be the mentality that we are [type of school] and the attachment to workbook type activities".

Other barriers and challenges

Other barriers/challenges recorded centered on issues such as technology, school district protocols and promotion of school district programs.

Three principals shared similar thoughts regarding difficulty with technology infrastructure impacting the ability for suitable use of devices in their schools. This has led to frustrations for principals and teachers when working with students on laptops, IPads and other devices. Allan spoke about frustrations with internet connectivity, "our ethernet doesn't work effectively to facilitate the kind of practices that we're talking about because the wiring was set up 10, 15 years ago for, what we believe was the maximum…we needed to have for an elementary school". John echoed similar sentiments, "I'm frustrated in that the band width I have coming in to my building is a 10. I'm at 441 kids across the street at [school] there they're under 400 kids and they've got 100 band width. So, they say they've addressed it, I haven't seen it yet". Debbie mentioned, "We had some trouble here. We had some infrastructure issues here with being an old building, but I think that's greatly improved".

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Jason felt that sometimes issues related to the school district as a system and the protocols involved within it that were obstacles to fostering innovation in his school, "if you want to get technology I have the funds…I have to wait for the quota within my school, then I have to go through purchasing, which takes like six months, which could take two days…the bureaucracy and the paperwork slows it down.

Brian's barrier was also a system issue due to the nature of his school. He saw it as school district issue in terms of them promoting the value of his school's potential for spreading innovative practices within the school district and the surrounding community. Similarly, he felt that he could possibly promote his school more, "I talk to people quite regularly around our district who had no idea that [school] exists. I need to develop that promotion side and advocacy side more, because honestly senior management folks are very busy and they're looking at a big system".

Leading and promoting innovation

Principals' influence on the innovation efforts in the school system has been studied by numerous scholars. The principals' role as a capacity "builder" for leading innovation is integral to the innovation process. As Fullan (2010) exhorts, "The answer is not in producing more individuals with quality characteristics, but rather it is to develop the collective capacities of whole schools and whole school systems…the key to the speed of quality change is embedded in the power of the principal helping to lead organization and system transformation" (p. 15).

Principals were asked what they did to lead and promote innovation in their schools. It became evident through the interviews that all principals saw themselves as being facilitators or "champions" for promoting innovation rather than being the leader with

the "idea" and leading the innovation effort. Rogers (2003) defines the role of a champion as "brokers and arrangers for an innovation in an organization, helping fit it into the organizational context" (p. 662-663).

Resources, Professional Development and Collaboration Time

Most, if not all, principals spoke of providing resources, professional development opportunities and or time to collaborate with colleagues in order to develop and implement innovation efforts. April talked about how she provided support to her teachers, "I stick a lot of money in to Pro-D…so that people can go to those things [pro-d]". Jason encouraged collaboration and professional development by offering these opportunities, "if there's something that you want to try and you need release time to plan, we will cover your class …our leadership teachers wanted to do WEB training and I encouraged that, actually I planted the seed at first and then…oh we want to do it…". Debbie extended the collaboration theme by temporarily hiring two additional teachers to allow her grade level teachers to collaborate. "I hired two teachers from October 1 until spring break and all the teachers partnered up and they had two blocks, like a block of health with a teacher and a block of music with a qualified teacher". John believed that providing timely professional development was a key to fostering innovation, "I believe Pro-D should be on a Monday so that the deal was build this so you can use lessons the next day. Versus doing Pro-D on a Friday and then you forget it". Sheila looked at engaging all her staff in professional development with the hope of developing a more effective system wide approach to innovation. "I took the whole staff to the 21st Century Skills Conference in Vancouver last year and I wanted us to go as a group to be able to share it, to see it and to understand it

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because I felt like all of those messages are great, but if you hear them in isolation, as a teacher, what do you do?".

Sharing good teaching practice and ideas

Another aspect principal's felt was important to promoting innovation was through collaborative opportunities to share innovative teaching and learning practices. This could take the form of professional learning conversations or actual demonstrations of innovative practices. Allan used information gathered from workshops and meetings he attended as a way to plant seeds and spread innovative ideas to his staff. His hope was that this would build the necessary momentum needed to explore innovations. "I pick things up from workshops, or administrative meetings, or other seminars…and share them with teachers …if we think they're important we'll continue to bring it back and we'll even send teachers to the workshops, bring back the information, and share it…". Don looked for opportunities to highlight innovative practices that he observed during the course of any school day and then recognize and facilitate interest amongst his staff, "if you see an innovative practice in a classroom…we have them present at a department meeting or at a staff meeting or you know if somebody else in the building is interested in that, being able to make a connection or facilitate a discussion…". Jack used a similar approach, "We highlight what is going on in terms of innovation. So some things came out of that and we came back and shared that. I am in classes, when I see innovation I comment on it and recognize it". Conversely, Beth utilized an open staff meeting brain storming format to generate multiple innovative ideas, "the ideas that come out of them are things I would never have dreamed of… that sparking of ideas off one another is the best way to go… if they fall flat on their face… I'm there to help…". Ron fostered innovation by providing support and feedback for innovative practices he observed, "…just really supporting what I see that is great and

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giving lots of positive feedback and then you know staff development and staff meetings, working that angle".

Allowing Risk Taking

Principals also spoke of the importance of giving their teachers license to take risks with innovative practices. They felt that this would send the message that failure was an option and more importantly learning comes from it. Brian viewed encouraging risk taking as a key factor to allowing his teaching staff to engage in innovative practices, "teachers need to feel licensed to be able to take a risk…but know if there's a problem that you're not going to chastise them…And the support comes from, really allowing the risk taking and the constant sort of cultivating and nourishing the mindset…". Daphne spoke of risk taking in terms of nurturing the growth mindset through a "fail forward type mentality" where she encouraged her teaching staff to try an innovation for a period of time, monitor progress or lack thereof, adjust along the way or terminate the innovation trial. Debbie also emphasized the importance of allowing risk taking, "if teachers feel like, okay my principal's not going to be critical because this didn't go smashingly, right? They won't be afraid to take risks".

Fostering relationships

Most principals highlighted the importance of fostering relationships with their staff as integral to building trust as well as a way to spark ideas for innovative practices. April, for example, saw the opportunity to build relationships through the many conversations she engaged in with her staff. This allowed her to gather insights into potential innovative ideas that her staff were interested in trying and then providing support for these pursuits. "Touch base with them, talk to them…what they need and during those discussions…if

there's something in there which I happen to hang on to at the back of my mind…and I'll support that…". Debbie also spoke about the significance of building trust with her staff, "you develop a sense of trust with people. They will even come and share what their needs are…the relationship piece does go far, as far as encouraging [innovation]…". Ron stressed the importance of establishing a collaborative school culture that is built on trust and is willing to take risks with innovative endeavours, "it is about a collaborative culture…working together as a team and supporting people…If they feel like they are going to be analyzed or judged on everything they are doing, then why would they take a chance…".

Demonstrating Leadership

Three principals strongly believed that it was important to work alongside teachers to demonstrate their commitment to being a part of the innovation efforts. It was their way of demonstrating the "walk the talk" adage but more importantly build the relationship of trust with their teachers. Jack spoke of a proud moment where he was given accolades by one of his teachers for demonstrating his commitment to working with teachers, "…one of the teachers said, a lot of administrators who come back from a conference and say from now on this is what you are going to do, and what Jack is saying, this is what we are going to do, and this is what I personally am going to do". Debbie also spoke about the importance of building trust by demonstrating her willingness to work alongside her teachers. "I'm working with teachers and so I think they see that I'm willing to put in the work and so they're willing to put in the work…So, it's those personal relationships that still always save the day at the end of the day…". Daphne's comments exemplified a humbleness as well as demonstrating characteristics of being a lead learner along side her staff. "I really try to lead from the side not from the front…I would say I did it along with

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my staff and we worked together because that just works so much better and I guess that takes some creativity and innovation to do that…".

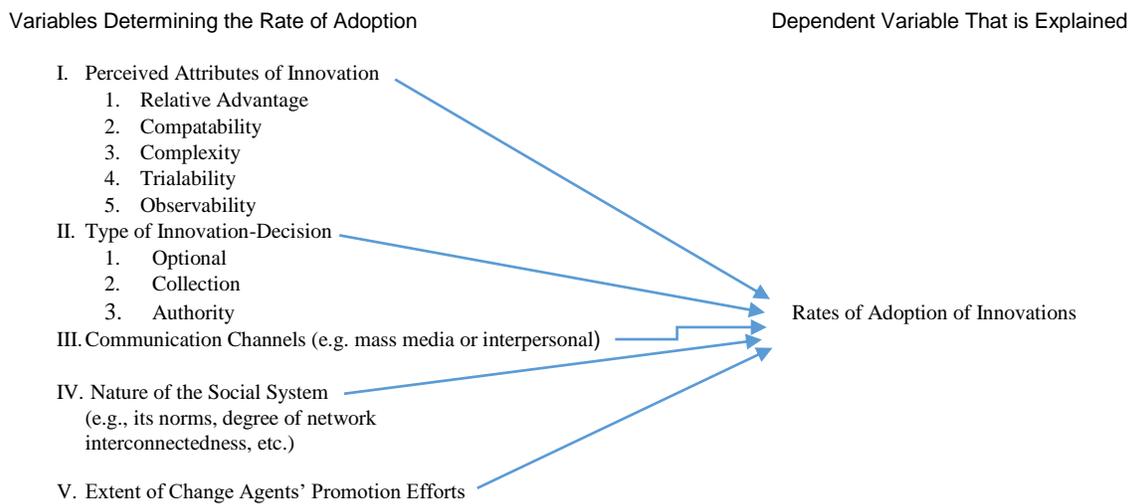*If you build it, they will come…*

One principal, Ron, felt that as a new principal in his school it was important to modernize his school building. He was able to receive a school district grant to convert his library into a learning commons space. As well, other renovations were also taking place such as the remaking of the front foyer of the school and the painting of the building. He felt that this would build a sense of community and the feeling of a wonderful place to teach and learn, "I know the district is saying to be innovative isn't about a space, but for our school, you are going to have to build it and they will come…I am just trying to get the building looking like it is in the 21st century because right now it looks like it is from the mid-80s.

Discussion

Everett Rogers (2003) noted that the rate with which an innovation is adopted by members of a social system can be partially explained by the five perceived attributes of innovations: *relative advantage, compatibility, complexity, trialability,* and *observability*. He emphasized that these attributes "have been found to explain about half of the variance in innovations' rate of adoption" (p. 365). Included in his *Variables Determining the Rate of Adoption* framework were: 1) type of innovation decisions, 2) communication channels, 3) nature of the social systems, and 4) extent of change agents' promotion efforts (see figure 4, p.164). Rogers (2003) was clear in stating that these four variables have received less research focus by diffusion scholars than the five *perceived attributes of innovations*.

School principals are tasked with nurturing innovation in their schools. More specifically, principals' characteristics and perceptions toward innovation play an important role in the change process within school systems. The following discussion analyzed principals' interview responses and their relationship to: 1) type of innovation decisions, 2) communication channels, 3) nature of the social systems, and 4) extent of change agents' promotion efforts. I excluded the five perceived attributes of innovation from my analysis because the five attributes are usually studied in conjunction with the adoption process of a specific innovation, which was not the focus of my research.

Figure 4: Variables determining the rate of adoption of innovations

Variables Determining the Rate of Adoption   Dependent Variable That is Explained

I. Perceived Attributes of Innovation
    1. Relative Advantage
    2. Compatability
    3. Complexity
    4. Trialability
    5. Observability
II. Type of Innovation-Decision
    1.   Optional
    2.   Collection
    3.   Authority
III. Communication Channels (e.g. mass media or interpersonal)

IV. Nature of the Social System
    (e.g., its norms, degree of network
    interconnectedness, etc.)

V. Extent of Change Agents' Promotion Efforts

Rates of Adoption of Innovations

Adapted from Rogers (2003)

Type of innovation-decision

Rogers (2003) stressed the importance that a social system's influence has on the adoption or rejection of an innovation by its members. It can take the form of individual members adopting or rejecting the innovation independent of other members of the system. Rogers defines this process as *optional-innovation decisions.*

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An innovation can outright be adopted or rejected by the entirety of the social system by *collective or authority-innovation decisions.* Collective-innovation decisions are those "made by consensus among the members of the system". As organizational scholars, Greenwood and Miller (2010) point out, that the fundamental underpinnings of organization theory are to uncover insights as to how to orchestrate collective cooperation in order to achieve the desired ends. This they believe is critical to the process of organizing people and resources to accomplish organizational change. Conversely, authority-innovation decisions are "made by a relatively few individuals in a system who possess power, status or technical expertise" (p. 71). These types of decisions are typically executed by formal leaders of an organization such as a company executive, manager or in the school context—the principal. Although, much of current leadership theory espouses a more collaborative decision making approach to the innovation process it does not mean that authority innovation decisions are not important. Indeed, complexity leadership theory scholars, Uhl-Bien, Marion and McKelvey (2007) believe that what they define as *administrative leadership* or top-down decision making performed by a formal leader is an important part of all organizations. They add that this formal position has the "authority and power to make decisions for the organization" but must do this judiciously so as to not stymie the "need for creativity, learning and adaptability" (p. 306). More importantly, they add that the formal leader's position is an integral part of complexity leadership theory in that they serve a "bureaucratic function" of planning and coordinating organizational activities as well as "imposing external coordinating constraints and demands" (p.305)

As the leader of a school, the principal has the challenge of making or presiding over numerous decisions whose outcomes significantly impact a school's journey toward

improvement. Fostering innovation in a school system requires an intricate decision process that the school principal must delicately balance. My interviews with principals provided insight into their thought processes regarding the innovation decision process.

