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Enhancing the EdTech Ecosystem in a British Columbia School District

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Abstract

Technology has brought significant opportunities to education, but they are largely being lost. In many cases, spending on educational technology (EdTech) has not resulted in improved student outcomes. This Organizational Improvement Plan (OIP) addresses the problem of practice (PoP) of a lack of a framework and supports for K-12 teachers to effectively utilize EdTech in classrooms in the Canadian province of British Columbia (BC). Using a BC school district as a case study, I propose strategies for how leaders can craft and implement a change plan to enhance an EdTech ecosystem that best supports teachers and learners. Establishing a framework for effective use of EdTech in schools is complex and multifaceted. Investments in technology must support best pedagogical practices, and leaders must create conditions that boost teachers' Technological, Pedagogical and Content Knowledge (TPACK; Mishra & Koehler, 2006). Leaders must adapt to shifting power dynamics in which teachers have new roles as emergent leaders. Optimizing the impact of EdTech in education requires a confluence of three key factors: technology, pedagogy, and excellent leadership. The change process must be iterative, ongoing, stakeholder-driven, and system-wide. This OIP blends Appreciative Inquiry (Cooperrider, 1986) principles with servant leadership (Greenleaf, 1970) and incorporates the district's existing approaches into a hybrid transformational leadership model. I explore a three-pronged solution of EdTech capacity building for teachers, an EdTech vetting system, and a supportive leadership framework. This aims to raise TPACK, optimize EdTech usage, support wise pedagogy, and improve student outcomes.

Keywords: Educational technology, EdTech, EdTech ecosystem, TPACK, transformational leadership in education, Appreciative Inquiry

Executive Summary

In our increasingly digitalized world, education has been irrevocably changed by technology and the corresponding access to content it brings. There are exciting new opportunities, but also significant challenges. The pressures are growing for education systems worldwide to provide students with a range of global competencies compatible with our new knowledge society (Frechette & Williams, 2015; Schleicher, 2018). However, schools are not yet equipped to adequately prepare students for these changes (Schleicher, 2019; Senge, 2012) and we are not yet realizing the full potential of digital tools in the educational process (Fullan, 2013; Livingstone, 2012; Schleicher, 2018). This paper presents an Organizational Improvement Plan (OIP) that addresses the problem of a lack of a framework to support K-12 teachers in their use of educational technology (EdTech), which has resulted in under-utilization of EdTech and missed opportunities. Using a school district in British Columbia (BC) as a case study, this OIP explores how leaders can support teachers in optimizing EdTech usage their classrooms.

Chapter One presents an overview of Cedar School District (a pseudonym). It then describes the leadership problem of practice that forms the basis of this OIP. I then discuss the theoretical lens through which the problem and possible solutions will be viewed, which is a social constructivist approach, shaped by systems thinking and influenced by Appreciative Inquiry, servant leadership, and the transformational leadership principles of Kouzes and Posner (2007). I examine the concept of an "EdTech ecosystem" in which a variety of interdependent factors affect the efficacy of technology usage in education. Chapter One also surveys the literature on EdTech, and divides it into four themes: the relationship between EdTech and the acquisition of 21st-Century skills;

the impact of EdTech on student outcomes; the importance of pedagogy and teachers' Technical, Pedagogical, and Content Knowledge (TPACK); and the key role that strong leadership can play in supporting effective frameworks for EdTech. This chapter outlines the vision for change and identifies key factors that will drive the change process. Finally, I assess Cedar's organizational change readiness, and conclude that Cedar is in a good position to embark on a change plan.

Chapter Two encompasses the planning and development elements of a change plan for how leaders in Cedar School District could provide a framework to help K-12 teachers to optimize EdTech in their classrooms. The plan is presented so that Cedar's leaders can address the problem of under-utilized EdTech in the district, and can improve teaching and learning outcomes. This chapter outlines the leadership approach to change, which is a hybrid model of Appreciative Inquiry, Kouzes and Posner's (2007) Five Practices, and servant leadership, presented in a systems-thinking framework. I combine this approach with the Change Path Model (Cawsey, Deszca, & Ingols, 2016) to describe what the multi-staged change process might look like. Next, I propose Appreciative Inquiry as a diagnostic tool for a critical organizational analysis, and combine it with an analysis based on Nadler and Tushman's (1989) Congruence Model. My analysis shows that although Cedar has capable and committed leadership, it has low usage rates of some EdTech, declining student achievement as represented by provincial tests, inequities between groups, and a lack of strategies for how to improve EdTech integration. This chapter then explores possible solutions to address the problem. Finally, I discuss a variety of ethical issues, including improving equity, that will need to be considered in the change plan and beyond.

Chapter Three presents a change implementation plan for Cedar to enhance its EdTech ecosystem in order to optimize EdTech use and improve teaching and learning. The plan has three components: first, EdTech capacity building for teachers via enhanced Professional Development opportunities and the creation of ongoing Professional Learning Communities in schools; second, the establishment of a comprehensive vetting system that focuses on the pedagogical value of various EdTech tools; and third, a supportive and knowledge-driven leadership framework. Together, these components can boost TPACK, result in better usage of EdTech, and improve student outcomes. I propose a Constructive Inquiry framework for monitoring and evaluating the change process, as well as a strategy for communicating change. I suggest that a long-term goal for Cedar is to have an effective learning organization (Senge, 1990) that fully supports leaders, teachers and students in an interdependent manner that elevates teaching and learning, as well as addressing equity concerns.

I conclude by noting that the current crisis caused by the COVID-19 pandemic has created urgency around remote learning uses of EdTech, and while there will be lessons gleaned from Cedar's experience with COVID-19, the challenge of integrating EdTech into classroom practices in a way that improves teaching and learning remains a separate question that must be addressed in its entirety. The situation with COVID-19 has raised many complex questions and has created some uncertainty about when Cedar will be able to fully resume its efforts to optimize EdTech in classrooms, but district leadership and stakeholders remain committed to the change process.

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I have had the good fortune to teach in both an independent school and in a public school district in BC, and those experiences have significantly shaped my academic interests and work. Many of my colleagues have expressed interest in my work, and have

cheered me along the way. I am fortunate to be included in my district's EdTech Working Group, which has allowed me to listen to the concerns of teachers and administrators, and to observe the commitment of district leaders, which in turn has greatly informed my work on this OIP. I received invaluable support from my district's technology leadership team, who will remain anonymous for confidentiality purposes.

As a teacher, one of my greatest joys has been watching my students learn. I am profoundly grateful for all that I have learned from them.

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My heartfelt thanks go to everyone. Now it's time to go for a hike in the woods.

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Glossary of Key Terms

Appreciative Inquiry: A philosophy and process for change, Appreciative Inquiry is "a form of transformational inquiry that selectively seeks to locate, highlight, and illuminate the life-giving forces of an organization's existence" (Cooperrider, Whitney, & Stavros, 2003, p. xi.)

Change drivers: Change drivers are "events, activities, or behaviors that facilitate the implementation of change" (Whelan-Berry, Gordon, & Hinings, 2003, p.100).

Change Path Model: A four-stage model for organizational change that incorporates a variety of principles and practices, developed by Cawsey, Deszca and Ingols (2016). Its phases include Awakening, Mobilization, Acceleration, and Institutionalization.

Digital literacy: "The interest, attitude, and ability of individuals to use digital technology and communications tools appropriately to access, manage, integrate, analyze and evaluate information, construct new knowledge, and create and communicate with others" (British Columbia Ministry of Education, 2018a, para 2).

Educational technology (EdTech): The Association for Educational Communications and Technology defines educational technology as "the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources" (Januszewski, & Molenda, 2008).

EdTech ecosystem: An ecologically-inspired theoretical framework for understanding the interrelated forces that affect the successful use of educational technology. Key factors shaping the ecosystem are leaders, teachers, and innovative processes.

Ethical leadership: A "social, relational practice concerned with the moral purpose of education" (Ehrich, Harris, Klenowski, Smeed, & Spina, 2015, p.199) that incorporates principles of respect, service, justice, honesty, and community (Northouse, 2019).

Information Technology (IT) in education: The use of computers and other digital technology in the educational process. In the context of this OIP, the term "EdTech" is generally used, although many academic studies use the term "IT" or "ICT" which refers to "Information and Communications Technology" so those terms are used in this paper accordingly.

Problem of Practice: "A persistent, contextualized, and specific issue embedded in the work of a professional practitioner, the addressing of which has the potential to result in improved understanding, experience, and outcomes" (Carnegie Project on the Education Doctorate, 2019).

Professional Development: "Activities that develop an individual's skills, knowledge, expertise and other characteristics as a teacher" (OECD, 2009, p. 49).

Professional Learning Community: A community in which teachers and administrators continuously seek and share learning, and act on that learning to enhance their effectiveness for the benefit of student learning (Hord, 1997).

Servant leadership: A non-hierarchical form of leadership that focuses on the follower, not the leader. Servant leaders have the following characteristics, according to Spears (2010): listening, empathy, healing, awareness, persuasion, conceptualization, foresight, stewardship, commitment to growth of people, and building community.

Systems thinking: "A problem-solving framework with which one can see a problem in its entirety, recognizing multiple causal roots" (Randle & Stroink, 2018, p. 646).

TPACK: Koehler and Mishra (2005, 2009) pioneered and refined the TPACK model, which encompasses Technological, Pedagogical, and Content Knowledge, and explores the impact of teachers' knowledge on integration of technology in the classroom.

Transformational leadership: A term first coined by Burns (1978), transformational leadership is "characterized by a leader who works with subordinates to identify needed change, create a vision to guide the change through inspiration, and execute the change in unison with committed members of a group" (Anderson, 2017, p.1).