It became evident that all of the principals understood the importance of collective-innovation decisions as the process that has the greatest potential for innovation adoption in a school setting. Rogers (2003) and organizational scholars note that the innovation process is more complex for organizations than individuals. From the school system perspective, Fullan (2014) in his book, *The Principal: Three Keys to Maximizing Impact,* speaks of the necessity of the principal having great *decisional capital,* but more importantly, that "more of it should reside in the many other individuals and groups that schools comprise". He defines decisional capital as the compilation of knowledge, intelligence, and energy necessary to put "human and social capital to effective use" (p. 80). Thus, Fullan's (2014) view of organizational decisions is seen to be compatible with those espoused by complexity leadership theorists who also see organizational decisions being made by all members of a system when considering to adopt innovations, (Burnes, 2005; Lichtenstein & Plowman, 2009; Uhl-Bien & Marion, 2009; Uhl-Bien, Marion & McKelvey, 2007).

Most principals employed some form of collaborative decision making in order to engage and encourage innovation in their schools. April used the example of an assessment innovation that her school was collaboratively involved with, "they want to be looking at assessment pertinent to the curriculum and what that's going to look like going forward…today we follow up with another conversation about that because innovation isn't an isolated act and it's one that requires a lot of collaboration and really it's about trans-forming…". Brian spoke about the need to avoid having innovation solely led by the

principal. He believed that this led to decisions that were unilaterally decided by the principal and thus was not seen as collaborative, "I started talking about [what] the STEM school is… what they really wanted me to do was, was chart the direction precisely… if I do that I'm not giving them ownership to develop it. Daphne strongly believed that a collaborative culture was important to her school in order for it to be successful, "you have to be collaborative to thrive here…let's try for another three weeks with these changes. And, so then that has become part of the culture…". Ron also felt that a collaborative culture was essential to his school, "it is about a collaborative culture, you know working together as a team and supporting people". Don's assessment of his teaching staff was that they were collegial and collaborative where "people are willing to look at new ideas and work together on these new ideas".

These principals saw the importance of collective decision making as integral to the innovation process. Debbie stressed the importance of her staff meetings being focused "on topics that require conversation, discussion and decision making…". Allan would introduce ideas and innovations and allow his staff to make the decision as to whether they felt it had potential for possible trial or implementation, "I share them with teachers and, if we think they're really important we'll continue to bring it back…". Beth saw collective decision making as integral to generating innovative thinking at her school, "the ideas that come out of them are things I would never have dreamed of…I think that sparking of ideas off one another is the best way".

Communication Channels

Communication plays an important role in the sharing of information with one or more individuals for the purposes of creating mutual understanding (Rogers, 2003).

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The essence of the diffusion process is the information exchange through which one individual communicates a new idea to one or several others…the process involves (1) an innovation, (2) an individual or other unit of adoption that has knowledge of, or has experienced using, the innovation, (3) another individual or other unit that does not yet have knowledge of, or experience with, the innovation, and (4) a communication channel connecting the two units. (p. 53-54, Rogers, 2003).

This exchange of information can take the form of *mass media channels* such as radio, television, Internet, or newspapers or *interpersonal channels* that involve face-to face exchanges between two or more individuals. Mass media channels allow for one or more individuals to reach a larger audience. Conversely, interpersonal channels are more successful in reaching and persuading an individual about a new idea (Rogers, 2003).

As previously mentioned in this chapter some principals had a preference for face-to-face conversations with their teachers in order to promote and support innovation in their schools. This was not the sole means of transmitting information about an innovation by these principals. Instead, it was also a means for building relationships and credibility with their teachers, an important aspect that many scholars of diffusion note are critical for establishing the momentum necessary for an individual or social systems' willingness to adopt an innovation (Rogers 2003). Nicholas Clarke (2013), a noted scholar of complexity leadership development, argues that the familiar individualistic leadership model of earlier times is no longer suited to the complexities of our knowledge based technological advanced world. Instead, leadership theories have shifted to models such as shared leadership where both the formal leader and followers are involved in a relationship focused on developing social capital. This he believes is crucial to the development of trust and respect, which is important to fostering the innovation process in an organization.

Although, other principal interviewees may not have mentioned this form of communication, it did not mean that they did not utilize face-to-face conversations to inform or persuade members of their organizations of new ideas. It is also understood that this transmission of messages is a reciprocal process in that it is not necessarily initiated solely from the school principal for purposes of accepting a new idea. Rogers (2003) emphasizes that, "most people depend mainly upon a subjective evaluation of an innovation that is conveyed to them from other individuals like themselves who have already adopted the innovation" (p.55).

These principals discussed ways in which they utilize the *interpersonal* channel to nurture the innovation process within their schools. Allan fostered innovation by utilizing his technology teacher as a conduit for sharing a new idea or innovation with the school staff, I ask him "every two weeks if he's got something to share". Debbie relied on a reciprocal approach where she brought forth ideas and her staff did as well. "I have this idea, what do you think? Or they'll come to me and say hey I've got this idea can I do this and the answer is almost always yes, and how can I help you". Don created opportunities through interpersonal channels regarding innovations, "if somebody else in the building is interested in that, being able to make a connection or facilitate a discussion between those two teachers I think is key". Brian approached the use of interpersonal channels to overcome resistance to innovations by showing his support through individual conversations. "I've got one reluctant elementary teacher who does not want to move in to the STEM philosophy…then she seems like she's okay, and then she's resistant, and it's like the quiet conversations of support along the way…".

These principals used the interpersonal channel to communicate with small groups of individuals as a way of nurturing innovation. Jason tapped into a group of teachers who

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"wanted to do WEB training and I encouraged that, actually I planted the seed at first…
Well there's a workshop, can you pay for it...absolutely". Daphne also took the approach
of using a small group to test an innovation and then potentially spread the innovation,
"So some people were willing to try it for three weeks and then they were noticing things
and they were talking about it… we'd bring it back and share it and talk about what was
difficult and what was easy… and is it worth continuing to try again". John took a direct
approach by providing small groups of teachers with professional development
opportunities with the proviso that they would in turn teach the rest of the staff. He also in-
serviced a small group of teachers on using Smart Boards and then moved onto training
the remaining staff members. Patricia also paid for professional development that focused
on blended learning for interested teachers. As well, she would "bring out helping teachers
…so that teachers can work with, and we have had that work successfully where some of
them continue to come back to some of the classes".

Nature of the social system

An organization whether large or small is considered to be a *social system.* Rogers
(2003) defines an organization as, "a stable system of individuals who work together to
achieve common goals through a hierarchy of ranks and a division of labor" (p.645). He
further adds that an organization will have a *social structure* within its boundaries. This
structure is understood as "patterned arrangements of the units in a system" (p. 63). It
provides a stable environment for human behaviour that is somewhat predictable and
reduces uncertainty. In addition to the formal structure of the social system there is also
an informal structure comprised of interpersonal networks that link its members through
various interactions and circumstances (its culture). A system's social structure impacts
the diffusion of innovations in multiple ways (Rogers, 2003). Organizational scholars from

the vast theoretical fields ranging from the ecological to the institutional have written about the complexities associated with the phenomena of change and innovation and its relation to the organization as a social system. Hatch (2004) notes that most organizational theory writers view organizations as conservative, stable, and resistant to change without intervention typically from management (formal leaders). She adds that leaders have influence in their organizations in regards to change as they are a part of their culture. However, she asserts, that a leader's, "ability to effectively mobilize this influence depends upon their knowledge of, and relationship with, the culture" (2004).

School principals are situated in a unique position within the parameters of their systems. They are both actor and observer of the dynamics that unfold within its boundaries. Although it is unspoken, principals as embedded leaders of their social systems play an integral role in the innovation process. This offers a unique understanding of the intricacies involved in fostering innovation. The principals of this study offered insightful comments regarding awareness of their school's social system and its significant role in the innovation process.

Allan and Patricia discussed two interesting perspectives of their school's social systems. Allan spoke about the cohesiveness of his teaching staff professionally and collegially yet felt that because of the rural environment they were more inclined to being risk aversive to change. "I think people in a smaller setting they tend to be more conservative…and a number of them share common values…you have teachers who have been here for a long time, sometimes they are here because they like things in a regimented way". Patricia had similar views, however, the issue of trust amongst teaching staff stifled the impetus for innovation. There seemed to be a lack of cohesiveness. "Sometimes there seems to be concerns about losing face or saving face, or status…one

of the areas for growth has been building trust so that people will feel that they can take risks.

Conversely, Brian and Don presented perspectives that were highly oriented toward innovation due to the uniqueness of their schools. For Brian, his school required a specific certification that allowed him to "select people who have the right mind set. Service capacity, innovation, risk taking…a bit more of a passion for technology…". Don felt that his school was in transition from being a school that traditionally was comfortable with the status quo to one that was "willing to look at new ideas and work together on these new ideas…". His school had gone "through a very dramatic change in our staff last year in order to embark on these new initiatives."

Jack and Jason viewed their social systems as being collegial and comfortable with the status quo. There was a perceived reluctance for risk-taking and innovative thinking. Jack felt that the dynamics of his staff coupled with what he characterized as a "very strong union environment" had a detrimental effect on fostering innovative practices at his school. "It is a somewhat warm, somewhat friendly, somewhat happy place, but for students, education is uncomfortable sometimes and I think for educators, education should be uncomfortable sometimes, and it's comfortable". Jason viewed his school culture in a similar light, "It's a very cohesive staff, but not very professional… some of the teachers have been here for 19 years…like I said like it's a stagnant culture here".

John had similar sentiments regarding his social system being comfortable, however, he decided to create a change mindset by shifting how he supported innovation initiatives. This approach he felt was his way of showing support to those teachers who were willing to try out new ideas and innovations. John also saw it as a way to possibly

gather momentum to encourage the resistors on his staff. "I implemented things here where those who are interested I support instead of a carte blanche handing everything out…they thought they just deserved it…I said well you need to show interest".

On the other hand, Ron struggled with the stability of his social system due to the transient nature of his teaching staff. This made it difficult for him to build the school culture and foster a unified vision toward embracing change and innovation, "In terms of moving initiatives forward, I have found it a little bit challenging because its…people here, people there, they are leaving, they are coming".

The remaining principal respondents spoke of their social systems being highly collaborative, collegial and willing to take risks to move forward. Beth spoke of her school culture as one that is extremely dependent on being collaborative. It was really the only way that they functioned as a school, "we have common planning time… all of the overviews and previews come out of a group effort so there's no individuals…staff members that through the whole staffing process have come here that aren't team players, and aren't collaborators by nature, couldn't fit into that". April defined her school culture as, "very caring, hardworking and they are at the point where every child counts and they will do what it takes". Debbie described her school culture as "a little gem…[they] are quite open and willing to try new things and to take on new challenges and they really work together". Daphne spoke about her school culture being very collaborative that it is difficult "for the new people to come in not used to that collaborative atmosphere and not sure how to do that...you have to be collaborative to thrive here". Sheila mentioned that even though they had a small school in terms of student population and teaching/support staff that they were "quite receptive to trying anything".

Extent of Change Agents' Promotion Efforts

The complexity of any change effort in an organization has many factors and key individuals linked to its success or failure. In a school setting the key individuals are those at the ground level, namely teachers who are adopting and implementing the change effort. It also includes others such as external *change agents* with expertise in specific content or technical areas related to the innovation. Rogers (2003) defines a change agent as "an individual who influences clients' innovation-decisions in a direction deemed desirable by a change agency" (p. 69). He adds, that the change agent's mandate is usually to have an innovation adopted, slow down its diffusion or negate it if it is seen as undesirable. As well, change agents will usually employ *opinion leaders,* those within a social system that have influence with individuals in the organization to speed up the diffusion process.

Rogers (2003) views a change agent as someone external to an organization. The school principal is situated in a unique position within its social system. In some respects, the principal can be viewed as an "external" member by its collective. One of the principal's interviewed, Sheila, captured this sentiment when she transitioned from the role of teacher to principal, "...then you move into admin[istration] and you are just the new person and nobody wants to hear from you. I have strongly felt that and this is my fourth year and I still feel it. I still feel like sometimes I share an idea and nobody cares". This is not to say that the principal is not considered to be an integral member of his or her school.

Hallinger (2003) describes the role of the principal as someone who keeps current with new ideas and being tasked with the introduction or facilitation of innovation. Heller & Firestone, (1995) and Anderson, (1997) add, "Evidence from change studies suggest that pressure and support are provided by principals, as well as other school members, who

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also function as change agents" (Adams & Jean-Marie, p. 361, 2010). Hence, the school principal may not necessarily be the "external change agent", yet their role embodies characteristics of a change agent. Their role in a sense, is positioned in the "middle" where teachers are at the ground level and senior district personnel are at the top of the hierarchy. Thus, the principal is tasked with the challenge of ensuring coherence with school district initiatives and at the same time working with their individual schools in an effort to provide meaningful learning experiences for students. This, no doubt, requires schools to focus on continuous improvement and innovation to accomplish this endeavour. It is then incumbent on the principal to build the organizational capacity of his/her school by encouraging change through innovation.

Judge (2011), sees the role of the middle manager [principal] as "change agents [who] can take initiative on their own to sell ideas, make sense of the proposed changes, and provide essential stability during tumultuous change events" (p.56). He adds, that middle managers have the ability to gather important information, transmit it quickly through communication channels, facilitate the change and implementation process. Similarly, Fullan (2014) views the role of principal as change agent as one of building human and social capital for the purpose of improving schools. This includes, he believes, cultivating and developing individual talent as well as new leaders (p. 89). More importantly, Fullan (2014) views the principal's role of using the group [teachers] to influence each other in an effort to strengthen their social capital and learn from each other as a way to grow their expertise to improve student learning.

These principals spoke of individuals within their schools who they sought or viewed as "opinion leaders" whose influential characteristics helped to spread innovations in their schools. Patricia spoke of two groups of teachers who were spearheading different

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initiatives in an effort to promote and encourage innovation school wide amongst all staff members, "We are building a learning commons, so I have three staff members who are going to be involved in kind of modelling what co-teaching is and supporting that initiative…I have a group of teachers who are going to be looking into the Aboriginal content in the new curriculum…". John also mentioned a group of teachers who "were working with the new curriculum…and they just wrote their report cards with the new curriculum language…". Debbie mentioned that "a couple of teachers took on this genius hour as a direct way to support the new curriculum. They're having such success with that, they've loved it". Jason utilized a school district helping teacher to promote the new curriculum with his teachers, "our French teachers are way ahead of the curve because they had time to plan and, and he's been working with them in terms of making it more fun and innovative…". Some principals spoke of using opinion leaders to promote new technologies with their colleagues. Allan mentioned his technology teacher who agreed to have a Smart Board placed in his classroom as a catalyst for spreading this new technology. This resulted in, two other teachers volunteer[ing] to have it in their room and once you reach a critical mass then highest resisters looked over their shoulders and said everyone has one I want one too". Beth also spoke of a new teacher who she used to promote technology at her school, "she's a whiz and so she's got all the teachers on Fresh Grade…so, at every staff meeting we have a section where we talk specifically about apps and technology and how to use it to good purpose…".

Three principals also looked at capitalizing on opinion leaders in their schools through the lens of sustainability of innovations. Jack felt that it was important for his teachers to be the ones to lead innovation initiatives so "that some of the changes that have taken place will endure because teachers have felt some ownership for it". Brian

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viewed taking ownership as a way of building system knowledge so that if a teacher "decide[s] to move on to a different school then somebody who comes in can adopt in to that…". Daphne had similar views but from the perspective of her teachers fearing that once she moves on how will they continue the innovation process. She assured her teachers that, "if it's really become part of your practice and something you believe in, then you continue it, if you truly believe it's beneficial for the students. If you don't, then it's going to go…".

One of the initial roles that a change agent introduces to an organization is the need for change. Rogers (2003) describes this as the stage where the change agent "helps [members] become aware of the need to alter their behavior" (p. 592). For one of the principals, Don, this was important to his school's survival, "I think by being able to create that sense of urgency for them then recognizing that if we sit around and do nothing we're going to have to close the building… if there's not the impetus for change… I think they're able to get that…". Allan used a future oriented approach to make his staff aware of the need to consider change, "something's coming down the pipe… with the new curriculum we will have to start using something...I don't want us to get left behind". Jack expressed a similar sentiment in regards to arousing the need for change, "create an environment where they see a need, they are smart enough, and I think caring enough to some extent, to respond to that need and say well what can we do here".

According to Rogers (2003) it is crucial that a change agent be "perceived as credible, competent, and trustworthy" as well as empathetic to the members "needs and problems" before the innovations being promoted are accepted (p. 592). Debbie spoke of the importance of building relationships and trust as integral to promoting innovation. She recounted a conversation with a colleague, "you need to be able to develop a sense of

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trust so that teachers aren't going to be freaking out, because you know what it's not going to go well the first time you try this…". Allan saw the trust factor as critical to fostering the innovation process at his school, "it has been a challenge for me to have them adopt new things… then once you've earned that trust… whatever we have that's going to improve our processes is actually beneficial for them and for the school…". Ron understood as a new principal to the school the importance of building trust with his teachers, "my credibility, I am being very cautious about that. I am not coming and saying you guys are doing X, Y, and Z, why aren't you doing that"?

The role of a change agent is to diagnose problems within an organization and examine the reasons that the current alternatives have not met the needs of its members. It is also to explore options that can be taken and then find ways to motivate an organization's interest toward the innovation (Rogers, 2003). These principals touched upon these aspects of change. Brian put it succinctly, "…teachers are the keepers of the culture of the school and its direction… we set the conditions for that to occur and we can certainly limit those conditions… or we can keep it going by nurturing it along the way…". Don viewed the change agent's role as being "able to identify what the gaps are and where the potential lies and being able to see ways that you can respond to that…". Jason saw his role as a problem solver where he tries to mobilize his staff to solve the problem. He saw himself as "creative in how I make it happen, but not creative in terms of people that come up with these inspirations…". John saw his leadership style as more of a facilitator, "I don't want to force a person to do something they're not comfortable with, but at the same time I'm saying what are you doing different…if you approach me saying, I would like to try and do this…that's where I support it …".

Summary of qualitative analysis

The purpose of this chapter was to analyze the responses of the 13 public school principals who partook in face-to-face interviews to answer the research question: *What are school principals' views, perceptions, and experiences toward innovation?* This was the second phase of my mixed-methods study that explored what Hesse-Biber (2010) describes as individuals [who] are perceived to be "meaning-makers" of the world they reside in; it is their lived reality… (p. 63).

All principals' felt positively about innovation and saw it as important to improving teaching and learning for the future of the education system. They understood the complexities involved in fostering the innovation process in their schools. In general, the majority of principals (9) interpreted the concept of innovation to mean as Rogers (2003) defined, "an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (p.44). The remaining four principals interpreted it to be a radical, or transformative concept defined by Christensen (2010) as disruptive innovation. Although both concepts of innovation are similar in their introduction of something "new" to an individual or social system, they differ in theory and application. This did not markedly change the way that both groups perceived the nature of their role in promoting and sustaining innovation within their schools.

Principals overwhelmingly believed that it was important for their schools to be innovative. They felt that it was imperative regardless of whether the innovation was in the form of new technology, a teaching idea or practice as long as it was different and had relevancy for student learning. For one principal being innovative was a matter of the school's survival due to declining enrolment. Another principal, due to the nature of her

school, felt that they would figuratively "die" if they stopped innovating. There was an underlying feeling of the necessity for nurturing a growth mindset within their schools in order to continue moving forward (Dweck, 2006). Only one principal believed that it was not important for her school to be innovative. This, however, was linked to her definition of innovation as being a much more radical interpretation. She stated that it was important for her school to be continually learning and meeting student's needs. She felt that there were little innovations that happen for individual students in need which she believed was more risk-taking. It should be noted that risk-taking is considered by innovation scholars as an important aspect of the process.

The general consensus among principals in terms of whether they saw themselves as innovators according to Rogers (2003) adopter categories coincided to their category classification from the quantitative phase results. The majority of principals were in the *early adopter* innovativeness category. Most principals saw themselves as facilitators or problem-solvers in the innovation process. One principal related his innovativeness as situational depending on the specific culture of the school. Six principals saw themselves as innovators although one was not sure because of the broad definition of innovation. Three of the six principals' responses on the quantitative phase of this study ranked them as *early adopters* for innovativeness.

Principals' views regarding the capacity of their schools for innovation were rated on a scale from 1 - 10 with "1" being low to "10" meaning high. As expected there were varied responses with a mix of complex explanations for them. Two of the principals viewed their schools in terms of rating individual teachers' innovativeness and then providing an average for the school overall. One principal viewed his rating in terms of the personalities of teachers as related to the more rural setting of his school. Three of the

principals who saw themselves as innovators spoke of their teachers' willingness to try new ideas, take risks and being comfortable with change. As such, they rated their school's capacity in the upper ranges on the scale. The two principals of choice schools rated their schools with the highest ratings of all principal participants. Their high ratings were very much due to the nature of their schools. Three principals rated their schools in the mid-range of the 10 - point scale. Each had different reasons for their ratings ranging from the constraints of the school's educational philosophy to being the newly appointed principal getting a feel for the school's culture. Lastly, one principal rated his school on the low end of the scale due to what he believed was a school culture steeped in maintaining the status quo.

Three themes emerged from principal responses regarding barriers and challenges to fostering innovation in their schools.

Five principals spoke of *time and energy* as one barrier. Responses were focused on the many demands placed on teachers and administrators such as Ministry of Education mandates, day to day stresses of teaching and learning, as well as other demands of school and community expectations. One principal viewed the *time* constraint in terms as the measurement of time to acquire the momentum necessary to embrace and implement an innovation. Another principal looked at time in terms of the financial aspect of sustaining an innovation over a period of time.

The theme of *personnel* was mentioned by the majority of principals as a challenge to innovation within their schools. Again, there were a variety of responses and interpretations of the "personnel" aspect, particularly the issue of "staffing" which is the human resources process (see p. 150) for allocating teaching staff for the following school

year. Several principals felt that this had an impact on their efforts to build a school culture conducive to innovation due to the lack of input and control they had in this process. Much of this process is bound by binding collective labour agreements. Principal perceptions on this issue suggested that being able to select the right personnel or at least having the right people for their schools would be a significant factor to developing the impetus for innovation. One principal viewed the personnel in terms of the nature of the school's environment, meaning geographical location as a challenge due to the mindset of the teachers who tend to choose these locales. This was his observation in comparison to his previous assignment in a different part of the school district. Two principals viewed the personnel factor from the perspective of longevity of members of a school who have influence on maintaining the status quo and thus inhibiting the innovation process. Finally, three principals spoke of the personnel issue due to the fallout from the previous year's bitter teachers' labour strike that pitted the teachers' union against the government of British Columbia. This they felt still had lasting repercussions on innovation efforts in their schools.

There were other barriers and challenges mentioned by principals that they felt had some impact on innovation efforts in their schools. Technology infrastructure was mentioned by three principals in regards to slow or outdated technology that caused frustration for teachers, students and themselves. One principal in a related technology matter felt that the school district's bureaucratic structures hindered his ability to order technology and have it delivered in a timely manner. Another principal saw the lack of promotion of his school by the school district as a barrier to the spreading of innovative practices school system wide. He also saw it as a task that he needed to promote as well. Interestingly, few of the thirteen principals' spoke of financial or resource support as being

a barrier to fostering innovation in their schools.

To gather further insights into principals' perceptions toward innovation I explored ways in which they led and promoted innovation in their schools. Several common themes emerged from principal responses. Providing financial support for resources and professional development was often mentioned as a way to demonstrate support and promote innovation. An important part of the professional development aspect was finding ways to provide time for embedded collaboration within the regular school day. All principals felt that this was invaluable for sharing teaching practice, spreading innovative ideas and importantly, moving the innovation process forward. Several principals' reinforced this by highlighting their visibility by being in classrooms and recognizing innovation efforts as well as connecting teachers with one another in order to expand the innovation network. Another important way that principals' promoted the spread of innovation was by reinforcing the notion of risk-taking being a normal part of the process. This was demonstrated by their emphasis on trying new ideas and learning from the "fail forward" mindset as one principal noted. In addition, three principals spoke about the importance of fostering relationships in order to build a culture of trust which they felt led to a willingness to try new ideas. Similarly, three principals believed that by working alongside teachers during the innovation process demonstrated their commitment and leadership to supporting innovation – "the walking the talk" cliché. One principal felt that the physical environment of his school building needed modernizing in order to encourage innovation.

My final analysis of interviews explored Rogers (2003) theoretical *Variables Determining the Rate of Adoption* framework (see p. 160) and its connection to principals' characteristics, and the role it plays toward fostering innovation. I chose to look at the four

variables: 1) type of innovation-decision, 2) communication channels, 3) nature of social system and 4) extent of change agents' promotion efforts. These variables are the least researched of Rogers (2003) framework and were more relevant in that I was not analyzing a specific innovation such as technology.

For all principals it was evident that it was imperative that the decision to promote, adopt and implement an innovation rested solely on a *collective decision-making* process. They understood that the complexities of an organization and specifically its culture necessitated such an approach if innovation efforts were to be successful. In terms of *communication channels,* most principals expressed its importance in terms of face-to-face and small group interpersonal conversations as a way of building relationships and trust with their teachers as critical to nurturing innovation. All principals had a good understanding of their schools' *social system* being integral to fostering innovation. Two principals were well aware of the reluctance of their staff to embrace innovation. One principal felt that it was a result of the rural setting of the school in conjunction to the types of personalities that are attracted to this environment. The second principal believed that the resistance to innovation was related to the lack of trust the teaching staff had amongst themselves. Similarly, three principals viewed their school as being comfortable with the status quo which also hindered the innovation process. Two principals had the opposite feeling as the opportunity to have the "right people" because of the nature of their schools made it much more open to innovation. The remaining principals saw their schools as collaborative enterprises that were open to risk-taking.

The extent of the principals' efforts *as change agents to promote innovation* was evidenced throughout all interviews. Most principals were aware of the need to find "opinion leaders" within their school to influence colleagues toward the critical mass

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required to promote and adopt an innovation (Rogers, 2003). Three principals also understood their role as a change agent was to articulate the reason(s) for change. In addition, three principals expressed their views regarding the importance of establishing credibility as a key factor to promoting innovation. Lastly, five principals spoke of their role as being able to problem solve "gaps" that can exist within their schools with the intent of raising awareness and exploring options for inspiring members to consider innovation alternatives.

The following chapter will synthesize the findings from the quantitative phase along with that of the qualitative phase to provide an integrated analysis of this mixed-methods study. This will provide further evidence to support and answer the central question of this study.