Acronyms

AI (Appreciative Inquiry)

BC ERAC (British Columbia Educational Resources Acquisition Consortium)

BCTF (British Columbia Teachers' Federation)

CBAM (Concerns-Based Adoption Model)

CI (Constructive Inquiry)

ICT (Information and Communication Technology)

ISTE (International Society for Technology in Education)

IT (Information Technology)

MoE (Ministry of Education)

OECD (Organisation for Economic Cooperation and Development)

OIP (Organizational Improvement Plan)

PD (Professional Development)

PISA (Program for International Student Assessment)

PLC (Professional Learning Community)

PoP (Problem of Practice)

TL (Transformational Leadership)

TPACK (Technological, Pedagogical, and Content Knowledge)

Chapter One: Introduction and Problem

We are living and learning in an increasingly digitalized world. Education has been irrevocably changed by technology and the corresponding access to content it brings. There are incredible opportunities, but also significant challenges. The pressures are growing for educational systems worldwide to provide students with a range of global competencies compatible with our new knowledge society (Frechette & Williams, 2015; Schleicher, 2018). However, schools are not yet equipped to adequately prepare students for these changes (Senge, 2012) and we are not yet realizing the full potential of digital tools in the educational process (Fullan, 2013; Livingstone, 2012; Schleicher, 2018). This paper presents an Organizational Improvement Plan (OIP) that addresses the problem of under-utilization of educational technology (EdTech) in K-12 schools. EdTech is defined as "the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources" (Januszewski & Molenda, 2008). Using a school district in the Canadian province of British Columbia (BC) as a case study, this OIP explores how leaders can support teachers in effectively integrating EdTech tools and processes in classrooms.

Chapter One is divided into seven parts. First, it describes the organizational context of Cedar School District[1]. Second, it articulates my leadership position and worldview. Third, it outlines the problem of practice (PoP). Fourth, it describes the factors that shape the PoP. Fifth, it poses questions that shape the OIP. Sixth, it describes the vision for change. Finally, it examines Cedar's organizational change readiness.

[1] Cedar School District is a pseudonym, used to preserve the anonymity of the organization. It is named for the provincial tree of BC, the Western Red Cedar, a treasured resource that has played an important role in cultures and communities in the province, including coastal First Nations.

Organizational Context

The purpose of this section is to give an overview of Cedar School District. It describes the district and its context; outlines its vision, mission, values and goals; describes its structure and established leadership practices; and gives a brief history of the district as it relates to its present mission and goals.

Introduction and context. Cedar School District is one of 60 public K-12 school districts in BC. There are approximately 8,000 students in about fifteen schools in Cedar. It has a diversity of students from a range of socio-economic backgrounds, and serves a variety of rural, suburban and indigenous communities. It operates a successful international student program. The district strives for inclusivity and emphasizes student success and safety. Cedar's teachers deliver the new "concept-based and competency-driven" BC curriculum, which focuses on personalized learning via improved teaching, flexibility, choice, and innovation (BC Ministry of Education, 2018b). In 2019, Cedar's high-school graduation rate was a few percentage points below the BC public school district provincial average, while its graduation rate for indigenous students was more than twenty percentage points below its non-indigenous rate, and more than ten percentage points below the provincial average [2] (British Columbia, 2020).

Cedar's teachers belong to the British Columbia Teachers' Federation (BCTF). This powerful union plays an advocacy role for teachers. The strength of the BCTF results in certain parameters in terms of hiring practices and working conditions. District leadership strives to maintain a productive relationship with the BCTF and its local

[2] First-time Grade 12 Graduation Rate across all types of educational facilities (standard schools and alternative, continuing education, and distance education programs). The precise differentials between Cedar and the provincial rates are withheld to preserve organizational anonymity.

chapter. Labour relations have at times been strained. Cedar has had to withstand the fallout from a series of difficult negotiations and job actions over the past few years.

Since October 1994, provincial legislation has mandated Cedar to comply with the *Freedom of Information and Protection of Privacy Act*. This act encompasses a range of privacy issues and has implications for computer usage in schools and at home.

The district experienced declining student enrollment in the early 2000s and closed several schools. Since 2015, however, enrollment rates have increased and currently the district is coping with a shortage of classroom space. Recently, Cedar has experienced a significant increase in the number of students with Individualized Education Plans (IEPs), with more than 10% of its students now requiring extra support in the classroom. Changes mandated by a 2016 Supreme Court of Canada ruling pertaining to teacher contracts and classroom sizes in BC have been causing financial pressures, teacher shortages, and operational challenges. Notwithstanding these factors, Cedar reported an operating surplus in 2019. The district is expecting declining revenues in 2020-21 due to COVID-caused lower enrollments in its international student program.

Vision, mission, values, and goals. Cedar's leadership is driven by the belief that public education should create equal opportunities for all, and should shape students into socially responsible citizens within our democratic society (Cedar School District, 2016). Its mission is threefold: to help prepare students to reach their full potential; to help students do their best and be lifelong learners; and to support the achievements of all learners in an inclusive framework (Cedar School District, 2016).

In its current strategic plan, the district cites five core values: compassion, fairness, honesty, responsibility, and respect (Cedar School District, 2016). It recognizes

the crucial nature of equity in public education, the role of schools in preparing learners to be responsible citizens, the responsibility of society in education, and the importance of healthy relationships (Cedar School District, 2016). Its vision is for an inclusive society, a relevant and responsible education system, a partnership between society and education, success for all students, and innovative learning (Cedar School District, 2016).

Cedar has identified sixteen broad goals, one of which is effective use of Information Technology (IT) (Cedar School District, 2016). Cedar strives to ensure its IT personnel provide effective, reliable and secure services and products that meet the needs of students and staff, and that IT infrastructure will be continuously improving within a collaborative framework (Cedar School District, 2016). One of Cedar's policy objectives is to review its IT strategy regularly to ensure it is appropriate. Cedar boasts of a "technology focus in all schools" in a brochure aimed at recruiting international students.

Organizational structure and leadership approaches. Cedar is led by an appointed superintendent and governed by an elected Board of Education. The district's executive team includes the superintendent, assistant superintendent, and two directors of instruction, one of whose focus is innovation and learning. Cedar has a manager of Information Technology, as well as five district teacher leaders, including those who focus on curriculum and innovation. Each school in the district is helmed by a principal, who is responsible for the management and daily operations of the school. Qualified teachers deliver instruction in classrooms throughout the district, supported by a team of educational assistants and other professionals and support staff.

The district's Strategic Plan 2020 identifies Kouzes and Posner's (2007) theories as indicators of strong leadership. Kouzes and Posner developed the Five Practices of

Exemplary Leadership® (Kouzes & Posner, 2007). The features of their trademarked approach are Model the Way, Inspire a Shared Vision, Challenge the Process, Enable Others to Act, and Encourage the Heart (Kouzes & Posner, 2007). Kouzes and Posner's model is a form of transformational leadership, and it is described in Chapter Two.

Cedar espouses four domains in leadership: Moral Stewardship, Instructional Leadership, Relational Leadership, and Organizational Leadership (Cedar School District, 2016). Each of these is supported positively in the literature. Sergiovanni (2013) noted the legitimacy and appeal of moral leadership and stewardship because it is inclusive of all the community's stakeholders. Fink and Markholt (2013) argued that to improve instruction, leaders must focus on learner and teacher expertise in strategic plans. Nicholson and Kurucz (2017) argued that relational leadership is essential for sustainability. Robinson, Lloyd and Rowe (2008) found that instructional leadership plays a big role in student success, and that its influence on student outcomes is greatest when leaders focus on relationships, their work, and teaching and learning.

In 2008, Cedar incorporated Appreciative Inquiry (AI) into its philosophy. While AI is not specifically cited in Cedar's current strategic plan, it embodies many of the principles that the district already embraces, and it provides a good framework for addressing the problem of practice. AI involves "the co-evolutionary search for the best in people, their organizations, and their relevant world around them" (Cooperrider, Whitney, & Stavros, 2003, p. 319). It is both a philosophy and process that promotes the "practice of asking questions that strengthen a system's capacity to apprehend, anticipate, and heighten positive potential" (Cooperrider et al., 2003, p. 319). AI embraces the value of reflection, shared understanding, and mutual respect (Cawsey et al., 2016).

Cedar strives for an organizational culture that acknowledges the leadership roles played by teachers, students, administrators, parents, and trustees (Cedar School District, 2016), which is also consistent with AI. Harris (2011) notes the importance of collaborative leadership in facilitating sustainable change. The critical role leaders play in student success has been well-documented in the literature (Leithwood, Patten, & Jantzi, 2010; Robinson, Lloyd, & Rowe, 2008; Robinson & Gray, 2019). Supportive leaders can result in student success (Bambrick-Santoyo, 2013), and leaders who believe that their work matters can facilitate higher student achievement (Reeves, 2008).

Organizational history. Cedar is a longstanding district that has evolved as its communities have developed and diversified, and as provincial mandates have changed. The district has a history of involving the community in discussions related to schooling. Of particular note is Cedar's historical and present acknowledgement of and respect for the local indigenous peoples. This dovetails well with the new provincial curriculum requirement of indigenous content, as well as broader societal expectations. Cedar has incorporated indigenous language and culture programs in many of its schools. This fosters a climate of appreciation and respect among stakeholders, including indigenous communities, whose voices have been historically under-represented.

The historical and cultural contexts of an organization are important, and they are often interrelated. Culture can be complex, and it can be complicated by the existence of competing sub-cultures (Connolly, James, & Beales, 2011). Moreover, culture can be fluid, and there can be an interrelationship between culture and performance (Connolly et al., 2011). Even within the district there can be significant differences between schools because of school leadership, culture, and stakeholder participation.

Leadership Position and Lens Statement

I am a teacher who works at an elementary school in Cedar School District. I do not hold a formal leadership position within Cedar, but I am, by virtue of being a teacher, a leader, according to Northouse and Lee (2019). Northouse (2019) defined leadership as "a process whereby an individual influences a group of individuals to achieve a common goal" (p. 6). I am a member of the district's new EdTech Working Group in 2019-20, and in that capacity, I expect to be an emergent leader who uses personal power (Northouse, 2019) to effect positive change in Cedar. I see my leadership role as a change initiator, as described by Cawsey et al. (2016, p. 26). I intend to champion change and offer support to make that change possible. I am pro-technology in education, but only insofar as it supports excellent pedagogical practices, and therefore student learning.