Chapter Six
Synthesizing the Quantitative and Qualitative Phases:

One learns to hope that nature possesses an order that one may aspire to comprehend—C.N. Yang

The basis of this mixed methods study underlined the integral role a public school principal plays in promoting change through the process of innovation. The purpose of this study sought to investigate school principals' perceptions toward innovation and its relationship to individual and organizational characteristics. More specifically, the research question of this study was: *How are the perceptions of principals toward innovation related to individual and organizational characteristics?*

This study was a sequential explanatory mixed-methods research design. It was comprised of quantitative and qualitative phases which were used to answer the overarching question of this research. The quantitative phase consisted of a survey analysis of school principals' perceptions of individual and organizational innovation characteristics and their relationship to organizational and demographic variables. The qualitative phase consisted of interviews from the purposive sample of principals selected from the quantitative phase. The interview process provided a deeper understanding of principals' perceptions, views, and experiences and its relationship to the notion of fostering innovation in schools.

Synthesis and analysis of the quantitative and qualitative phases

As a sequential explanatory mixed-methods study the quantitative and qualitative findings were analyzed separately for each phase. Yet, examining a social phenomenon by each distinct research method does not provide a complete understanding of it (Pearce,

2015). Pearce (2015) notes that, "rigor and measurement give us ways to confirm theory, but we must have imagination and listen and watch carefully to identify important questions and discover theoretical ideas that advance our understandings of the social world" (p. 2). Each method has its strength and weaknesses but when integrated provide a "yin and yang" understanding of a social phenomenon (Johnson, 2012, and Johnson & Stefurak, 2013). Using the findings from the survey and interviews conducted I attempted to amalgamate the research methods in order to interconnect them in a more holistic way for the purpose of further expanding upon and supporting the main research question.

Analysis from the quantitative survey phase, which was a partial replication of Mitchell (2008) and Williams (2013) studies of public school superintendents' perceptions of individual and organizational innovativeness, indicated similar findings. More specifically, superintendents and principals regarded themselves to be more innovative than their school district and schools. As well, the majority of participants from the three studies fell in the *early adopter* category of innovativeness in accordance with Rogers (2003) framework. Statistical analysis also generally found no significant differences between organizational and demographic variables in relation to individual and organizational innovativeness among the three studies.

The interviews I conducted captured the essence of the thirteen principals' responses in relation to their perceptions toward innovation. More importantly, the interviews provided a wealth of rich dialogue that allowed me to explore the relationship between principals' responses and the sample study's perceptions of innovation analyzed in the quantitative phase. The way I did this was by examining statements from the survey responses such as, *I am generally cautious about accepting new ideas, I seek out new ways to do things,* and then linking them to particular interview questions or statements

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such as, *Do you see yourself as someone who is innovative*? or *My school is cautious about accepting new ideas* for further analysis. My examination consisted of analyzing principals' interview responses seeking statements that supported or contradicted principals' perceptions toward innovation as expressed from the quantitative findings. Through this analysis I had hoped to attain a more holistic understanding of principals' perceptions toward innovation.

Investigating links between quantitative and qualitative phases

In an effort to link the quantitative and qualitative phases of this study I decided to divide the 13 principals into two age categories. The age categories were: 1) 40 – 50 years of age and, 2) 51 – 60+ of age. My reasoning for this was that the younger age group generally had less experience as a principal and also included three principals who perceived themselves as *innovators* (using Rogers, 2003 classification framework) from the quantitative survey phase results. The older age group generally had more years of experience as a principal and fewer innovators. Each group overwhelmingly classified themselves as *early adopters*. More importantly, I wanted to examine principal's interview and survey responses from each study phase to help answer my overarching research question regarding how their perceptions toward innovation are related to individual and organizational characteristics.

Connecting the two phases

In order to develop an understanding of the relationship between the two study phases I sought to explain the connection between principals' perceptions regarding individual and organizational innovativeness from survey responses and their interview

responses regarding innovation: 1) innovative orientation, 2) views, 3) barriers, 4) leading and promoting innovation.

Principal as innovative

The survey instrument of the quantitative phase focus was to probe principals' orientation toward innovativeness. Statements such as, *I enjoy trying new ideas, I seek out new ways to do things, I am generally cautious about accepting new ideas, and I am suspicious of new inventions and new ways of thinking* were examples of individual characteristic survey items. For the statements, *I enjoy trying new ideas, and I seek out new ways to do things* all 13 principals interviewed either replied that they *agreed or strongly agreed* with this statement. Interestingly, for the statement, *I am receptive to new ideas,* 12 principals responded with either *agree or strongly agree.* Jason responded with *strongly disagree* to this statement. This may have been an error when selecting his response since he responded with *strongly agree* to the statement *I seek out new ways to do things.* Eleven principals *agreed or strongly agreed* with the statement, *I frequently improvise methods for solving a problem when an answer is not apparent* with April and Sheila stating that they *disagreed.* For the statement, *I consider myself to be creative and original in my thinking and behavior,* ten principals stated they *agreed or strongly agreed,* with Jason, Daphne and Allan responding with a *neutral* reply. Similarly, all 13 principals responded to the statement, *I find it stimulating to be original in my thinking and behavior* with 9 principals *strongly agreeing and 4 agreeing.* Twelve principals responded with *agree or strongly agree* to the statement, *I am an inventive kind of person* with only Jason stating a *neutral* response. See table 27 below for summary.

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Table 27: Principal responses to positive oriented individual innovativeness statements; N = 13 principal respondents

Statements	Strongly Disagree	Disagree	Neutral	Agree/Strongly Agree
I enjoy trying new ideas				13
I seek out new ways to do things				13
I am receptive to new ideas	1			12
I frequently improvise methods for solving a problem when an answer is not apparent		2		11
I consider myself to be creative and original in my thinking and behavior			3	10
I find it stimulating to be original in my thinking and behavior				13
I am an inventive kind of person			1	12

Generally, principals' responses to survey statements that had negative innovation orientations were answered with either *disagree or strongly disagree*. For the statement, *I am generally cautious about accepting new ideas*, 10 principals responded with *disagree or strongly disagree.* April and Jason *agreed* with this statement and Daphne was *neutral* in her response. Twelve principals responded with *disagree or strongly disagree* to the statement, *I am suspicious of new inventions and new ways of thinking.* Daphne's response was *neutral* for this statement. Eleven principals responded with *disagree or strongly disagree* to the statement, *I must see other people using new innovations before I will consider them.* Patricia and Jason gave neutral responses to this statement. For the statement, *I tend to feel that the old way of living and doing things is the best way*, 12 principals responded with *disagree or strongly disagree.* April's response was *neutral* for this statement. Eleven principals responded with *disagree or strongly disagree* to the statement, *I am reluctant about adopting new ways of doing things until I see them working for people around me*. Ron and Jason responded with *neutral* for this statement. All

principals responded with *disagree or strongly disagree* to the statement, *I often find myself skeptical of new ideas.* Please see table 28 below for a summary.

Table 28: Principal responses to negative oriented individual innovativeness statements; N = 13 principal respondents

Statements	Strongly Disagree	Disagree	Neutral	Agree/Strongly Agree
I am generally cautious about accepting new ideas	10	1	2	
I am suspicious of new inventions and new ways of thinking	12	1		
I must see other people using new innovations before I will consider them	11	2		
I tend to feel that the old way of living and doing things is the best way	12	1		
I am reluctant about adopting new ways of things until I see them working for people around me	11	2		
I often find myself skeptical of new ideas	13			

What became evident from principals' survey responses was that their perceptions were oriented toward innovative thinking in terms of how they viewed this phenomenon. The findings of the survey illustrated this as 9 principals were seen as *early adopters* and 4 principals fell into the *innovator* category according to Rogers (2003) innovativeness framework. In addition, there was a strong correlation to principals' survey responses and their face-to-face interview responses to the question, *Do you see yourself as someone who is innovative?* An interesting aspect of this question was that some principals did not see themselves as innovative but more as facilitators of innovation even though their responses depicted innovative characteristics. For example, Allan saw himself as a facilitator who was "always curious about other ways to help my teachers and other ways

to help our students learn better…". April was adamant that she was not innovative, "I actually see myself as someone who maybe can spot and support good things and look for those to lead the charge". Daphne initially felt that she was not innovative because she didn't do anything different than what other principals did in terms of fostering innovation. As she continued with her response to this question a noticeable shift in her thinking occurred when she stated, "I guess I am innovative because I'm willing to try things, I'm willing to fail forward…".

It could be suggested that these principals did not see themselves as innovative due to their definition to my earlier interview question that asked, "How do you define innovation as it pertains to school improvement?" April's view was that innovation had to be "disruptive" or radically different as defined by Christensen (2011) and saw innovation in the school system as incremental that builds on existing innovations.

Overall, principals' interview responses correlated with their responses to the innovative characteristic statements from the survey phase of the study. For example, principals' spoke of being creative, a problem solver, or embracing change as part of how they viewed the innovation process. Beth was a creative thinker "who always want[s] change…" and as a leader she felt she needed "to put the reins on a little bit". Brian had a similar view who saw himself as "an ideas guy, [who] work[s] on the innovations". Debbie also viewed herself as a creative or innovative thinker, "I feel at times it's kind of put me at odds because I see the world in a different way than many people, even with colleagues…" Don felt that he too was more of a "creative" thinker, but as he continued to elaborate it became evident that he was describing innovative characteristics, "maybe it's that I get bored… I don't like the status quo because I know once I get to a point I can begin to rest on my laurels…not that I coast, but the curve begins to flatten out…". Jason

saw himself as "a good problem solver and innovative in a sense, like how do you make your school unique and serve the needs of your kids"? Sheila also displayed characteristics of being restless with the status quo, "It is something that I always fear, that I am not going to stay as engaged. I want to be a life-long learner, but sometimes I struggle and think "oh man, am I doing that right now". Patricia's perspective on being innovative was a somewhat interesting epiphany, "I think the challenge of being innovative is when you do it, you don't actually realize that you are because it is just the way you do everything…".

Principals' perceptions of their school's innovativeness

The second part of the quantitative survey phase asked for principals' perceptions regarding their school's orientation toward innovation. Results from this section of the survey indicated that principals' viewed their organizations to be less innovative than they rated themselves. These findings were consistent with the studies of Mitchell (2008) and Williams (2013) who surveyed superintendent perceptions of innovation in the states of South Dakota and South Carolina.

This was evident from principals mixed responses to the various statements regarding their school's innovativeness starting with the stem, *"My school…".* Principals responded to *My school is very inventive* with Patricia and Jack responding with *disagree* and John, April, Jason and Ron with *neutral.* Daphne, Allan, and Sheila responded with *agree* and Don, Debbie, Beth and Brian with *strongly agree.* For the statement, *My school is creative in its method of operation*, 3 principals responded *neutral* and 5 principals responded with *agree.* Three principals responded with *strongly agree.* Jack responded with *disagree* and Patricia with *strongly disagree.* Two principals were *neutral* with the

statement, *My school is receptive to new ideas* and 5 principals responded with *agree.* Three principals *strongly agreed* with the statement with three *disagreeing.* Four principals responded with *neutral* to the statement, *My school is very original in its operational procedures.* Six principals *agreed* with this statement and 2 principals *strongly agreed.* Jack was the only principal to *disagree* with this statement. One principal responded with *neutral* to the statement *My school seeks out new ways to do things.* Seven principals *agreed* and 3 *strongly agreed* with this statement. Two principals *disagreed* with the statement. See Table 29 below for a review of principals statements.

Table 29: Principal positive responses to their school's innovativeness statements; N = 13 principal respondents

Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
My school is very inventive		2	4	3	4
My school is creative in its method of operation	1	1	3	5	3
My school is receptive to new ideas		3	2	5	3
My school is very original in its operational procedures		1	4	6	2
My school seeks out new ways to do things		2	1	7	3

Principal responses to statements regarding their school's innovativeness that had negative innovation orientations also supported principals' perceptions of being more innovative than their organizations. For the statement, *My school is suspicious of new ways of thinking* 3 principals *agreed* and 1 principal *strongly agreed* with this statement. Five principals *disagreed* and 4 principals *strongly disagreed* with this statement. For the statement, *My school is usually one of the last of its kind to change to a new method of operation,* 4 principals had *neutral* responses, 2 principals *agreed* and 1 principal *strongly agreed* with this statement. Two principals *disagreed* and 4 principals *strongly disagreed*

with this statement. For the statement, *My school is skeptical of new ideas,* 1 principal responded *neutral*, 3 principals *agreed* and 1 principal *strongly agreed.* Five principals *disagreed* and 3 principals *strongly disagreed* with this statement. For the statement, *My school follows the belief that the old way of doing things is the best*, 1 principal responded *neutral*, 3 principals *agreed*, and 1 principal *strongly agreed*. Four principals *disagreed*, and 4 principals *strongly disagreed* with this statement. The statement, *My school is slow to change*, generated 6 responses of *agree*, and 1 with *strongly agree*. Five principals responded with *disagree* and 1 principal's response was *strongly disagree*. See table 30 below for summary of principal's responses to their school's innovativeness.

Table 30: Principal negative responses to their school's innovativeness statements; N = 13 principal respondents

Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
My school is suspicious of new ways of thinking	4	5		3	1
My school is usually one of the last of its kind to change to a new method of operation	4	2	4	2	1
My school is skeptical of new ideas	3	5	1	3	1
My school follows the belief that the old way of doing things is the best	4	3	1	4	1
My school is slow to change	1	5		6	1

Generally, principals' viewed their school to be less innovative than themselves. Using Rogers (2003) adopter category framework 1 principal perceived their school innovativeness category as *laggard or traditionalist* adopters. Two principals perceived their schools to be *late majority* adopters and 1 principal's response was *early majority*.

Five principals saw their schools as *early adopters* and 2 principals perceived their schools to be *innovators*.

As with principals' responses from the second part of the survey regarding their school's orientation toward innovativeness, interview responses were generally supportive of their survey responses. Principals were asked to rate their school's capacity toward innovation using a scale from 1 to 10, with 1 meaning *not innovative* to 10 meaning *highly innovative.*

Principals' interview responses regarding their school's capacity for innovation reflected a similar mixed pattern as the findings from the survey phase. Jason rated his school a two for innovativeness with the correlating adopter category of *laggard*, "it's a stagnant culture here…they're not necessarily having conversations pertaining to students…". Jack rated his school on a range from 2-9 with a corresponding *late majority* rating from the quantitative survey, "In any given classroom, it can be as different as night and day…two grade levels, three rooms apart, totally different.".

Patricia, Ron and April rated their school's innovativeness as a "5" with their corresponding adopter categories being *late majority*, *early adopter* and *innovator* from the survey results. Ron and April's school ratings could be viewed as somewhat contradictory in light of their survey responses regarding their school's innovativeness characteristics*.*

Interestingly, April's *innovator* adopter category rating from the survey of her school is contrary to her school's innovativeness capacity rating, "I don't think they're innovative, but I think they're growing and learning and applying things so, transforming". This researcher believes that this is related to her definition of innovation. Patricia felt that

some of her staff members believed that their school of choice did not have to try new teaching strategies and as such rated her school's innovative capacity "around 5, a 4 or 5 as a whole school". Ron rated his school as a "5" based on the range of innovativeness he had observed throughout the school. However, he felt that they were not quite there as a "culture moving towards a common goal in terms of innovation".

Allan, John, and Sheila rated their schools in the "6-7" range for innovativeness. Their respective adopter categories from the survey were *early adopter* for Allan and John and *late majority* for Shelia. Allan's rating of his school was very much tied to his feeling that he had a conservative staff who "may have chosen to come to a rural setting because the amount of change that happens in a rural setting is less than it would happen in an urban setting". John's rating of his school was based on some of his teacher's reluctance to adapt to the diverse learning styles of their students, which he stated, "irks me the most" when they say students should be adapting to their teaching styles. Sheila's rating of her school's innovativeness was based on viewing her teacher's from least to most innovative and then giving an average overall rating.

Don, Daphne and Debbie rated their school's capacity for innovation in the "7-8" range. All three principals categorized their schools as *early adopters* of innovation from the survey results. Don's school was in the initial stage of a complete transformation, "with the potential for more growth…when you make a significant change and you're asking people to change their practice in significant ways…". Daphne rated her school's innovativeness as an "8" due to their willingness not only "try something new" but also to critically evaluate whether it was beneficial for student learning or not. Debbie's rating of her school's innovativeness was based on her teacher's work and commitment to

aboriginal students and the new curriculum, "I think my staff is kind of like well ahead of many staffs, and they have been presenting to different staffs".

Beth and Brian rated their school's capacity for innovation in the "9-10" range. The nature of their schools reflected creative and innovative approaches to teaching and learning. Both principals' perceived their school's to be *early adopters* of innovation from the survey phase. Beth felt that her school's innovativeness was a reflection of its overall creative and collaborative nature, "any new idea there's always those seed people that are willing to go with, or want to go with it… then it's just what happens". For Brian the ability to be "able to select people who have the right mind set" was a critical factor to his school's innovativeness rating.

Some of the phase one survey responses were supported by principal interview responses regarding barriers to fostering innovation in their schools.

One of the common themes emerging from interviews highlighted barriers related to school personnel and the difficulties with "change" as associated with innovation. Those principals' that had rated their school's capacity for innovation higher than "6" tended to have responses that generally *disagreed* with survey statements such as, *My school is suspicious of new ways of thinking, or skeptical of new ideas.* Whereas, principals that rated their school's capacity for innovation "5" or lower generally responded with *agree or strongly agree* to the above mentioned statement examples.

Allan took a philosophical view of the nature of change in general and the usual resistance that accompanies it, "I think that there's a reluctance to change in everything that we do, and I understand that… I think it's the reluctance of some teachers to look at

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change as a positive thing…". April looked at resistance to change from the perspective of how staff dynamics can have a major impact on innovation efforts, "Every once in a while in you can get one or two individuals who are not going in the same direction as everybody else and that can really, really throw a loop into things". Although April rated her school a "5", due to her definition of innovation, her responses to survey statements were consistent with principals' who rated their schools as "6 or higher" for innovativeness.

Jason felt that barriers to fostering innovation were related to teacher's overall mindset, "as a rule teachers think they're autonomous…If they think they're autonomous, no matter what you do they don't want to be receptive to it…". Patricia's response was also consistent with teacher's mindset in relation to innovation, "One of the barriers would be the mentality that we are [type of school choice]". Conversely, Ron looked at the barrier to innovation from the perspective of teachers being wary of the continual changes principals attempt to implement when first arriving to a new school, "stereotypical we have seen this before…wait, this principal will leave and then we will see what the next thing is… leadership movement is a challenge because a principal takes it one way and then another principal takes it another way". Principals' who rated their school's higher than "6" also spoke of school personnel as a potential barrier to innovation, however, they mostly responded with *disagree or strongly disagree* to the negative oriented innovation survey examples mentioned previously.

In a further analysis to integrate the two phases of this study I examined 2 variables from the quantitative phase that reported statistical significant results. The variables that reported statistical significances were: 1) the differences between individual and organizational innovativeness and percentage of budget allocated to school professional development, and 2) the difference between individual and organizational innovativeness

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and principals' gender (see p. 125-126). Differences were found (.01) between principals who allocated 0 – 7% of their budgets and those who allocated 8 –15%. As well, differences were found (.03) between female and male principals and their perceptions of organizational innovativeness.

Although these 2 variables were found to be statistically significant they were not considered as critical factors that hindered innovation efforts as gleaned from principal interviews. The variable of percentage of budget allocated to professional development was rarely spoken of during interviews. On the contrary, most principals spoke about the many ways that they provided professional development opportunities for their schools as well as inviting and encouraging teachers to embrace it as part of fostering innovation. Generally, principals' had a positive view of their schools, regardless of their budget allocations. Financial issues did not overly hinder innovative endeavours. In fact, some of the smaller schools had embarked on various innovation initiatives. For example, Daphne spoke about her school's "pockets of little brilliance where we'll try something new".

Similarly, the statistical significance found between female and male principals in relation to organizational innovativeness was also not seen as a factor that impeded innovation by principals' during interviews. More importantly, all principals regardless of their gender viewed their school's as diverse communities with a variety of strengths and needs. "For example, Brian proudly stated that "we're among a few of schools that are more on the cutting edge of innovative and I would say that the mind set here would be that, and every person would believe this…". Debbie felt that the age of her staff made them somewhat reluctant to embrace technology as a teaching tool, "we have generally an older staff and we have a couple of young staff members…and the technology piece is not our greatest strength, but I think we're getting better".

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There were many commonalities expressed regarding the successes, failures and challenges they faced travelling the journey of fostering innovation as school leaders. It was evident that they all recognized the importance of innovation as being vital to improving student learning.

Summary and conclusions

The purpose of this chapter was to synthesize the quantitative and qualitative findings of this study in an effort to glean further insights from principals' responses from each respective research phase. Specifically, it was a way to integrate both methods to answer the main research question.

It became evident in my analysis of the phase one survey responses that principals' individual characteristics overwhelmingly displayed a positive orientation toward innovation. This conclusion was found to be congruent with principals' interview responses regarding whether they saw themselves as innovative. Woodman and Dewett (2004) note that in order to effect organizational change it is essential that the individual change their knowledge, attitudes, and behaviour. Interview responses also provided further insights into the innovation phenomenon. Importantly, it also confirmed the reliability of the communication measures survey instrument.

In my analysis of examining ways to further integrate the two research phases I looked at how principals' perceived their schools in terms of its innovativeness. Principals' perceptions of their school's innovativeness were mixed in both phases of this study. Some viewed their schools as being open to innovation while others felt that there was a reluctance to embrace innovation as a change process. There was a general correlation

between principals' survey responses to negative statements oriented toward innovation and interview responses of their school's capacity for innovation. Survey and interview responses were generally supportive of this mixed pattern of perceptions held by principals. The two variables found to be statistically significant from the quantitative survey phase were somewhat congruent with the findings of the qualitative phase.

In the final chapter I will review the findings of my research. As well, I will discuss the limitations and potential contributions to educational theory, policy and practice. From this study I will offer my conclusions and recommendations for further research.

Chapter Seven
Conclusions, Recommendations,
Limitations, Contributions and Further Research

Science outstrips other modes & reveals
more of the crux of the matter
than we can calmly handle
—A.R. Ammons

Conclusions

The purpose of this mixed methods study was an investigation of public school principals' perceptions of innovation and its relationship to individual and organizational characteristics. This study's purpose was two-fold: 1) to partially replicate the previous quantitative studies of Mitchell (2008) and Williams (2013) as applied to a different population sample - school principals' vs school district superintendents, and 2) gain further insights into principals' perceptions toward innovation and its relationship to individual and organizational characteristics via qualitative interviews. The specific individual and organizational innovativeness characteristics analyzed from the quantitative phase were: 1) the individual principal characteristics including the demographic factors of age, gender, administrative experience, and professional development practices. 2) organizational characteristics of school enrolment, financial resources, and professional development capacity. The analysis of the qualitative phase was to further expand upon the findings from the survey responses through in-depth interviews conducted with the 13 principals who volunteered for this phase. Importantly, this study also integrated aspects from both phases in an effort to provide a richer context of principals' perceptions of the innovation phenomenon and its relation to the notion of school reform.

Theoretical underpinnings

The theoretical framework that underpinned this study was based on Rogers (2003) *diffusion of innovations* theory. His theory examined the innovation adoption process for both individuals and organizations with the emphasis on how innovations are introduced, implemented and sustained over periods of time. He found that there were four main elements that were consistent in all diffusion of innovations studies: 1) the innovation 2) communication channels 3) time 4) and the social system. In addition, Rogers (2003) developed an adopter categorization that defined *innovativeness* as "the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a social system" (p.454). The five *innovativeness* categories are defined as: 1) innovators (are venturesome), 2) early adopters (hold high degree of opinion leadership), 3) early majority (have important link to social system's network), 4) late majority (adopt ideas after the average member of a system), and 5) laggards or traditionalists (last to adopt innovations - skeptical) (p. 459 – 462).

Main Elements of the Diffusion Process

As Rogers (2003) notes the first element in the diffusion process is the *innovation*, "the idea, practice or object that is perceived as new by an individual or other unit of adoption" (p. 44). Based on the interviews conducted with principals it was evident that they generally agreed on the definition of innovation as it pertained to educational change. Most principals viewed innovation as a new technology or teaching practice that enhances the learning experience for students. For example, Allan looked at it "from a technology standpoint, it's, the ability for me and my staff to integrate new technologies and then to use that in a way that helps our students to learn". Daphne's definition was similar to the

research literature in that innovation is, "new to us or different than how we have done it before and growing from there".

Some principals saw innovation as needing to be disruptive using Christensen's (2011) definition as something that radically changes a system in an effort to transform it from its existing state. Don viewed it as "doing something that already isn't being done in schools with the purpose of moving the school forward". Brian's definition was a classic definition taken from Christensen (2011) and other noted scholars of disruptive innovation, "taking the standard school model and disrupting it. To change the [school] model…". April offered a similar view, "something that's actually rather drastic…. A new thought and a new way of doing things".

Although principals had slightly different views when defining innovation, they overwhelmingly saw it as critical to the future of providing a relevant education for students. As Hatch (2013) urges:

> we need to create the conditions for individuals, groups, and organizations to adapt, innovate, and improve all the time. Developing those conditions begins with rethinking what really is required to build capacity for educational improvement and recognizing the social and systemic aspects of innovation. (p. 34)

Communication Channels

Rogers (2003) explains that the communication channel is the core of the diffusion process. It is the conduit where the exchange of information regarding a new idea passes from one individual to another or a group. Critical to this communication exchange is that individuals regard "near peers" as important purveyors of a new idea, especially if they

have adopted it, rather than scientific evidence as a key determinant to whether to adopt an innovation.

The communication element was integral to principals' perceptions of their individual innovativeness as evidenced by survey and interview responses. 17 out of 23 principals responded with either *agree or strongly agree* to the survey statement, *I feel that I am an influential member of my peer group.* Similarly, 8 of the 13 principals who participated in the interviews responded positively to this statement. For the statement, *I am reluctant about adopting new ways of doing things until I see them working for people around me*, 20 of the 23 principals either *disagreed or strongly disagreed.* Eleven of the 13 interview participants either *disagreed or strongly disagreed* with this statement.

Principal responses to statements concerning their school's innovativeness also highlighted the importance of the communication element. Thirteen of 23 principals either *disagreed or strongly disagreed* with the statement, *My school is reluctant to adopt new ways of doing things until other schools have used them successfully.* Seven of the 13 interview participants either *disagreed or strongly disagreed* with this statement. For the statement, *My school maintains good communication between supervisors and employees,* 20 of 23 principals responded with *agree or strongly agree.* Eleven of the 13 interview participants responded with *agree or strongly agree* with this statement.

The interviews of the 13 principals further illustrated how communication plays a significant role in introducing and spreading a potential innovation. Rogers (2003) explains that the transmission of new ideas through interpersonal channels "is more effective in forming and changing attitudes toward a new idea, and thus influencing the decision to adopt or reject a new idea" (p. 82). He further emphasizes that this interpersonal channel

is usually "near peers". They are viewed as role models who demonstrate innovation behaviours that influence others in their systems. As a result, this behaviour is likely to be replicated.