My worldview for the purposes of this OIP is social constructivist, which is a contextual approach characterized by individuals holding subjective interpretations of their own experiences, resulting in a complexity of multiple viewpoints (Creswell, 2014). Social constructivism grew out of Berger and Luckmann's (1967) foundational work, *The Social Construction of Reality* (Pfadenhauer & Knoblauch, 2019). It is based on the idea that participants' perspectives are a crucial component of the research, and are interactive in nature (Creswell, 2014). Data are gathered by open-ended, qualitative questions (Crotty, 1998). Social constructivism is closely aligned with the social constructionist elements of Appreciative Inquiry. Cooperrider et al. (2003) described several points of overlap between AI and social constructionist theory: that the social order is viewed as the result of broad social agreement; that social patterns are not fixed; that social action is subject to multiple interpretations; that observations are filtered through multiple lenses;

that language and dialogue are critical components of change; that social theory can change patterns of social action; that narrative accounts have the potential to impact the way people interact; that social theory is a narrative creation; and that social knowledge is built by collective stories. From a pedagogical perspective, social constructivism is linked with Vygotsky's belief that learning is inherently a social process, and that cultural activities and processes are integral to understanding (Palincsar, 2005).

Social constructivist research is typically characterized by qualitative rather than quantitative data (Creswell, 2014). However, in this case, I am choosing to integrate both qualitative and extant quantitative data in this study's analysis because the quantitative data are useful in identifying the problem, allow for data triangulation, and will ultimately contribute to measurement and evaluation.

I am inspired by the grand theories of Swiss educator Johann Pestalozzi (1746-1827), who embraced the importance of the relationship between home and school (Bowers & Gehring, 2004) and in the centrality of the student-teacher relationship (Wilkinson & Wilkinson, 2013). Pestalozzi believed that students are guided by a holistic "Head-Heart-Hands" approach in which each child is developed to their full potential, and the heart is the key component (Wilkinson & Wilkinson, 2013). Pestalozzi believed that education must make us better people, and that trust and gratitude are essential.

I personally subscribe to a servant leadership model, in which people in positions of influence embrace caring principles (Northouse, 2019). Hays (2008) stated that applying servant leadership can profoundly affect both teaching and learning in positive ways. It focuses on the needs of followers, not leaders in the traditional sense, and I thus believe it is an ideal approach in education. It is described more fully in Chapter Two.

I am a systems thinker. Randle and Stroink (2018) defined systems thinking in organizational management as "a problem-solving framework with which one can see a problem in its entirety, recognizing multiple causal roots" (p. 646). Systems thinking involves a big-picture, holistic approach, one that Senge (1990) described as "a framework for seeing interrelationships rather than things, for seeing patterns of change rather than static 'snapshots'" (p.68). Scott and Vare (2018) noted that an underlying assumption of systems thinking is that the whole is larger than the sum of the parts, and that the whole cannot be fully understood only by looking at the parts. Systems thinking is linked to what Senge (1990) called a learning organization, implicit in which is the ongoing development of new organizational capabilities (Kim & Senge, 1994).

Senge (1990) cited five disciplines of a learning organization: personal mastery; mental models, which influence our understanding of the world; building a shared vision; team learning; and finally, systems thinking, which combines the previous four disciplines. This way of approaching organizational improvement provides stakeholders with key roles; Senge (1990) argued that "people become active participants in shaping their reality, from reacting to the present to creating the future" (p. 69). Scott and Vare (2018) noted that advocates of systems thinking embrace it because our world is changing in three crucial ways: there is increased complexity, uncertainty, and unsustainability.

Systems thinking is thus an appropriate lens through which to view the problem of how to optimize ever-changing technology in education. It is from the principles of system thinking that I embrace the concept of an "ecosystem" for educational technology. EdTech can be thought of an entire landscape that has many inextricably-linked interdependent components, key of which are the technology itself, pedagogy, and

leadership. Driven to create a framework for understanding technology in education, Zhao and Frank (2003) compared computer usage in schools to an invasive alien species. They argued that understanding an alien species "requires a comprehensive and systemic approach that takes into consideration the nature of the species, the environment, other facilitative forces, and the interactions among these components" (Zhao & Frank, 2003, p. 808). Zhao and Frank (2003) found multiple factors that influenced the usage and efficacy of computers in schools, and argued for an ecological metaphor. They defined an ecosystem as "an open and dynamic system, with things constantly entering and leaving" (Zhao & Frank, 2003, p.811) and in which species co-evolve and adapt. In their model, the school itself is the ecosystem; I modify my approach to make EdTech the ecosystem.

I subscribe to integrative thinking, as described by Martin (2009) and Riel and Martin (2017). Martin (2009) noted the importance of causality and saliency, and takes a big-picture approach to solving problems that may seem to have unacceptable trade-offs. Key elements throughout this OIP will be leadership metacognition and empathy, which Riel and Martin (2017) argued are integral to integrative thinking.

Fullan (2013) stated that empathy is a "rich, multi-faceted resource" (p. 68). Leaders having empathy for stakeholders is crucial. Cawsey et al. (2016) emphasized the importance of leaders paying attention to the emotions of stakeholders. This aligns with servant leadership and is especially important in education, in which the stakeholders include the youngest and most vulnerable members of society. The emotions of parents should also be considered. For example, some Cedar parents do not allow their children to use Google products that require a login, citing privacy concerns. Others worry how screen use affects their child's well-being. The issue of stakeholder emotions also applies

to teachers who may be resistant. Many teachers in the district were trained in an era dominated by textbooks, and the pace with which books have been replaced by digital tools can be difficult to accept. Cawsey et al. (2016) pointed out the importance of not ignoring older workers, which matters when making changes to digital practices.

Interestingly, the role of formal, assigned leadership in Cedar is shifting, while the influence of emergent leaders is rising, because district leadership now has less control over classroom content than before. For example, Google has made its way into classrooms around the world by wooing teachers with glitzy events and goodies, resulting in a suite of Google products in classrooms that often bypass decision-makers at the district level (Singer, 2017). This has happened in Cedar, and it is an important phenomenon, both practically and in terms of leadership approaches. On a practical level, teachers are making daily decisions to utilize technology products, apps, websites and media that have not necessarily been vetted by districts or curriculum specialists. This underscores the importance of teachers both in terms of their role in delivering pedagogical content, and as emergent leaders and change agents with specific EdTech knowledge and classroom experience that some administrators may lack. The phenomenon also impacts leadership approaches because power, which is closely linked to leadership, has been shifted by external forces. Northouse (2019) stated that technology has empowered followers, and that is exactly what has been happening in classrooms around the world. Teachers, as emergent leaders, are acquiring more personal power in the digital sphere than the assigned leaders, defined as those who have a formal title and positional power (Northouse, 2019), but the assigned leaders may not be fully aware of many of the changes happening in classrooms, let alone be in control of it. In the

context of the autonomy and classroom flexibility that Cedar's teachers enjoy as a result of collective bargaining, the current and future trajectory of power relations must be considered. There are pedagogical and ethical dimensions to this problem which are not yet fully understood. These shifts in knowledge and power, along with the complex nature of the problem require an innovative approach to leadership (Schleicher, 2015). Schleicher (2015) argued that "ministries and country-level education agencies should provide the legitimacy and the system-wide perspective to push innovation" (p. 10).

My overall lens for this OIP is a hybrid transformational leadership approach that includes Appreciative Inquiry and servant leadership principles, blended in a systems-thinking framework that acknowledges the complexity of the problem and applies an ecosystem concept to EdTech. My approach is inspired by Kouzes and Posner (2007). This hybrid leadership approach is explored in Chapter Two.

Leadership Problem of Practice

The problem of practice that will be addressed is the lack of a framework and support mechanisms for teachers to efficiently and effectively utilize educational technology in K-12 classrooms in a school district in British Columbia. There are multiple challenges in integrating EdTech in schools. Leaders must shape and implement policies that promote digital literacies among students, and they must facilitate effective digital pedagogies, including content and practices that best support classroom teaching, learning, and student outcomes. District leaders are tasked with making decisions about hardware, software, and digital content. Such decisions are often made under changing circumstances, sometimes with incomplete information, usually with inadequate means for assessing those products, and always with financial constraints. So far, the results are

not encouraging: Cedar's usage of approved digital content, in the form of a suite of products called the BC Digital Classroom, is just over half the provincial average, and has been declining both in relative and absolute terms (BC ERAC, 2019). Despite inclusion of digital literacies in the new K-12 BC curriculum, there is not a well-defined means for delivering these concepts, and there is vast inconsistency in practice across BC, and even within the district. Cedar's teachers have identified numerous concerns and areas for improvement with the current EdTech situation.

BC's public education system is generally regarded as excellent, and its students perform well internationally (BC Ministry of Education, 2016; O'Grady et al., 2019), but the digital difficulties are not surprising. Educational leaders worldwide are struggling to accrue the benefits of school-based technology in the learning process, and society in general has not yet achieved the full potential of digital tools in education (Fullan, 2013; Livingstone, 2011; Schleicher, 2018; Senge, 2012). There are multiple factors that affect successful implementation of EdTech. Molnar (2020) has summarized the ten most important EdTech implementation factors identified by the EdTech Genome Project: EdTech adoption plans; competing priorities; foundational resources; implementation plans; professional development; school and staff culture; support from the district; teacher agency and autonomy; teachers' pedagogical and content knowledge (TPACK) and their beliefs about technology; and a vision for teaching using technology. These factors comprise part of the EdTech ecosystem, an approach that acknowledges the complex and interdependent relationship between a variety of forces, including leaders, teachers, and innovative tools and processes. By using a small BC school district as a case study, this OIP explores strategies that district leaders could use to support teachers

so they can effectively integrate EdTech usage in classrooms with the goals of improving digital literacy, student outcomes in general, and ideally, equity. By creating a supportive framework, leaders can enhance the EdTech ecosystem to elevate teaching and learning.

The problem is complex, and responding to these new realities requires a fundamental shift away from past practices (Hargreaves, 2007). This OIP embraces the ideas of Fullan (2013), who argued that three key forces of technology, pedagogy, and change knowledge combine to create a "stratosphere" that can transform education for all, and lead to "whole-system reform" (p. 3). This OIP adopts a systems-thinking approach and applies the four-stage Change Path Model (Cawsey et al., 2016), which charts a course for organizational change. By engaging in AI processes and principles, and incorporating its established transformational leadership practices, Cedar could offer EdTech solutions for all its stakeholders. An achievable and measurable organizational state would be to increase usage of BC Digital Classroom resources to at least the provincial average, to increase student satisfaction with EdTech products, and to increase teacher confidence and competence in using EdTech these tools. Longer-term goals could include improving teaching, improving equity in student outcomes, improving student achievement as it relates to EdTech usage, and a positive district culture for EdTech.