Through the interview phase it became evident that principals' viewed the interpersonal channels in their schools as vital to transmitting and nurturing innovation. They encouraged this process in a variety of ways. Several principals spoke about the importance of developing the notion of collaboration as critical to fostering an innovative attitude. Don's statement highlights this point, "I would say the culture of our teaching staff this year, it's very collegial and collaborative. People are willing to look at new ideas and work together on these new ideas". Beth's statement also emphasizes the importance of interpersonal channels, "I say our staff meetings the ideas that come out of them are things I would never have dreamed of myself and I think that sparking of ideas off one another is the best way…". Brian's statement captures the essence of the innovation process, "…today we follow up with another conversation about that because innovation isn't an isolated act and it's one that requires a lot of collaboration and really it's about transforming…". Finally, Daphne's statement exemplifies Rogers (2003) interpersonal channel element and how the process of introducing an innovation to a system evolves.

> …some people were willing to try it for three weeks and then they were noticing things and they were talking about it… what was difficult and what was easy, what we liked and didn't like about it and is it worth continuing to try again.

Principals also viewed their encouragement and support as influential in promoting the necessary communication channels required for facilitating innovation within their schools. As Fullan (2010) asserts,

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Successful principals develop others in a way that is integrated into the work of the school. These collaborative cultures have two powerful features: They are collectively effective at solving problems and making progress on an ongoing basis, and they generate a pipeline of leaders for the next phase. (p. 13)

Debbie spoke about the reciprocal influence she has with her teachers in terms of fostering innovative ideas, "I have this idea, what do you think? Or they'll come to me and say I've got this idea can I do this and the answer is almost always yes".

John, Sheila, Jason and Allan spoke about ways that they encourage the development of communication channels amongst their teachers in an effort to champion innovation. John used a "learn and teach approach", "I sent a teacher to a workshop. The expectation is that they come back and teach [to teaching staff]". Sheila took a lead learner (Fullan, 2010 et al.) approach to foster the communication channels in her school, "I took the whole staff to the 21st Century Skills Conference… I wanted us to go as a group …to see it and to understand it because I felt like all of those messages are great, but if you hear them in isolation, as a teacher, what do you do?" Jason offered support as a way to open the communication channels among his staff, "if there's something that you want to try and you need release time to plan, we will cover your class… If you would like to go to another school and observe, we will provide you release time…". Similarly, Allan sent teachers to workshops to help build momentum for beginning conversations about possible innovations, "a couple of teachers initially were saying no. Now they've gone to a couple of workshops at shared learning…now they're saying [we will] take a look…".

Time

Rogers (2003) third element of the diffusion process is *time.* According to Rogers this often ignored variable by various bodies of research is a strength of diffusion research.

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He cites three diffusion dimensions related to time. The first dimension involves the time an individual first becomes aware of the innovation through to whether he or she adopts or rejects it. Second, is the how early or late an individual or other unit of adoption adopt the innovation in comparison to the others of the social system. This is called *innovativeness.* Third, is the rate of adoption which is the number of members of a social system who adopt an innovation over a given period of time.

The scope of this study was not focused on researching how specific innovations were introduced, adopted or rejected. Thus, the dimension of *time* for my study would be difficult to measure as the focus was on the perceptions of principals' toward individual and organizational innovativeness. However, the *time* factor was mentioned as a concern in some of the survey and interview responses by principals.

There were four statements from the survey that could be considered related to *time* in terms of adoption of innovations. Two statements were from the individual and two were from the organizational innovativeness survey sections. The individual innovativeness statements included, *I am aware that I am usually one of the last people in my group to accept something new, and I must see other people using new innovations before I will consider them.* All 23 principals either responded with *disagree or strongly disagree* to the first statement. As the leader of a school the challenge is to harness the collective and move them through the innovation process with the hopes that it will be beneficial for student learning. Hence, time would be an important aspect for a principals' consideration. For the second statement 16 principals responded with *disagree or strongly disagree* and the remaining 7 principals responded with *neutral.* Of the 13 principals who were interviewed, 10 responded with *disagree or strongly disagree* and 3 principals with *neutral.* Principal responses to this statement suggests that some principals may consider

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"a wait and see" approach before they consider introducing or adopting an innovation.

The survey statements for the organizational innovativeness section included, *My school is usually one of the last of its kind to change to a new method of operation,* and *My school is slow to change.* For the first statement, 11 principals responded with either *disagree or strongly disagree*, 5 with *neutral,* 6 with *agree* and 1 with *strongly agree.* Of the 13 principals interviewed, 5 responded with either *disagree or strongly disagree*, 4 with *neutral*, 3 with *agree* and 1 with *strongly agree.* For the second statement, 10 principals responded with either *disagree or strongly disagree*, 3 with *neutral,* 10 with *agree* or *strongly agree.* Of the 13 principals interviewed, 6 responded with either *disagree or strongly disagree*, and 7 with either *agree* or *strongly agree*.

Interestingly, some principals interviewed spoke of the *time* dimension as a barrier to innovation for their schools. It was not necessarily seen as a hindrance due to the individuals within their schools being slow to adopt innovations. Instead, it was viewed as a finite period of time in relation to finding *time* to be able to introduce, adopt and implement innovations.

Debbie mentioned, "Well, it seems like the time barrier is always the barrier". Similarly, Allan added, "many [teachers] feel like they have done as much as they can give …so when we try something new…it just adds to the time that they feel that they don't have". April succinctly put, "…how much energy and time do you actually have". Ron stated, "Time is huge, even more now than ever before. Everyone is busy and just another thing to do".

Innovativeness and Adopter Categories

As previously mentioned *innovativeness* is "the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than the other members of a system" (p. 60, Rogers, 2003). Rogers (2003) then classified members of a social system into adopter categories based on their innovativeness. This was the focus of the quantitative phase survey that sought to gather principals' perceptions of individual and organizational innovativeness.

The majority of principals (16) perceived themselves to be *early adopters,* 6 as *innovators,* and 1 as *early majority* for individual innovativeness. Interestingly, of the 13 interview participants, 9 principals perceived themselves as *early adopters,* and 4 as *innovators.* It was no surprise that the majority of principals rated themselves as early adopters given their leadership role as a change agent. As Rogers (2003) notes, early adopters hold a high degree of opinion leadership where members of a social system will go to for advice and information about adopting a potential innovation. Conversely, only 9 principals perceived their schools to be *early adopters*, 2 as *innovators*, 8 as *early majority*, 3 as *late majority*, and 1 as *laggard* for organizational innovativeness. Of the 13 interview participants, 6 principals perceived their schools to be *early adopters*, 2 as *innovators*, 1 as *early majority*, 3 as *late majority*, and 1 as *laggard* for organizational innovativeness. Again, these findings reflect principals' perceptions of their respective school cultures in terms of the dynamics, interactions, and mindsets that they have toward innovation and change.

The design of this study was to examine public school principals' perceptions of individual and organizational innovativeness. Specifically, this examination sought to determine whether a difference existed between principals' perceptions toward innovation

and individual and organizational characteristics. Principals' individual characteristics analyzed included age, gender, and professional development practices. Organizational characteristics examined included school enrolment, financial resources and school budget. Results for these individual and organizational variables were obtained from the quantitative survey phase of the study.

One of the main purposes of the first phase of the study was to compare the results obtained from my study to those of Mitchell (2008) and Williams (2013) studies, who examined superintendents and their school district's individual and organizational innovativeness. Results of my findings were mostly consistent with these two studies. Principals and superintendents in all three studies perceived themselves to be more innovative than their organizations. Each study found some significant differences in variables such as budgets, school enrolment, and other demographic factors. The two studies found that school districts with larger enrolment tended to be more innovative than smaller districts which Rogers (2003) also found in the various studies he conducted of larger versus smaller populations. In my research, it was difficult to determine this as I had a much smaller sample size. In the final analysis it can be concluded that generally principals' (and superintendents') characteristics were not statistically significant in determining individual and organizational innovativeness.

The second phase of this study involved interviewing 13 principals selected from a purposive sample derived from the survey. My purpose was to obtain a deeper understanding of principals' perceptions, feelings and experiences regarding the phenomenon of innovation as it pertained to their schools. It also served to further enhance and complement the findings from the survey phase. Overwhelmingly, it was evident that all principals valued the importance of innovation as key to improving the

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school system. Further, regardless of individual definitions of innovation all principals strongly adhered to the notion that if the innovation was beneficial for student learning then it was important to explore various avenues for its potential introduction and implementation. More importantly, principals saw their role as either introducing or facilitating the innovative process in their schools. In short, they clearly demonstrated restlessness with the "status quo". Thus, it can be concluded that principals saw the importance of their role as a change agent. Along the same lines some principals spoke of the necessity to develop a system wide approach to fostering innovation throughout the school district. They believed that the "pockets of brilliance" where innovation thrived were unevenly distributed and unknown from school to school. Banathy (1988), a noted systems thinking scholar posits that, "educational change systems should have the potential to define, develop/adapt, deliver, implement, and institutionalize programs, curricula, educational strategies, and resources in order to meet changing societal expectations and learning/learner needs" (p. 209).

In regards to barriers to fostering innovation principals did not believe that there were an insurmountable number of factors. Interestingly, *time* and *personnel* were the two most often cited issues by the majority of principals. As previously mentioned *time* was viewed as adding another dimension to an already complex and overloaded school agenda for its members. In terms of *personnel* there seemed to be two prominent themes discussed by principals. The first one concerned having the ability to choose the "right" people being hindered by the collective agreement contract of the teacher's union combined with the staffing process of the human resources department for placing teachers from layoff/recall. The second issue concerned the general complexities of school culture in terms of the various personnel dynamics and the associated struggles

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that principals face in guiding the collective toward embracing innovation as a part of the change process. Interestingly, financial constraints or lack of resources were rarely mentioned by principals as being barriers to fostering innovation.

Recommendations

Rogers (2003) and other diffusion of innovations scholars have clearly demonstrated that decisions about an innovation is a complex process that involves a variety of actions spanning over a period of time. The principal as the lead "change agent" of this prodigious process is tasked with facilitating adoption of innovations for the purposes of improving teaching and student learning. Having knowledge and understanding of Rogers (2003) diffusion of innovations theory would benefit not only principals but also teachers and senior administrative personnel at the school district level as a system wide approach.

In addition, in keeping with a systems thinking perspective as highlighted in the literature review, principals could also benefit from professional development with a complexity leadership theory focus in relation to possible approaches to fostering innovation. Based on complexity science, Lichtenstein and Plowman (2009), define complexity leadership theory as connecting "individual behaviors with organizational contexts, thus revealing far richer dynamics of interdependence and influence" (p. 618). Importantly, an understanding of the diffusion of innovations process combined with that of complexity leadership theory has the potential to provide a strong grounding for principals' quest to build organizational capacity in order to lead the innovation journey. Accordingly, integrating diffusion of innovations and complexity leadership theories

system wide has the potential for a more informed approach to fostering innovation. In the following sections I will present recommendations for District X garnered from my study.

1. Based on survey and in particular interview responses it became evident that the importance of building relationships was a critical factor to fostering innovation for principals. Developing organizational capacity is an essential skill that principals need in order for innovation to be successful in schools.

2. Based on principals' responses to the surveys and interviews, participants had little knowledge of Roger's diffusion of innovation theories. School districts and principals interested in advancing innovation should make sure that principals get adequate professional development regarding innovation theory. This could be expanded into forming networks of innovation learning cohorts of principals across schools with the potential of linking teachers to the network.

3. Although District X has established a technology plan that provides all schools with the opportunity of having a minimum standard of technology and its associated infrastructure, inequities still exist. Some of these inequities as reported in interviews were concerned with infrastructure that worked sporadically due to the structure of older school buildings. Ensuring that reliable technological infrastructures are in place would reduce the frustration of inconsistent service.

4. Principal familiarity and comfort with technology varied across interview participants. Age range of principals ranged from 40 – 60+ years. Thus, many could be considered to not be "digital natives" in terms of technology experience. As one principal mentioned, "I realize what the district goal is in regards to technology, ethical use of

technology, and innovative, and there are some principals who that is their vent. It is not mine and that may be a function of my age, so equipping the educational leaders, that is not going to happen just on my own". Again, some form of meaningful and sustained professional development from technology helping teachers would be beneficial for principals and teachers.

5. The variable of low income levels was not explored in the quantitative phase because only one school could be designated as an inner-city or low income school. However, during interviews some principals spoke about the additional challenges and economic hardships they faced while trying to foster the process of innovation. These schools should be afforded additional financial and human resources to assist with fostering innovation.

6. There were no significant statistical differences found between the different size of schools in terms of their enrolment. This was also not mentioned as a critical factor by principals' during interviews. The majority of principals rarely spoke of the size of their schools as being a negative factor to fostering innovation. Some principals of smaller schools spoke of difficulties fostering innovation due to fewer personnel to share ideas, collaborate and disseminate innovations. Connecting with neighbouring schools for professional development and utilizing district helping teachers would benefit smaller schools' innovation initiatives.

Recommendations for further study

The phenomenon of fostering innovation is a complex process that involves a multitude of factors working in a non-linear, somewhat chaotic state with the potential to

enact change in schools and the system at large. Scholars of change and innovation have studied this phenomenon for decades. As Poole (2004) and other scholars point out that there is not a formulaic template that can be standardized across the diverse environments, and cultures that encapsulate organizational systems. There is no one theory that can explain change and innovation. Instead, the many theories are parts that when put together provide a more holistic understanding of the phenomenon.

The findings and limitations of this research should be further investigated. Although this study found some statistically significant differences with the variables of professional development allocations, and principals' gender the small sample size may have not been large enough to provide valid results. A replication of this study with a larger but manageable sample size for both quantitative and qualitative phases could be undertaken by including principals from neighbouring school districts. A larger sample has the potential of providing more in-depth insights regarding perceptions of innovation that could be statistically significant and generalized for the given population. Further, a larger interview sample size would expand upon the lived realities of principals' perceptions toward innovation and thus enrich the findings from the quantitative research phase. As well, a larger sample of interview participants could further verify common themes and reveal new themes that strengthens the integration of both phases of a mixed method study.