Framing the Problem of Practice

The complex and multidimensional relationship between EdTech and student outcomes is still not well understood. The purpose of this section is to situate Cedar's circumstances in a broader framework and to explore the variables that shape the problem. First, this section describes theories and frameworks for EdTech by reviewing recent literature on the topic. Then it describes evidence of the problem in Cedar. Finally,

it outlines contextual factors in Cedar that shape the problem. Understanding these theories, frameworks and Cedar's data and context will define the lines of inquiry.

Factors and practices shaping the problem: A literature review. Despite some studies that show some positive correlations between EdTech and student learning in certain subjects (Chauhan, 2016), the impact of digital technology on learning has not been clearly and consistently established (Biagi & Loi, 2013; Livingstone, 2012; Schleicher, 2018). Moreover, the impact of EdTech on the social-emotional skills that are deemed so important in modern times (National Education Association, 2012) is also not clear, and evidence that information technology (IT) leads to creative learning is so far inconclusive (Livingstone, 2012). Overall, it appears we are not yet realizing the full potential of digital tools in education (OECD, 2015; Schleicher, 2018). In a multi-country analysis of standardized Programme for International Student Assessment (PISA) test scores, the Organisation for Economic Cooperation and Development (OECD) found that students who use computers often at school perform much worse than those who use computers less frequently, even when adjusting for other factors (OECD, 2015). In regions like Shanghai-China and Korea, which produce some of the highest PISA scores in math and digital reading, only about 40% of students use computers in schools, compared to the OECD average of 72% (OECD, 2015). Surprisingly, Schleicher (2018) found that there are no significant improvements in PISA scores in mathematics, reading or science in countries that spent more money on EdTech.

These data paint a complex picture. Many factors shape the problem, and understanding these forces and how they interact with each other is crucial. Fullan (2013) noted four essential criteria in the successful integration of technology and pedagogy: "i)

Irresistibly engaging (for students and for teachers); ii) elegantly efficient and easy to use; iii) technologically ubiquitous 24/7; and iv) steeped in real-life problem-solving" (p. 4).

I have divided the literature review into four themes. First, we need to understand the global landscape in which students now learn, and the future skills that learners will require. Second, we need to know how EdTech impacts student outcomes and what variables impact the way in which EdTech is successfully integrated in schools. Third, we need to understand the central role of teachers in the successful use EdTech. Finally, we need to understand how leaders can weave these factors together to create a supportive framework, using an innovative, ecosystem approach to the problem.

Our global landscape and 21st-Century skills. We are living in a digital world, and our daily existence is irrevocably and inextricably linked to digital tools. We shop, apply for jobs, pay bills, and earn university degrees online. The global changes spawned by technological advances are bringing opportunity, hope, and complexity, while altering the very shape of human society (Gee, Takeuchi, & Wartella, 2018). The nature of schooling, too, has been irrevocably changed (Schleicher, 2018). Students have access to more gadgets and more information than ever before. There are computers in almost half of the classrooms around the world today, and 42% of all students utilize smart phones in class (Cambridge Assessment International Education, 2018). Among the OECD countries, almost three quarters of students use computers at school, and 96% have access to computers at home (OECD, 2015). Worldwide, students in OECD nations spend an average of three hours a day online outside of school (Schleicher, 2019).

Children are learning in a different world – and in different ways – than in previous generations. Children's brains are developing differently because of early

exposure to screens (Domingues-Montanari, 2017; Sigman, 2012). Screen time in young children has been found to affect development (Madigan, Browne, Racine, Mori & Tough, 2019) as well as language acquisition (Madigan, McArthur, Anhorn, Eirich, & Christakis, 2020). The implications of these clinical findings must be considered by leaders because of how they shape perceptions of screen use in schools, particularly at the elementary level. But they also must be considered insofar as early exposure to screens can influence the expectations that students have in class, as well as the very ways in which they learn.

According to Anderson (2008) we are living in a "knowledge society" which derives from "greater intercultural interaction made possible by global electronic networks and an economic system in which knowledge functions as a commodity" (p. 7). Traditionally, education was characterized by the three Rs: reading, writing, and arithmetic. But the literature now suggests that the requisite suite of "21st-Century skills" goes well above that, to include the four Cs: critical thinking, communication, collaboration, and creativity (National Education Association, 2012). These skills are reflected in the three "Core Competencies" of BC's new curriculum: Communication, Thinking, and Personal and Social (BC Ministry of Education, 2018b). It is also necessary to incorporate technological literacy, digital literacy, and life skills into the learning process (Anderson, 2008). Technology can help promote collaborative learning (Anderson, 2008; Larson & Miller, 2011) and it can thus support new competencies. Although the human desire for innovation dates back to the time of Socrates (Larson & Miller, 2011), we must consider the new digital global context in which people are now living, and design education systems and processes accordingly. However, that can be a

challenge. Senge (2012) argued that "the widening gap between schools' aims and what will be needed of tomorrow's globally oriented, socially responsible knowledge workers has become the biggest unrecognized threat to America's future" (p. 45).

EdTech integration and the impact of EdTech on student outcomes. As outlined above, the overall impact of EdTech on student learning has not been clearly established, and sometimes, increased computer usage actually leads to poorer outcomes for students (Biagi & Loi, 2013; Livingstone, 2012; OECD, 2015; Schleicher, 2018). Anderson (2008) argued that IT has the potential to greatly expand knowledge-related capacities across a variety of subjects; however, integration of digital tools must be contextual. Biagi and Loi (2013) cited several complex relationships, including institutional, school, student, and family factors. Conflation of digital tools without fully understanding their purpose, quality, and contexts is also a complicating factor (Livingstone, 2012).

While existing data that relate computer usage to student outcomes are not available for Cedar, looking at other countries' experiences will be helpful in shaping the inquiry. In a meta-analysis of 122 peer-reviewed studies that examined technology's impact on elementary students' learning outcomes, Chauhan (2016) found that technology has a "medium effect" on student outcomes, and that impact differs across subjects, with the greatest impact being in science. She also found that EdTech's effectiveness depends on the duration of its use in the classroom, and whether it is formal or informal (Chauhan, 2016). Comi, Argentin, Gui, Origo and Pagani (2017) found that EdTech effectiveness depends on teacher beliefs and classroom use. Fu (2013) argued that EdTech has particular benefits when constructivist practices are employed. Teaching approaches and school culture also matter (Knezek & Christensen, 2016; Petko, 2012).

There is agreement in the literature that the mere presence of digital tools is not enough (Anderson, 2008; Biagi & Loi, 2013; Chauhan, 2016; Comi et al., 2017; Knezek & Christensen, 2016; Prestridge, 2012). EdTech must actually be used in an effective manner. Fullan (2013) stressed the importance of focusing on pedagogy to engage learners, and then incorporating the technology accordingly. Molnar (2020) has noted that in 2019, the EdTech Genome Project, which involves over 100 educational organizations, identified about 80 factors that can influence the usage of EdTech. Anderson and Dexter (2005) found that while the technology itself is important, technology leadership is an even more important factor in predicting effective IT use in schools. There is agreement in the literature that great leaders and confident teachers are needed for successful integration of IT in the learning process (Schleicher, 2018; Wastiau et al., 2013).

The central role of teachers. Teachers matter. Despite the pervasiveness of digital tools in classrooms around the world, teachers need not fear that they will be made obsolete by technology. On the contrary, the role of the teacher will be elevated, not diminished, in our new digital era (OECD, 2015; Schleicher, 2018). In fact, Schleicher (2018) cautioned that technology can eclipse student-teacher interactions that are crucial for not only deeper conceptual understanding, but student well-being. Fullan (2013) argued that technology needs to be engaging but must be guided by strong pedagogy.

The impact of teachers on the successful integration of technology in the classroom is well-documented in the literature, and specific factors include teachers' competencies, knowledge, attitudes, beliefs, and confidence (Anderson, 2008; Chauhan, 2016; Comi et al., 2017; Ertmer & Ottenbreit-Leftwich, 2010; Koehler & Mishra, 2009; Koh, Chai, & Lim, 2017; Prestridge, 2012; Wastiau et al., 2013). Koehler and Mishra

(2005, 2009) pioneered and refined the TPACK model, which encompasses Technological, Pedagogical, and Content Knowledge, and explores the impact of teachers' knowledge on integration of technology in the classroom. TPACK has been widely studied in the literature as a conceptual framework. Mishra (2019) noted that since 2009, there have been over 1200 journal titles and book chapters on TPACK. Koehler and Mishra (2009) characterized teaching as "a complex, ill-structured domain" but concluded that TPACK can facilitate integration of EdTech into classrooms, and is thus a key factor in effective teaching. In 2019, Mishra suggested that a new element be added to the classic TPACK model: Contextual Knowledge (Mishra, 2019). This refers to teachers' awareness of their own knowledge, and the circumstances in which they are working. This allows us to see teachers as "intrapreneurs" who know "how their organization functions, and how levers of power and influence can effect sustainable change" (Mishra, 2019, p. 77).

One of the ways that teachers gain knowledge and skills is through their pre-service training. Research has shown that designing lessons rich in EdTech is difficult for pre-service institutions (Tondeur, van Braak, Siddiq, & Scherer, 2016). Voogt, Fisser, Roblin, Tondeur, and van Braak (2013) reported that pre-service teachers find it challenging to create technology-based lessons. Even when pre-service teachers learn how to integrate EdTech, it doesn't always translate into classroom usage (Zipke, Ingle, & Moorehead, 2019). Thus, ongoing professional development (PD) is vital.

For the purposes of this OIP, PD is defined as "activities that develop an individual's skills, knowledge, expertise and other characteristics as a teacher" (OECD, 2009, p. 49) and usually occurs outside the classroom. PD is generally seen to have a

positive impact on TPACK and teachers' use of EdTech (see, for example, Koh et al., 2017; Morsink et al., 2011) but there are many factors that affect the success of PD.

An ecosystem: Linking leadership, teachers, and innovation. Schleicher (2015) argued that there are three requisites for successful use of IT in schools: strong and effective leaders, digitally confident teachers, and innovative approaches. These are linked to Fullan's (2013) essential triad of change knowledge, pedagogy, and technology. Leadership matters, and understanding the power relationships is key to exploring solutions to the problem of practice. On one hand, Cedar's administrative leaders have less influence in the classroom because teachers are making direct decisions to use EdTech, but on the other hand, they have increasingly more formal responsibilities because of a recent policy change. Previously, BC's school boards were required to use resources recommended by the Ministry of Education (MoE), or those approved by the district. However, a policy change in 2017 now means that individual school boards in BC are responsible for approving resources, increasing both the autonomy and responsibility of the district (BC Ministry of Education, 2017a). Thus, while assigned leaders have more responsibilities, their actual influence on EdTech in the classroom is diminishing, with teachers taking almost the entire role in choosing what gets seen on screen, and becoming emergent leaders. This complex, challenging, and shifting landscape, in combination with the multitude of factors that influence EdTech usage, demands collaborative leadership that involves stakeholder input.

Donnelly, McGarr and O'Reilly (2011) noted that there is no "one-size-fits-all" solution, and that contexts must be considered. Petko, Egger, Cantieni and Wespi (2015) outlined a model that focuses on process and combines top-down and bottom-up efforts

to integrate EdTech; this approach involves district leaders, principals and teachers. Schleicher (2018) stated that there must be coherent plans to support teachers. Collaboration and communication must take place across all levels. In summary, an ecosystem approach that recognizes the many factors shaping the problem and incorporates leadership, teachers, and innovation will offer the best chance for change.

Evidence of the problem in Cedar. In Cedar, there few statistics on EdTech usage. The key quantitative indicator is a measure of the district's use of a suite of digital products called BC Digital Classroom (BCDC), which is offered by BC Educational Resource Acquisition Consortium (BC ERAC). BC ERAC data is used because it is the only quantitative data available, and while it could be considered to be a proxy for other EdTech usage in Cedar, such extrapolations are acknowledged to be of a limited nature.

BC ERAC has a variety of vetted, curriculum-linked resources for all levels, including a core package with tools such as World Book Reference Center, Nat Geo Kids, EBSCO research suites, and optional à la carte products such as NFB Campus, Maclean's Archive, and TEACH Magazine (BC ERAC, 2019). BC ERAC tracks usage by district. Most districts have BC Digital Classroom as a link on their school websites, and it can be used in school or at home. Despite the theoretical ease with which the product can be used, usage is very low province-wide. For example, the average number of BCDC searches per BC student is just 2.27 over a four-month period (March to June 2018). Cedar fares far below the provincial average, with just 1.33 searches per student in the same period (BC ERAC, 2019). These vetted resources are readily available, but they are barely being used. The reasons are not known.

Another example of an underused digital resource in Cedar is Discovery Education, a digital educational package that is, according to its website, "transforming teaching and learning" (Discovery Education, 2019). Cedar subscribes to the popular online service, which can be found in half of all US classrooms (Discovery Education, 2019). Unfortunately, because privacy issues relating to discrete student logins have not yet been resolved in Cedar, classroom teachers cannot use Discovery Education in its full functionality.[3] The problem of under-utilized EdTech is common: the EdTech Genome Project (2020) estimates that 85% of EdTech spending in the US is wasted.

Given the very limited data in Cedar, I have focused on analyzing Cedar's current situation, and evidence of the problem.

Cedar's current context. At the beginning of the 2019-20 school year, Cedar was faced with outdated equipment, data storage problems, and Internet bandwidth issues in its schools. It embarked on a significant hardware upgrade in its schools, which was completed in early 2020. In 2019, district leaders spearheaded an EdTech Working Group. The purpose of the group was to seek input from key stakeholders such as principals and teachers to help shape the district's plan to develop impactful new strategies for EdTech. The group's leaders were explicit that they would undertake their efforts in a supportive, collaborative way.

The first EdTech Working Group meeting was held in February 2020, with the essential question "How might we amplify technology to enhance teaching and learning in Cedar?" The meeting employed an Open Space Technology approach, a style

[3] This highlights the need for a systems-thinking decision-making process with complex EdTech choices.

pioneered by Owen (1997) that allows participants to shape the agenda. Open Space Technology is philosophically and practically aligned with Appreciative Inquiry in that it is a highly inclusive, participant-driven, collaborative process that results in stakeholders being given the opportunity to express their viewpoints. Eight key themes emerged from the meeting, including digital citizenship and literacy, mental health and technology, increased access, digital portfolio, teacher collaboration, technology for Universal Design for Learning, software, and my suggestion, which was to enhance the whole EdTech ecosystem. A subsequent meeting was held remotely in April 2020. Leadership led the discussion toward the creation of smaller sub-groups to focus on areas where members perceived a need for improvement, including digital learning resources, software and apps, mental health as it relates to technology, using technology for assessment, and using technology to leverage teacher collaboration. At the meeting, two additional sub-groups were added: professional development, and communications. The diversity of topics and sub-groups offers a qualitative glimpse of the range of areas in which teachers see room for EdTech improvement.

Guiding Questions Emerging from the Problem of Practice

Considering the factors affecting the problem of practice, the literature that pertains to it, and Cedar School District's specific context, I have identified four key lines of inquiry for this OIP. First, what digital skills should students learn? Second, how do they best learn, and what tools work best to support that learning? Third, what role do teachers play, and how can they be best equipped to teach in our digital era? Fourth, what district leadership framework and practices can best support the successful integration of EdTech in the classroom? These questions are further explored in this section.

What digital skills should students learn? British Columbia has a "Digital Literacy Framework" (British Columbia, 2014) which aligns with 21st-Century skills. It defines digital literacy as "the interest, attitude, and ability of individuals to use digital technology and communications tools appropriately to access, manage, integrate, analyze and evaluate information, construct new knowledge, and create and communicate with others" (British Columbia, 2014, p. 1). It outlines six dimensions of digital literacy: research and information literacy; critical thinking, problem-solving and decision-making; creativity and innovation; digital citizenship, digital footprint and reputation, and technology operation and concepts (British Columbia, 2014). Digital literacy is peppered across the BC curriculum, but it is not consistent at all levels and it is unclear how it is cohesively linked across the grades. For example, Grade 9 students in BC learn coding, but does coding itself create a digitally literate society, or is coding merely a part of that? Can Cedar develop a coherent, district-wide plan for acquisition of age-appropriate digital skills and digital literacy? How can Cedar best equip its students?

The impact of EdTech on student outcomes. The literature is unclear on the impact of digital tools on student outcomes, so the answers for Cedar are not straightforward. Still, there are crucial issues to be considered, including Fullan's (2013) essential conditions of engaging content, efficiency and ease of use, availability, and the problem-solving component. How can Cedar identify what content works best in the district? Who is vetting that content? How are teachers using digital tools to teach to students? Does usage of particular EdTech tools improve student outcome and contribute to well-being and social-emotional well-being? For equity of access, should the district strive for uniformity of EdTech in all its schools, or should it promote individual choice?

For equity in outcomes, how can EdTech be used to close the high school graduation rate gap between the district's indigenous and non-indigenous learners?

Teacher competency, confidence and attitudes. How can Cedar achieve the teacher competencies, confidences, and attitudes that the literature states are crucial for successful uptake of digital tools in classrooms? In an era in which schools are relying less on textbooks in class, how can leaders develop and implement policies, strategies, and PD for teachers so they are equipped with the TPACK that will best support their teaching? How can positive attitudes and confidence be promoted? How can leaders ensure appropriate and ongoing PD, and how can they ensure that that teachers consolidate their PD into meaningful ways in the classroom?

Leadership framework: Sustainably balancing the old and the new. Innovation is a key concept in our digital society. Hargreaves (2007) described an apparent paradox between the innovation and change required for a knowledge society, and the need for sustainable leadership, which implies conserving the past. But how do leaders reconcile the old with the new? How can Cedar ensure that change will be successful and sustainable? How can leaders decide which aspects of the past to preserve, and which new ones to embrace? This is important when it comes to EdTech, which is constantly changing. Harris (2011) argued that "while bright, shiny policies and innovations tend to get all the attention at the outset, without attention to proper implementation and associated capacity building they are unlikely to succeed" (p. 626). What is really needed, she argues, is sustained capacity building (Harris, 2011). This is crucial in the context of EdTech, which changes pedagogical and social structures. How can Cedar's leadership achieve capacity building and sustainable change?

Leadership-Focused Vision for Change

The purpose of this section is to outline the gap between the current situation and the planned future stage; to describe priorities that balance Cedar's interests with its stakeholders; and to discuss the change drivers that will facilitate the process.

The gap: Usage of BC Digital Classroom. Presently, there is low usage of approved digital resources in Cedar's classrooms, as evidenced by data from BC ERAC (2019) and described above. Specifically, Cedar's per-student search usage is only half the provincial average and is declining in both relative and absolute terms (BC ERAC, 2019). Those data may be symptomatic of a more extensive problem: Cedar's teachers are not generally using vetted EdTech, and instead are using a variety of non-vetted digital resources. I attended a professional development session hosted by BC ERAC in 2019; about half of the teachers in attendance had never even heard of BC Digital Classroom. I have observed an elementary school computer technician – who works in the computer lab and sees all the school's students during each year of their elementary school journey – state that students are not taught computer skills in a coherent or consistent fashion. I have observed numerous teachers say that they are not comfortable using particular resources because they have not been trained. Overall, there appears to be no effective mechanism in place that helps guide or train teachers in the use of appropriate resources. A possible result of this is that students may not be acquiring adequate digital skills throughout their K-12 years. Another concern is that public money is not being wisely spent. The reasons for the lack of use are not fully understood.

An envisioned state for Cedar would be that its students utilize resources from BC Digital Classroom at a level that is, at the very least, consistent with the provincial

average. A better scenario would be that Cedar exceeds the provincial average and becomes a "Super User District" which BC ERAC (2019) defines as a district with consistently high usage across all digital products in the BC Digital Classroom suite. The benefits of increasing usage of BC Digital Classroom could be many, and although the link between EdTech and overall student outcomes is still not well-understood, and depends on multiple factors, the use of approved resources in a deliberate, planned, and consistent manner could lead to improved digital literacy and student outcomes for Cedar's students. This could help achieve other provincial curricular goals, including development of the Core Competencies. Implicit in the achievement of this goal is that it would require teachers to be better trained, and more digitally competent and confident. This benefit could carry over to improved integration of other EdTech products.