A further replicated investigation should be conducted within a given school district but include the sample populations of teachers, senior management (e.g. superintendents, assistant superintendents, directors of instruction and curriculum) as well as principals. Findings from each respective participant group regarding individual and organizational perceptions of innovativeness could be compared to determine similar and

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contrasting patterns across each population sample. As well, each participant group's perceptions of the other population samples innovativeness orientations could also provide interesting insights for further exploration.

In addition, a longitudinal study should be conducted to examine whether innovations that are implemented are sustained over a period of time in the various schools. Again, with a larger population sample a statistical analysis could illuminate significant differences. Of particular interest would be to track and analyze the selected population samples perceptions toward the diffusion of an innovation over the studies duration. This data could be collected by conducting interviews with principals and teachers.

Conducting a qualitative case study of principals', and teachers' perceptions of individual and organizational innovativeness could provide valuable information as to how participants process Rogers (2003) five attributes of innovation, 1) relative advantage, 2) compatibility, 3) complexity, 4) trialability, and 5) observability. More importantly, the focus could be on the decision-making process of adopting an innovation as defined by Rogers (2003). In addition, challenges principals and teachers face with the adoption of innovations would be invaluable in providing a process for fostering positive attitudes toward innovation as well as overcoming resistance.

Contributions of this present study

I began this study with the aim of finding out whether public school principals would have similar orientations toward innovation as did two previous studies that surveyed public school superintendents. It was no surprise that in general principals' perceptions of

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individual and organizational innovativeness were similar to those of superintendents. One of the primary roles of school and school district leaders is to encourage and develop change and innovation for the betterment of student learning. Interestingly, the lived experiences of principals garnered from interviews proved to be enlightening in regards to understanding the innovation process from their perspectives.

The quantitative analysis of the two partially replicated studies and my study identified some variables of statistical significance, although not strong, that potentially can contribute to a better understanding of the challenges that schools face in adopting innovations. Factors such as school communities with low-income levels, or a school's enrolment size can play an important part in the adoption rate of innovations. Rogers (2003) points out that, "the socioeconomic status of individual adopters is connected with the innovation-development process" (p. 267). Further, schools with larger enrolment tend to have greater financial resources, and teaching/support personnel with more expertise which as Rogers (2003) puts is "highly related to innovativeness" (p.655). As a result, school district personnel and policy makers should be aware that smaller schools and those with lower socioeconomic demographics need further support with the innovation process.

Findings from interviews of this study highlighted important factors that could contribute to a better understanding of the innovation process. First, the complexity of each school's organizational dynamics clearly demonstrated that their uniqueness requires a diverse theoretical perspective in terms of how innovation is adopted. There is no common "template" that can be applied universally. Schools are complex systems as McGrath and Tschan (2004) state, that are made up of its members who are part of the larger system which is the organization. Similarly, every school has its own unique culture

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which ultimately determines to what degree it is willing to adopt innovations. Principals understood the influence they wield as change agents in their schools. They were also cognizant of the importance of what was needed to mobilize members to act on their influence (Hatch, 2004). Hatch (2004) emphasizes that a leader "requires knowledge of and relationship with, the culture" (p. 207). It was evident that principals saw themselves as *champions* who according to Rogers (2003) definition are important to promoting new ideas within their organizations.

Importantly, the findings from this study, particularly the qualitative phase will benefit school district senior management's understanding of the innovation process from the perspective of principals at the ground level. This would be beneficial in providing systemic and sustainable professional development on the innovation phenomenon for principals, senior management and teachers. It could also be an opportunity to introduce theories such as complexity theory and complexity leadership to better explain how a systems thinking approach to innovation could be fostered in schools. As Mason (2008) posits,

> If education is about fostering the emergence of learning, of creativity, of imaginative and critical perspectives, then educators would be fair in asking of complexity theory how we might set about establishing, or at least contributing to the establishment of, the conditions, insofar as it is possible to influence those conditions, for emergence to occur. (p. 48)

Principal interviews also highlighted how leadership has changed from what Clarke (2013) states as the solo-heroic model to one that is more complex in nature. It was evident through the various conversations with principals that it was understood that they were but one part of a complex dynamic that emerged when considering adoption of

innovations in their school environments. It was evident that they understood what Clarke (2013) defined as complexity leadership theory which has "moved towards seeing leadership from more relational and systemic perspectives that have implications for leadership development practice" (p.135). Thus, an understanding and development of the notion of complexity leadership and its relation to the innovation process has much to offer the main stakeholders at all levels of the education system from principals to policymakers.

Another aspect gleaned from interviews was the effect that information and communication technology (ICT) has had on fostering innovation not only in schools but society. Principals spoke about the impact that the various technologies had on the school system in regards to teaching and learning. They understood that ICT, although not the main driver of innovation in schools, was integral to meaningful and relevant education for all students.

This also raises the question as to the significance of ICT and innovation in relation to many of the previous innovation theories such as Rogers (2003) diffusion theory, which was developed over 40 years ago. As Lundvall (2012) notes, "a good theory of innovation is not carved in stone but has to evolve as a result of changes in society and our attempt to understand these changes…" (p. 7). In recent years' alternative approaches to the traditional diffusion model have been developed. For example, Wirth, von Pape, and Karnowski (2008) developed an integrated model combining a dozen theories "to explain how mobile adopters generate personalized mobile phone usage and meaning" (as cited in Rice, 2017). Rice (2017) notes that new media (such as digitized information, wired and wireless networks, and platform crossing software programs has blurred the boundaries of our cyberspace world). He defines this as *intermediality,* which "refers to phenomena

involving, or relationships between, at least two media (we include face-to-face)" (p. 532). Further, Rice (2017) emphasizes that,

> Interpersonal, mass, and new media play a central role in providing diverse sources and types of information about an innovation, which shapes awareness of, and reduces uncertainty about, the attributes, meanings, uses, and consequences of an innovation, thus influencing adoption decisions. (p. 533)

Importantly, it is critical that all major stakeholders from the school principal to policymakers understand that new media has added another layer to innovation theories and as such brings a new "lens" to this phenomenon in terms of the diffusion model.

Limitations

For the quantitative aspect of this study, surveys were distributed to all principals of the suburban school district. This could be considered a representative sample of the general principal population of the province. A case could be made that by selecting all principals in the district that they do represent a diverse group found across all school districts. On the other hand, because I did not select a subgroup from across the province, this sample does not lend itself to generalization external to the district.

During the analysis phase, I ran multiple t-tests to compare mean scores across various researcher-created subgroups consisting of relatively few data points. The lack of significant findings resulting from such small sample t-tests could be due to the small sample sizes and be the result of a type 2 error. Just because I was unable to detect a difference between the groups across most of the measures examined does not mean that a difference doesn't exist. Similarly, the use of multiple t-tests to examine the multiple data relationships across researcher created groups increases the possibility of a type 1

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error. As a result, the significant differences identified in this research should be interpreted with caution.

The qualitative aspect of this part of the mixed-methods study is limited to only principals who agreed to an interview from the quantitative phase of the study. This is not a representative sample of the school district principal population or the general principal population of the province. Part of this is due to the issue of time required for data collection and analysis in conjunction with the similar process required for the quantitative part. As a result, there was difficulties using the limited number of participants' data for any valid comparisons to either population. However, the rich contextual insights gathered from principals in regards to their perceptions of innovation further illuminated the quantitative findings.

The findings of this study have some limitations that need to be recognized. First the findings can only be limited to the population of District X. As well, with a purposive sample size of 47 public school principals to draw from the study can only be generalized to this respective school district. Further, the 23 respondents (although a respectable 47.9% survey response return rate) for the quantitative phase represented a small sample size. This made it difficult to ascertain any statistical significance of variables analyzed using Microsoft Office Excel software program although some variables did show partial significant differences. In addition, one of the respondents did not complete the demographic questions of the survey which further limited analysis of those variables. The researcher of this study also omitted two demographic questions regarding school budgets and school enrolment which limited responses to 14 participants who agreed to an interview as I was then able to contact them and obtain this information. This limitation did not present as an overly critical factor in the final analysis of the quantitative phase.

Another limitation regarding participant survey completion are the unknown factors related to the conditions of how the surveys were completed. It is difficult to determine if participants completed surveys over a period of time, without interruptions or whether the demands of home and work life had a bearing on responses. As well, as the survey participants were solely school principals it is difficult to surmise whether their individual and organizational perceptions of innovativeness had any elements of self-inflation. Further studies could include teachers' perceptions of principals' innovativeness in an effort to provide a more holistic analysis of the innovation phenomenon.

Similarly, the qualitative phase of this mixed-methods study also presents with limitations. The small purposive interview sample is a representation of District X's population only. As such, findings cannot be generalized for other school district populations. Perhaps a larger sample outside of District X could enhance the possibility of formulating trends and patterns that could have potential for generalization across populations. However, limitations of researcher time, travel, expenses, and the ability to compile and analyze a larger compilation of data would be prohibitive.

Lastly, when research is conducted, using human subjects for the purposes of eliciting responses through survey instruments or in person interviews, there is always an element of *social desirability bias* (SDB) that must be considered in the analysis of findings. King and Bruner (2000) define *social desirability bias* as, "The pervasive tendency of individuals to present themselves in the most favorable manner relative to prevailing social norms" (p. 80). As mentioned previously, it is difficult to determine whether a participant is responding truthfully when completing surveys as there is potential for self-inflation. Similarly, during an interview it is difficult to discern whether a participant is providing responses that he or she believes the researcher wants to hear.

This is an area that scholars of social science research continue to explore in an attempt to reduce its prevalence.

The Final Word

Consistent with the previous studies of superintendents' perceptions of innovativeness, my study's findings of principals' perceptions confirmed the importance of their attitude toward innovation as a critical factor for fostering this phenomenon. It was also of interest to find that Rogers (2003) theory of diffusion of innovations is remarkably consistent with how principals and the other major players, namely teachers, travel and experience the innovation journey. Whether it was the four main elements, the five attributes, or the decision making process of innovations in play this non-linear phenomena's role was ever present in both phases of this study.

As leaders, principals see the urgency for the school system to embrace the notion of innovation. Although the importance of technology as a key learning tool cannot be understated principals did not view it as the liberator of the innovation process. Instead, they viewed innovation in the broadest sense as something that can be technology based or improved teaching practices that provide all students with the possibility and opportunity for an equitable and meaningful education.

What stood out particularly through the interviews was the delicate nature of the leadership "dance" principals are engaged in to promote innovation and change in schools. It became abundantly clear that the relationship piece of a school's culture was a key ingredient that required the principals' orchestrated skill to manage, cultivate, and motivate their collective communities toward an innovation orientation. They saw the

innovation process as a collaborative venture where leadership was shared and not solely the responsibility of the principal. Principals' saw their role as that of a facilitator who was there to encourage and support the innovation juggernaut as much of the professional literature on leadership espouses as the "new age" leader. Yet, the principal is but one cog in the school system and it will take the collective of local school levels, provincial education bodies, and the community at large to bring about the necessary change that innovation promises for the future of all students.

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Appendix A: Perceptions of Innovation Survey

Public School Principals' Perceptions of Innovation Survey

Individual Innovativeness (II)

Part I

*If you agree to participate in the interview process please indicate your willingness by putting your name here: _____

An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption (like an organization). People and organizations vary a great deal in their "innovativeness." Innovativeness has to do with how early in the process of adoption of new ideas, practices, etc. that the individual or organization is likely to accept a change.

Directions: People respond to their environment in different ways. The statements below refer to some of the ways people can respond. Please indicate the degree to which each statement applies to you by marking whether you: **Strongly Disagree = 1; Disagree = 2; are Neutral = 3; Agree = 4; Strongly Agree = 5** Please work quickly, there are no right or wrong answers, just record your first impression.

_____ 1. My peers often ask me for advice or information.

_____ 2. I enjoy trying new ideas.

_____ 3. I seek out new ways to do things.

_____ 4. I am generally cautious about accepting new ideas.

_____ 5. I frequently improvise methods for solving a problem when an answer is not apparent.

_____ 6. I am suspicious of new inventions and new ways of thinking.

_____ 7. I rarely trust new ideas until I can see whether the vast majority of people around me accept them.

_____ 8. I feel that I am an influential member of my peer group.

_____ 9. I consider myself to be creative and original in my thinking and behavior.

_____10. I am aware that I am usually one of the last people in my group to accept something new.

_____11. I am an inventive kind of person.

_____12. I enjoy taking part in the leadership responsibilities of the group I belong to.

_____13. I am reluctant about adopting new ways of doing things until I see them working for people around me.

_____14. I find it stimulating to be original in my thinking and behavior.

_____15. I tend to feel that the old way of living and doing things is the best way.

_____16. I am challenged by ambiguities and unsolved problems.

_____17. I must see other people using new innovations before I will consider them.

_____18. I am receptive to new ideas.

_____19. I am challenged by unanswered questions.

_____20. I often find myself skeptical of new ideas.

Source: Hurt, H. T., Joseph, K., & Cook, C. D. (1977). Scales for the measurement of innovativeness. Human Communication Research, 4, 58-65.