Priorities for change: Balancing organizational and stakeholder interests. Cedar's leadership has already declared that in 2019-20, the EdTech priority is upgrading computer hardware across schools, and that other decisions related to EdTech will happen after the hardware upgrade. This is a wise choice; in a recent Dutch study, Vermeulen, Kreijns, Van Buuren, and Van Acker (2017) found that while leadership can promote teachers' use of digital tools both directly and by supporting a positive learning framework in schools, adequate IT infrastructures must already be in place.

As described above, Cedar has convened an EdTech Working Group, comprised of district management as well as principals and teachers from each school. The group met in February 2020 to identify ways EdTech could be used to enhance teaching and learning. The group cited eight broad priorities for change:

- Digital Citizenship/ Digital Literacy: Healthy media balance, district vision, capacity building for students, staff, and parents, and Applied Design, Skills and Technology (ADST) curriculum;
- Mental Health and Technology: Harm reduction model, tools to manage, depression and anxiety, and curriculum links;
- Access to Technology: In-service and collaboration, managing technology, bring your own device (BYOD), and discrepancies between schools;
- Digital Portfolios: Need for a standard (K-12);
- EdTech Ecosystem: Data-driven-decisions, streamlining offerings;
- Using Technology to Leverage Teacher Collaboration: Safe space for sharing, professional support;
- Technology and Universal Design for Learning: Accessibility, meeting learning needs; and
- Software: technology for technology's sake vs. technology for learning.

A subsequent meeting was held in April 2020 in order to further develop these ideas, and small focus groups were formed to move forward with a variety of issues. Due to other complications related to COVID-19, there will not be another meeting of the group until the start of the new school year. When Cedar eventually returns to working on developing its vision for change, it should continue to engage in stakeholder-driven discussions so it can further identify priorities and trade-offs, and it should see what lessons it can glean from the COVID-19 experience. Cawsey et al. (2016) noted that change vision is short-term and more focused than overall organizational vision, but the two should still be aligned. Cedar includes the effective use of EdTech in its strategic

plan, but it also includes equity. This means, for example, asking how EdTech could be leveraged to help improve high school graduation rates of indigenous learners. Cedar should ensure that its current change agenda is fully aligned with its overall goals.

Change drivers. Organizational change is complex and challenging (Whelan-Berry & Somerville, 2010). Change drivers are "events, activities, or behaviors that facilitate the implementation of change" (Whelan-Berry, Gordon, & Hinings, 2003). They can be internal or external to the organization, but Cawsey et al. (2016) noted that the strongest change drivers are often outside the organization. Fullan (2011, 2013) argued that there are four "wrong drivers" that can detract from the change process: external accountability; individualistic solutions; technology (because it should only play a supporting role and not a starring role); and ad hoc vs. systemic policies. Whelan-Berry and Somerville (2010) distinguished between factors that drive the need *for* change, and those that drive the implementation *of* change.

Drivers of the need for change. There are four key reasons why Cedar needs to change its practices with respect to EdTech in the classroom, and they all relate to pedagogy and how technology can support teaching. First, the worldwide digital revolution in education and society in general requires that a modern educational system adapt so as to equip students with adequate digital skills (Anderson, 2008; Schleicher, 2018; Senge, 2012). Specifically, Cedar needs to comply with the new BC curriculum, which supports EdTech-enabled education, and states that "students need opportunities to develop the competencies required to use current and emerging technologies effectively in all aspects of their learning and life" (BC Ministry of Education, 2018b, para 41). A second driver of the need for change is the 2017 change in BC MoE policy that requires

districts to evaluate and approve their own resources. This places extra responsibilities on Cedar's leaders to ensure that content is adequately vetted and utilized, and that it actually helps teaching and learning. A third driver is the general trend to reduce the utilization of textbooks in classrooms – especially at the elementary level – which means that digital resources will play an increasingly important role in classroom content. A fourth change driver is the gap in Cedar's usage of vetted digital resources compared to other districts, as evidenced by its low usage of the BC Digital Classroom.

Drivers of the implementation of change. These drivers are typically within an organization, and facilitate adoption of change initiatives (Whelan-Berry & Somerville, 2010). I have identified three key drivers in this category. First, the new EdTech Working Group is perhaps the most important. Individuals within the group have expressed a strong desire for organizational change, and as the group commences its work, it has already demonstrated energy and commitment to change, which will result in a strong vision. That vision can further drive the change. Because the group has a strong presence of teachers, and is not comprised of only management, it is incorporating stakeholder perspectives at the outset and thus has the potential to result in widespread acceptance of a change vision among stakeholders, including teachers. A second driver is the upper management; both the superintendent and assistant superintendent have expressed an interest in the issue of EdTech and how it can be effectively used in the schools. This is important because upper management can drive the agenda for general district operations, and having commitment and passion at the highest levels, while demonstrating collaborative leadership, is a positive factor. Fullan (2013) argued that leadership is the "ultimate cohesive driver" (p. 70). Third, PD or other training that provides teachers with

skills and confidence to use digital tools can be considered change-related training (Whelan-Berry & Somerville, 2010) and thus could also be an important change driver. The more confident teachers become with EdTech and the more benefits they derive from the usage of digital tools, the more likely they will be to further support change initiatives related to the amplification of technology.

Organizational Change Readiness

The need for change in Cedar has been identified, both by district personnel and by evidence of low usage of certain EdTech products. Hardware has just been upgraded across the district. A new and energetic EdTech Working Group has convened to discuss challenges, successes, and new initiatives related to EdTech, as well as specific themes of interest. A change vision is emerging from the work of this group, but the change plan and its timeline is currently unknown. The purpose of this section is to examine to what extent Cedar is ready for change. It explores readiness by applying the Judge and Douglas (2009) model and completing a readiness questionnaire designed by Cawsey et al. (2016). Finally, it examines forces that shape the change process.

Cedar's readiness for change. Cawsey et al. (2016) noted that readiness depends on many factors. One model for determining an organization's readiness was developed by Judge and Douglas (2009). They identified eight dimensions of readiness: trustworthy leadership, trusting followers, capable champions, involved middle management, innovative culture, accountable culture, effective communications, and systems thinking (Judge & Douglas, 2009, as cited in Cawsey et al., 2016). Each is discussed below.

Trustworthy leadership. Determining this depends on precisely how one defines leadership, but if the focus is on senior management in the district, Cedar is in a good

position to embrace change. Leadership's establishment of the EdTech Working Group, and the expressed goal of integrating EdTech in a meaningful and effective way for teachers demonstrates commitment and therefore engenders trust among stakeholders. Moreover, leadership's exemplary manner in which it has handled the COVID-19 response has resulted in considerable trust and respect among stakeholders.

Trusting followers. The followers are primarily teachers. Although teachers have acquired personal power and emergent leadership roles because of their expertise in EdTech, they are still followers who are subject to decisions made by management. It appears that if senior management continues to engage in transformational leadership in which the stakeholders are given a voice, then trust should naturally follow.

Capable champions. Although the EdTech Working Group is in its infancy, there have already been several champions identified. One of Cedar's district teacher leaders, whose focus is on curriculum and innovation, has been working to engage in outreach with other teachers to seek their feedback. She has worked as a tireless conduit to senior management, has gained the trust and respect of both teachers and management, and is a champion for change. As one of the leaders of the EdTech Working Group, her role will be key in the development of the change vision and in the change process itself. The assistant superintendent, who enthusiastically listens to input from teachers, is a strong champion for change. There are also many individual teachers who are capable champions for change, both inside their classrooms and in a broader district context.

Involved middle management. Building on the strengths of the highly capable, cooperative, and responsive district teacher leader described in the previous section, there is a good communication channel between Cedar's teachers and senior management. This

bodes well for organizational change readiness, and will be more fully determined when the EdTech Working Group's activities resume in the coming months.

Innovative culture. The superintendent prides himself on being an engaged leader who is innovative. He maintains an active blog, which he promotes to all stakeholders in the district. This sets the stage for an overall positive feeling of innovation and modernization. At the time of the initial EdTech Working Group meeting, many participants expressed enthusiasm for innovation. Because of the COVID-19 crisis and the suspension of in-class instruction in Spring 2020, all the district's teachers had to embrace innovation in teaching by moving their classrooms online. These rapid changes, while disruptive, may facilitate a future path for innovative thinking across the district.

Accountable culture. Because of the structure of the district's operations, there are checks and balances in place that result in a level of accountability in terms of expenditures. Among some stakeholders there may be residual feelings of a lack of accountability and empathy that relate to labour relations, and those emotions can cloud stakeholder perceptions of management's ability in other domains. The accountability may improve as stakeholders witness the district's exemplary response to COVID-19.

Effective communications. The district has a track record of good communications with employees and stakeholders, via its website, email notices to all stakeholders, and via communication between the schools and families. While these communications may not always fully disclose the nature of an issue, the district is generally seen to be open and effective with its communications. Particularly at the onset of the COVID-19 crisis, the district was seen to have been highly communicative.

Systems thinking. This concept is addressed throughout this OIP. Systems thinking allows the organization to understand interdependencies and the big picture that extends outside itself. In Cedar's case, systems thinking will involve considering how change is affected by internal factors as well as external ones, like provincial curriculum requirements, culture and expectations, and stakeholder relations.

Cawsey et al. (2016) suggested a 36-question "readiness-for-change" questionnaire, which was completed for Cedar and is attached in the Appendix. Given the Judge and Douglas (2009) analysis of Cedar's current context, and the readiness-for-change score of 23 (on a scale of -10 to 35), it seems well-positioned for change.

Factors that shape Cedar's organizational change readiness. The need for change in Cedar has been identified and the district is ready. Change will require active efforts and will need to begin from a state of organizational readiness. First, Cedar can ensure that its vision for change is aligned with requirements of the BC provincial curriculum. Second, Cedar should ensure that any changes that affect teachers are made with input from teachers, and are consistent with the goals of BCTF. Third, Cedar should ensure that any decisions take into account privacy concerns and are consistent with provincial legislation. Fourth, Cedar should communicate the need for change, and its change vision, to all stakeholders even before a precise path for change is developed. Finally, Cedar's leaders should understand that there may be resistance from teachers or perhaps students and parents, especially if there are privacy concerns. If strong enough, such resistance can impede organizational readiness.