Part II

Perceived Organizational Innovativeness Scale (PORGI)

Directions: Organizations respond to change in different ways. The statements below refer to some of the ways members of organizations perceive their organizations' to be. Please indicate the degree to which you agree that the statement describes your organization. In the blank just before the statement, indicate whether you:

Strongly Disagree = 1; Disagree = 2; are Undecided; Agree = 4; Strongly Agree = 5

My School is:

_____ 1. cautious about accepting new ideas.

_____ 2. a leader among other schools in the district.

_____ 3. suspicious of new ways of thinking.

_____ 4. very inventive.

_____ 5. often consulted by other organizations for advice and information.

_____ 6. skeptical of new ideas.

_____ 7. creative in its method of operation.

_____ 8. usually one of the last of its kind to change to a new method of operation.

_____ 9. considered one of the leaders of its type.

_____10. receptive to new ideas.

_____11. challenged by new ideas.

_____12. follows the belief that "the old way of doing things is the best."

_____13. very original in its operational procedures.

_____14. does not respond quickly enough to necessary changes.

_____15. reluctant to adopt new was of doing things until other organizations have used them successfully.

_____16. frequently initiates new methods of operations.

_____17. slow to change.

_____18. rarely involves employees in the decision-making process.

_____19. maintains good communication between supervisors and employees.

_____20. influential with other organizations.

_____21. seeks out new ways to do things.

_____22. rarely trusts new ideas and ways of functioning.

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_____23. never satisfactorily explains to employees the reasons for procedural changes.

_____24. frequently tries out new ideas.

_____25. willing and ready to accept outside help when necessary.

Source: Hurt, H. T., & Teigen, C. W. (1977). The development of a measure of perceived organizational innovativeness. In B. R. Ruben (Ed.), *Communication Yearbook I* (pp.377-385). New Brunswick , NJ: Transaction Books.   Reprinted with permission from West Virginia University

Appendix B: Demographic Information

Part III

Demographic Information

Directions: Please respond to the following information about yourself.

1. **What is your age?**

   ☐ 29 to 39

   ☐ 40 to 49

   ☐ 50 to 59

   ☐ 60+

2. **Gender:** ☐ Male ☐ Female

3. **Total years experience as a principal?**

   ☐ 1-5

   ☐ 6-10

   ☐ 11–15

   ☐ 16 –20

   ☐ 21+

4. **How long have you been in your current school?**

   ☐ 1-3 years

   ☐ 4-6

   ☐ 7-9

   ☐ 10-12

   ☐ 13-15

   ☐ 16+

5. **Educational level (choose all that apply)**

   ☐ BA/BEd/BSc ☐ MA/MEd/MSc ☐ Ed.Sc ☐ Ed.D

6. Professional development activities you attended in the 2014-2015 school year? (choose all that apply)

☐ ASCD conferences ☐ Solution Tree conferences ☐ Other (please list below)

1.	2.	3.	4.	5.	6.

7. Professional Organizations you belong to (choose all that apply):
☐ British Columbia Principals Vice Principals Association (BCPVPA)

☐ Association for Supervision and Curriculum Development (ASCD)

☐ Canadian Association of Principals (CAP)

☐ National Association of Middle School Principals (NAMSP)

☐ National Association of Elementary Principals (NAESP)

☐ National Association of Secondary School Principals (NASSP)

☐ Phi Delta Kappan International (PDK)

☐ Other (please list)

8. Directions: Please respond to the following items about your school district.

1. How many days of your **2014-15** school district's calendar were designated for professional development (include late starts, early dismissal and partial days)?

2. What percentage of your Budget in **2014-15** was dedicated for professional development?

Appendix C: Interview Protocol

Interview guidelines in regard to public school principals' perceptions of innovation

The purpose of this interview is to gather school principals' views in regards to their perceptions of innovation and its relationship to the school system. This interview process is in no way an evaluation of you or your school. The questions that I will be asking you are designed to be open-ended with no right or wrong answer. I am looking for your candid opinions and views on the various topics related to innovation. You are invited to freely express and share your thoughts and opinions in this confidential discussion. Your time and willingness to participate in this interview is greatly appreciated.

1. **Background Information**

   - Could you share with me how long you have been a school principal?
   - How long have you been a principal at this school?
   - Describe your school in general terms (demographics, culture, climate etc.)

2. **Perceptions regarding innovation in the school setting.**

   - What is your general understanding of the concept of innovation as it relates to school improvement?
   - Do you think it is important for your school to be innovative? Please explain?
   - How do you rate your school's capacity for innovation? Please explain?
   - How do you rate your school districts' capacity for innovation? Please explain?
   - Is your school currently involved in any innovative practices (i.e. pilot projects, inquiry groups, project based learning, initiatives involving the use of technology to enhance teaching and learning)? Please explain?

3. **Personal experiences regarding innovation in the school setting.**

   - How do you promote and support innovation in your school?
   - Do you see yourself as someone who is innovative? If so, how?
   - Have you led implementation of any innovation in the past five years? Can you describe any such effort?
   - What are the barriers that you have encountered in promoting and sustaining innovation in your school?

4. **Perceptions of characteristics of innovation**
   - Has your school experienced any unexpected successes or failures that have stimulated innovative initiatives? If so, how?
   - Have perceived difficulties in implementing new curriculum stimulated innovative initiatives at your school?
   - Have any new technologies enhanced innovativeness in your school? Please explain?

5. **Summation:**

   - Being innovative is considered imperative to meeting the needs of the 21st Century learner, what are your thoughts on this?
   - Anything you wish to add

                                        (adapted from St. Clair, 2008)

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Pilot Study Survey

Date:

Dear Colleague

As a doctoral student at Simon Fraser University and fellow principal, I am preparing a survey that will assist me in collecting information for a research study entitled: An Examination of Public School Principals Perceptions of Individual and Organizational Innovativeness. The final survey will be administered to all public school principals in xxxxxx School District.

I would like to respectfully request your assistance by participating in a pilot study of the survey instrument. The information gained from this pilot will be used to finalize the survey instrument and not become part of the data. Some of the items from the pilot study will be omitted or rewritten as a result of your input. Participation in the pilot study involves completion of the survey instrument and a survey critique. Participation is voluntary and returning the forms implies your informed consent. Please complete the enclosed survey and critique by [date] and return via email address below.

If you require any additional information, please do not hesitate to contact me. You may do so by phone at ***-******* or via email to: *******@*******. Thank you very much for your time and assistance.

Sincerely, Luigi

Part II – Survey Critique

Directions:

Please click on the box ☐ (a "X" will appear for your choice) that most represents your response for each sentence stem. If you wish to change your response simply click on the box you first selected and the "X" will disappear. Your responses will assist in producing the final form of the survey

1. The time required to complete the survey was:

   ☐   less than 5 minutes

   ☐   5 to 10 minutes

   ☐   10 to 15 minutes

   ☐   more than 15 minutes

2. The directions for completing the survey were

   ☐   clear - easy to understand and follow

   ☐   too wordy - but could be followed

   ☐   confusing - hard to understand and follow

   ☐   other (please explain below)

   other:

3. Does survey accurately reflect my views?
4. additional comments:

Thank you for participating in this project. The information that you provide will be used to assist in the preparation of the final survey instrument. Your assistance is greatly appreciated.

Sincerely, Luigi

Appendix E: Consent Forms

Letter of Invitation and Consent

Dear Colleague

My name is Luigi DeMarzo and I am a doctoral candidate at Simon Fraser University in the school of Educational Leadership and a fellow principal in the xxxxx School District. I am currently conducting a research study entitled Public School Principals' Perceptions of Innovation.

The purpose of this study is to examine the perceptions of xxxxx public school principals regarding individual and organizational perceptions toward innovation. In order to obtain the information required to successfully complete the study, all public school principals in xxxxx school district will be invited to participate in the study by completing a survey. The survey takes approximately 15 minutes to complete and your participation is completely voluntary. A follow up personal interview related to this research will be conducted with a sample of participants from this survey. The purpose of the interview is to obtain a deeper understanding of your perceptions regarding innovation. The interview should take approximately 45 minutes to complete. If you are willing to participate in an interview please indicate this by typing your name on the space provided at the beginning of the survey.

There are no known risks associated with participating in this study. Your identity will be kept confidential and the information that you provide will be added to the body of data related to innovation and the role of the principal. Neither you nor your school district will be identified in connection with any results or reporting. The SFU board of ethics has approved this research study and I have been given permission by our school district to conduct this study.

Please respond to this survey by [date]. I will send one follow-up email if you do not respond by [date].

I would greatly appreciate your participation. The completion of the attached

survey will imply your consent to participate in this study. When you click the link below you will be directed to the survey. [website link] If clicking on this link does not work, please copy and paste the link in to the address bar of your Internet browser.

I deeply appreciate your cooperation and support. If you require any additional information, please do not hesitate to contact me by email at *******@****** or at (***) ******. Thank-you in advance for your participation in this study.

Sincerely,

Luigi DeMarzo

Simon Fraser University Doctoral Candidate

***** **Avenue, ******** BC ******

(604) *******

*******@****.***

Informed Consent by Participants in a Research Study

The University and those conducting this research study subscribe to the ethical conduct of research and to the protection at all times of the interests, comfort, and safety of participants. This research is being conducted under permission of the Simon Fraser Research Ethics Board, under the application number [?]. The chief concern of the Board is for the health, safety and psychological well-being of research participants.

Should you wish to obtain information about your rights as a participant in research, or about the responsibilities of researchers, or if you have any questions, concerns or complaints about the manner in which you were treated in this study, please contact the Director of the Office of Research Ethics by email at ....@sfu.ca or phone at 778-……..

If you have any questions please contact the researcher, Luigi DeMarzo by email at ......@sfu.ca or phone at 778-……or contact the researcher supervisor, Dr. Daniel Laitsch by email at ....@sfu.ca.

_____

Research Title: Public School Principals' Perceptions of Innovation

Principal Investigator Name: Luigi DeMarzo

Investigator Department: Faculty of Education, Simon Fraser University

_____

Having been asked to participate in the research study named above, I certify that I have read the procedures specified in the "Information Document for Participants in the Research Study" describing the study. I understand the procedures to be used in this study and the personal risks to me in taking part in the study as described below:

_____

Goals/purpose of the study
The purpose of this research study will be to investigate the perceptions of public school principals in relation to the attributes of individual innovativeness, and organizational innovativeness, and their correlation to the likelihood of the adoption of innovations. My focus will be to examine how school principals perceive their innovativeness as well as that of their school district's innovativeness.

Volunteer to participate

　　　　Your participation in this research study is voluntary. You are free to participate in this study and you can also freely withdraw at any time. During the interview process you may refuse to answer any questions or end the interview at any time. Refusal to participate or withdrawal after agreeing to participate will have no adverse effects on you or on your employment. You will not receive any type of payment for participating in this study.

Page 1 of 3

What is expected of the participants?

You have been invited to participate in this study because of your role and experience as a school principal. As the formal leader of a school your perceptions regarding individual and organizational innovativeness will be invited through a semi-structured interview format. Interview questions will be asked of you in person or I will send it to you by email. Email is not considered to be a confidential medium.

The duration of the interview will take approximately 45 minutes to one hour to complete. You will be asked to discuss your perceptions as they relate to the research topic. Interviews will take place at your school site or a place of your choosing to ensure that you are comfortable in discussing your experiences freely. The interview will be audio-recorded with your permission, and all recordings will be transcribed and analyzed. The purpose of the interview will be to encourage you to talk about your thoughts and perceptions regarding innovativeness as it relates to yourself, your school and school district. I will write memos about my observations during the interview.

Security of Data

Data obtained from the interview phase of the study will be audio recorded. All data will be transcribed into a Word document for analysis purposes on my password-protected personal computer hard drive. Both the audio recorder and any printed physical documentation will be stored in a locked filing cabinet in my residence. I will have sole access to this data. Two years after the completion of my doctorate physical documents pertaining to the study will be shredded and audio files will be deleted.

Anonymity/confidentiality

Your confidentiality will be respected and maintained throughout the study. Information that discloses your identity will not be released without your consent unless required by the law. Pseudonyms will be used in place of participants' names in order to maintain anonymity. I will ensure that during the analysis phase of the study that no judgments of participants' experiences will occur. The principal investigator will only read all data of this study containing personal information. All research data will be stored on a password-protected computer or a USB flash drive that will be secured in private and locked location in my home.

Benefits of the study to the participants

There is no direct benefit to you as a participant of this study. You will not receive financial remuneration or author's rights. The study may not have any direct benefits to participants during the initial data collection phases. However, participants may benefit from the final analyses and results in terms of gaining further insights into how principals perceive their own individual innovativeness and that of their school district. More importantly, it will provide participants with a broad understanding of the concept of innovation and the conditions necessary for overcoming challenges to successfully implement innovation in a school system.

Page 2 of 3

Risks of the study

There are no risks to participants in this study.

Permission obtained from organization/school

Permission to conduct this research will be obtained from the ………. School District. **Contact For Complaints:** I also understand that I may register any complaint with the Director of the Office of Research Ethics.

Jeff ………..
Director,
Office of Research Ethics
Simon Fraser University
8888 University Drive
Multi-Tenant Facility
Burnaby, B.C. V5A 1S6
.....@sfu.ca

I may obtain copies of the results of this study upon its completion by contacting the researcher named below:

Luigi DeMarzo
..........@sfu.ca
Cellphone: ***-******* Home phone: ***-******
Graduate Student
Faculty of Education
Simon Fraser University

Signature: Your signature on this form will signify that you understand the procedures, potential risks and benefits of this research study. In addition, you have received adequate opportunity to read and consider all documents pertaining to this study and that you voluntarily agree to participate in this study. Taking part in this study is entirely up to you. You have the right to refuse to participate in this study. If you decide to take part, you may choose to withdraw from the study at any time without giving a reason and without any negative impact on your employment.

_____

Participant Signature   Date

_____

Printed Name of the Participant signing

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