Chapter One Conclusion

This chapter has presented the leadership problem of practice that forms the basis for this Organizational Improvement Plan: the lack of a framework and support for teachers to integrate educational technology in classrooms in a school district in British Columbia. This problem has resulted in EdTech resources being under-utilized and missed opportunities in teaching and learning. The chapter has summarized the context of Cedar School District, which serves as a case study for the problem. It has described the theoretical lens through which the problem and possible solutions will be viewed. It has presented the concept of an "EdTech ecosystem" in which a variety of interdependent factors affect the efficacy of technology in education. This chapter has also explored the literature on educational technology, and has focused on four themes: the relationship between EdTech and the acquisition of digital skills; the impact of EdTech on student outcomes; the importance of teachers' Technical, Pedagogical, and Content Knowledge (TPACK); and the key role that strong leadership can play in supporting effective frameworks for EdTech integration in education. This chapter has described the vision for change and has identified key factors that will drive the change process. Finally, it examined Cedar's organizational change readiness, and concluded that Cedar is in a good position to embark on a change plan. Chapter Two explores the planning and development components of a change plan.

Chapter Two: Planning and Development

Chapter Two encompasses the planning and development elements of a change plan for how leaders in Cedar School District could provide a framework and supports to help teachers to successfully integrate EdTech in K-12 classrooms, with a goal of improving teaching and learning. This chapter is organized into the following sections: Leadership Approaches to Change; Framework for Leading the Change Process; Critical Organization Analysis; Possible Solutions for Addressing the Problem; and Leadership Ethics and Organizational Change. It ends with a brief conclusion.

Leadership Approaches to Change

This OIP employs a hybrid transformational leadership model, which is designed to align with Cedar School District's existing approaches, and to fit the particular problem of practice, which is characterized by a significant shift in power from formal leaders to emergent leaders – the teachers. The type of organizational change needed is characterized as "adapting" as defined by Nadler and Tushman (1989). That is, the problem requires incremental changes in response to an external environmental change (Nadler & Tushman, 1989). The external change is the rapid rise of technology and its corresponding infusion into the educational process over the past two decades, coupled with increasing expectations that students will be equipped with 21st-Century skills.

The leadership approach in this OIP is built on the foundations and principles of Appreciative Inquiry (Cooperrider, 1986) and incorporates philosophies of servant leadership (Greenleaf, 1970). Kouzes and Posner's (2007) Five Practices of Exemplary Leadership® are also integrated into the process for change because that is Cedar's stated approach. Each of these elements is described in this section.

Appreciative Inquiry. Appreciative Inquiry (AI) is a positive, inclusive, narrative-driven approach to transformative change, and has been successfully embraced by a variety of organizations, including corporations, governments, non-governmental organizations, health care institutions, educational institutions, and school systems (Ludema, Whitney, Mohr, & Griffin, 2003). AI is "the cooperative, coevolutionary search for the best in people, their organizations, and the world around them. It involves systematic focuses on the positive elements already in place in an organization" (Cooperrider & Whitney, 2005, p. 8). Watkins and Mohr (2001) suggest that AI could be considered "*a philosophy and orientation to change* that can fundamentally reshape the practice of organizational learning, design, and development" (p. 21). AI was founded upon the principle of asking questions to find root causes of success – not failure – within an organization (Ludema et al., 2003). This approach facilitates deep reflection throughout the change process, and provides a framework for effective engagement in reflective practices (Cawsey et al., 2016). Storytelling is fundamental to AI (Richards, 2016). Participants tell stories of their experiences, and that forms a basis for change.

At the centre of the AI model is a positive core of energy. This core embodies strengths such as achievements, opportunities, technical assets, innovations, best practices, positive emotions, wisdom, core competencies, vision, traditions, values, social capital, collective spirit, alliances and partnerships, and relational resources (Cooperrider & Whitney, 2005). AI accentuates the positive starting point, the basis upon which successful and sustainable change can occur. In turn, the model promotes positive change, which Cooperrider and Whitney (2005) defined as "any form of organizational change, redesign, or planning that begins with a comprehensive inquiry, analysis, and

dialogue of an organization's positive core, that involves multiple stakeholders, and then links this knowledge to the organization's strategic change agenda and priorities" (p. 12).

AI is characterized by a "4-D" cycle of Discovery, Design, Dream, and Destiny (Cooperrider & Whitney, 2005). This process provides a framework for change that encompasses the model's core principles. Central to this process is an "affirmative topic choice" which is the agenda for change (Cooperrider & Whitney, 2005, p. 17). The AI cycle is presented in Figure 1.

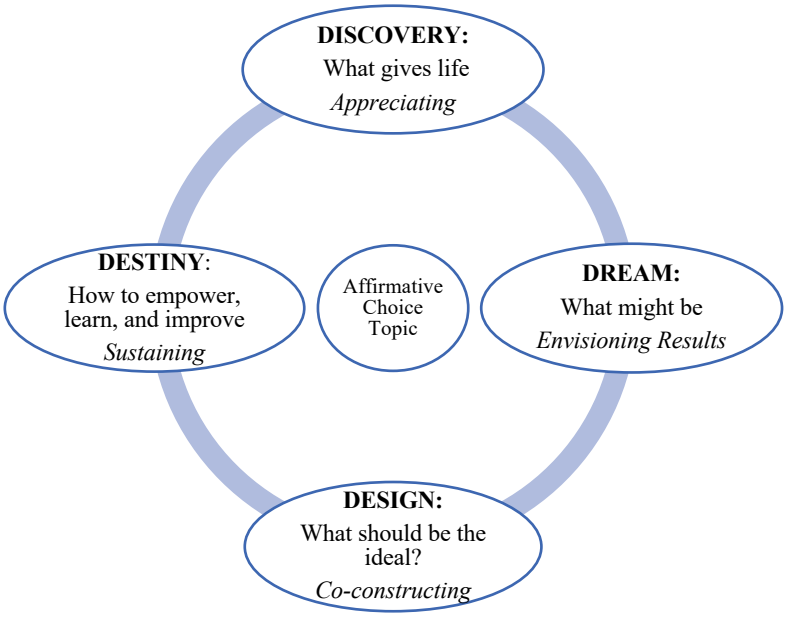

Figure 1. Appreciative Inquiry Cycle. Adapted from Cooperrider and Whitney (2005).

One of the most appealing elements of AI in the context of this OIP is its inclusivity: it engages all stakeholders in a highly participatory and cooperative learning process (Cooperrider & Whitney, 2005). This is especially relevant because of the way power is distributed in Cedar, in which teachers make many – if not all – of the decisions related to EdTech in the classroom. AI fits well with these circumstances, because it

values all relationships and it "levels the playing field and builds bridges across boundaries of authority and power" (Cooperrider & Whitney, 2005, p. 56). Moreover, Cawsey et al. (2016) noted that "there can't be a 'wrong' understanding," (p. 267) in AI, which further validates the perspectives of all stakeholders. Finally, AI works particularly well in emergent systems because it incorporates an improvisational capacity (Cooperrider, Whitney, & Stavros, 2003). Despite the positive elements of AI and its good fit with my PoP, there are shortcomings (described in Chapter 3). I am not using AI exclusively; rather, I am incorporating its principles into my approach, and applying it in conjunction with other forms of diagnosis and evaluation in the change process.

Servant Leadership. Servant leadership focuses on the follower, not the leader. First developed by Greenleaf (1970), servant leadership incorporates a sense of social responsibility. Servant leadership is non-hierarchical (Maynard & Mehrtens, 1993), and it can address the concerns of a range of stakeholders. It has a strong moral purpose, because the leader places the interests of others first. According to Northouse (2019) servant leadership is ethical. Spears (2010) cited ten characteristics of servant leaders: listening, empathy, healing, awareness, persuasion, conceptualization, foresight, stewardship, commitment to growth of people, and building community.

Although the body of peer-reviewed literature on the efficacy of servant leadership has been relatively slim (Northouse, 2019; Yukl, 2006), new research has been emerging recently. In a meta-analysis of servant leadership, Parris and Peachey (2013) found that servant leadership helps organizations and also improves outcomes for individuals. They also cited several empirical studies that indicated that servant leadership affects followers' well-being because it creates a positive work environment

(Parris & Peachey, 2013). Taylor, Martin, Hutchinson and Jinks (2007) argue that "servant leadership, much like transformational leadership theory, transforms followers by modelling effective leadership behaviour, by enabling others to move beyond what they thought possible and by encouraging others to make extraordinary contributions to the organisation" (p. 416). Taylor et al. (2007) also found that school principals who identified with servant leadership were rated more highly by their teachers across the five leadership practices of Kouzes and Posner (2007).

Kouzes and Posner. Leadership pioneers James Kouzes and Barry Posner began collaborating on researching leadership in 1983. They have consistently found that "leadership opportunities are everywhere" (Kouzes & Posner, 2007, p. 8) and they argue that "when the leader in everyone is liberated, extraordinary things happen" (p. xii). Kouzes and Posner developed the now-trademarked Five Practices of Exemplary Leadership®, which focus on behaviours and practices, and are not related to personality. They argued that behaviour earns a person respect, and that leadership is learned, which means that anyone can be a leader (Kouzes & Posner, 2007). Moreover, they stress the importance of relationships in leadership, emphasizing the importance of people, and the relationship of service to purpose (Kouzes and Posner, 2007), aligning their model with servant leadership, as well as the specific power dynamics in Cedar, with teachers as emergent leaders. The Five Practices of Exemplary Leadership® are: Model the Way; Inspire a Shared Vision; Challenge the Process; Enable Others to Act; and Encourage the Heart. These practices are paired with "Ten Commitments" of Leadership, and together, these set the standards for an approach to change. They are summarized in Table 1.

Table 1

Kouzes & Posner's Five Practices and Ten Commitments of Leadership

Practice	Commitment
Model the Way	1. Clarify values by finding your voice and affirming shared ideals. 2. Set the example by aligning actions with shared values.
Inspire a Shared Vision	3. Envision the future by imagining exciting and ennobling possibilities. 4. Enlist others in a common vision by appealing to shared aspirations.
Challenge the Process	5. Search for opportunities by seizing the initiative and by looking outward for innovative ways to improve. 6. Experiment and take risks by constantly generating small wins and learning from experience.
Enable Others to Act	7. Foster collaboration by building trust and facilitating relationships. 8. Strengthen others by increasing self-determination and developing competence
Encourage the Heart	9. Recognize contributions by showing appreciation for individual excellence. 10. Celebrate the values and victories by creating a spirit of community.

Note: Adapted from Kouzes and Posner, 2007, p. 26.

This model is a type of transformational leadership. Transformational leadership (TL), a term first coined by Burns (1978), is "characterized by a leader who works with subordinates to identify needed change, create a vision to guide the change through inspiration, and execute the change in unison with committed members of a group" (Anderson, 2017, p.1). In the theoretical TL model, "organizational members become highly engaged and motivated by goals that are inspirational because those goals are associated with values in which they strongly believe—or are persuaded to strongly believe" (Leithwood & Sun, 2012, p. 388). TL emphasizes the role of the leader in "a process whereby a person engages with others and creates a connection that raises the level of motivation and morality in both the leader and the follower" (Northouse, 2019, p.

174). Taylor et al. (2007) argue that servant leadership is an extension of TL, which brings together the elements of this approach. Unlike other models of TL which often rely on a leader's charisma or personality, Kouzes and Posner's is all about practice (Northouse, 2019, p. 187). At the foundation of the model is credibility of the leader, and it recognizes that leadership is reciprocal (Kouzes & Posner, 2007).

A hybrid approach. This OIP explores ways that educational leaders can support teachers in the process of integrating EdTech into K-12 classrooms. The problem is characterized by a shifting of power from formal leaders to emergent leaders. Thus, an approach to change that embodies the power dynamics specific to this problem of practice is required. The combination of Appreciative Inquiry, servant leadership, and Kouzes and Posner's (2007) Five Practices can address the problem in a synergistic manner consistent with Cedar's transformational leadership practices and the PoP. Systems thinking is present throughout the process. The alignment of these approaches and philosophies is explored alongside the change framework in the next section.

Framework for Leading the Change Process: The Change Path Model

This OIP uses the four-stage Cawsey et al. (2016) Change Path Model as a framework for leading the adaptive change required in Cedar. The Change Path Model will be intertwined with the four-stage Appreciative Design 4-D model. While each phase does not correspond exactly, and although the underlying principle of AI is different than the traditional change models, there are some key similarities and principles that allow both to be utilized. Cooperrider and Whitney (2005) argued that the basic assumption of a problem-solving approach is that an organization is a problem that needs to be solved, while AI assumes that an organization is a "mystery to be embraced" (p. 13). I argue that

the problem that needs to be solved – which is not the organization itself, but the circumstances – can be tackled using AI principles to include all stakeholders and to more fully diagnose the problem. The AI concept that change initiatives are approached within a positive core framework is not, in fact, inconsistent with the Change Path Model. The combined framework provides a trajectory for change that aligns with key elements of my hybrid transformational leadership approach.

Another model I considered was Kotter's (1996) Stage Model of Organizational Change, which was initially compelling because of its detail and comprehensive nature, but I disliked the idea of an ongoing sense of urgency. In an article about Los Angeles's disastrous iPad tale[4] – a case study of what leaders should not do in EdTech – a professor was quoted as saying "[the superintendent's] style was typical of so-called reformers who sound alarm bells over the state of public education and claim the emergency demands radical change" (Iasevoli, 2014). This sounded alarm bells for me, leading to a principle that seems valid: there need not be breathless urgency or a crisis to prompt change, and a lack of urgency does not imply that leaders can be complacent with the status quo. In the case of this PoP, it is evident that the problem is not an emergency; rather, it is a systemic shortcoming, spawned by a lack of a framework to deal with an externally-imposed change, which ultimately leads to sub-optimal outcomes. The Change Path Model thus seems to be a better approach than Kotter (1996) for the change Cedar requires.

[4] In 2013, the Los Angeles Unified School District (LAUSD) – the second-largest district in the United States, with a student population of over 700,000 – rolled out a US $1 billion plan to equip each student in the district with an iPad, loaded with the curriculum supplied by Pearson, a private company. Unfortunately, LAUSD did not have a plan for how the tools would be used, a vision for how the materials would support learning, or teacher training prior to the rollout (Culatta, 2019). The results were disappointing and led to the superintendent's resignation, a lawsuit between LAUSD and Apple and Pearson, and a federal probe into the program.

The Change Path Model is a refined, detailed, comprehensive approach that embeds a variety of components from other models. It combines both process and prescription (Cawsey et al. 2016); and ultimately, it fits my problem of practice and a plan for improvement. It incorporates vital components of my hybrid approach, such as the need to consider stakeholder emotions, and it allows for alignment with the positive-core elements and inclusivity of AI.

There are four phases to the Change Path Model: Awakening, Mobilization, Acceleration, and Institutionalization (Cawsey et al., 2016). Below is a brief outline of the phases, possible considerations for Cedar in the framework, a description of how AI's principles and 4D framework of Discovery, Dream, Design, and Destiny are incorporated, and how Kouzes and Posner's (2007) principles can be embedded.

Awakening. This phase involves acknowledgment and understanding of the problem in context and sets the stage for successful change. Why does Cedar need to change? Is it because it lags far behind other districts in its BC Digital Classroom use, or is it because its use is declining, or is it because students are not learning how to use digital tools? Is it because teachers have expressed concern in a number of areas of EdTech? Is there concern about Cedar's performance on standardized provincial tests? If so, what is the performance gap? And how is it related to EdTech? What is the future vision for change? While this phase involves a lot of contextual analysis, Cedar will also need to look to other case studies of improving EdTech integration in schools, in order to develop a coherent vision, which is also part of this phase (Cawsey et al., 2016). Cedar will need to question whether those case studies have relevance to its own context, and how those relate to the positive core change of AI. This phase of asking questions is

consistent with AI's inquiry-driven approach, framed around the question of how leaders can improve EdTech integration from a positive core perspective. Leaders need to work with stakeholders to ensure that they understand both the need for change and the vision for change. This aligns with Cedar's approach to collaborative leadership, driven by AI principles, and focusing on a positive approach as a change driver. Kouzes and Posner's (2007) practice of Model the Way could be incorporated during Awakening.

Mobilization. In the next step, leaders leverage and position systems to achieve change. What are the resources, both human and technical? What are the opportunities and constraints? Where are the gaps that are causing problems, and how can they be filled? This stage involves a thorough understanding of the power dynamics, and the ability to use those dynamics to shape sustainable change. Whose responsibility is it to spearhead improvements in EdTech integration? According to BC ERAC, it is each district's responsibility to encourage use of the resources. But is it the superintendent, principal, teacher, IT personnel, or Learning Commons teacher who is responsible? How can BC ERAC facilitate this? And what about classroom content? According to the Ministry of Education, school boards are responsible for vetting their own educational resources (BC Ministry of Education, 2017b). There is currently no framework or process in Cedar for doing this with EdTech, and consequently, there is a complex story unfolding in classrooms, with teachers choosing content, often with little or no dialogue with anyone else. Cedar's assigned leaders will thus need to understand how power is shifting into the classrooms because of the way teachers, as emerging leaders, are directly accessing digital content without district vetting. Also, identifying change agents, and understanding and utilizing the relationships between power brokers – both assigned and

emergent – and stakeholders will be key. Fullan (2013) identified teachers as change agents in the context of technology in the classroom. Thus, teachers are change agents and power brokers, and they are the stakeholders whose capacity must be built accordingly. Sustainable change will hinge on effective implementation of the change plan and ongoing capacity building.

During the Mobilization stage, Cedar could focus on applying the first two phases of the 4-D approach. Collective strength, according to Cooperrider and Whitney (2005) has the power to transform organizations. Starting with the Discovery stage, which mobilizes the entire system by involving all stakeholders (Cooperrider & Whitney, 2005), Cedar could identify the components of the positive core. What are Cedar's positive elements and capacities for change? This can be gleaned from stakeholders by employing the "appreciative interview," which entails an investigation of the root causes of success (Cooperrider & Whitney, 2005). According to Cedar's current strategic plan, the district already utilizes stakeholder interviews and surveys. The focus of the AI interview is not on what is negative, but what is positive. The next part of the AI cycle, Dream, presents an opportunity for envisioning the future and aligning the organization with its positive core (Ludema et al., 2003). It can be an iterative process and should include "blue-sky thinking" – creative brainstorming in which the sky is the limit. Blue-sky thinking is especially important in the context of educational technology, where rapid change creates both opportunity and uncertainty. This process helps articulate the dream. That strategic vision for the future is built upon positive narratives from the past (Cooperrider & Whitney, 2003). This phase can incorporate Kouzes and Posner's (2007) practice of Inspire a Shared Vision, in which possibilities are imagined and a vision is created.

Acceleration. This is the phase in which the change process speeds up. The change journey has started and the plan is being implemented. Leaders should use all available tools and supports to build momentum. At this stage, there may be transitions to manage, and milestones to celebrate (Cawsey et al., 2016). Leaders also need to define the best balance of human and technical resources in the Change Path Model, and in AI, this is achieved by stakeholder engagement and positive questions in the Dream phase. Because the process is iterative, questions should be asked throughout all phases. In the AI Design phase, stakeholders are continually encouraged to challenge the status quo and to ask: "What would our organization look like if it were designed in every way possible to maximize the qualities of the positive core and enable the accelerated realization of our dreams?" (Cooperrider & Whitney, 2003, p. 29).

As leaders and stakeholders embark on the change design, they also need to reconcile innovation with sustainability (Hargreaves, 2007). During the Acceleration phase, Cedar's leaders may learn what is proving to be sustainable and what is not, and they can adjust their trajectory accordingly to ensure that change proceeds in a forward direction. Cawsey et al. (2016) noted that conditions can change unexpectedly, and leaders must adapt. The need for leaders to adapt and innovate has been explored throughout the literature (Schleicher, 2018). This is especially true in the context of ever-evolving EdTech, which can present exciting opportunities in education, but also can create confusion and a lack of clarity for stakeholders. Cawsey et al. (2016) argued that the show must go on during the change process, so efforts will need to be made to ensure minimal disruptions to teaching and learning. This phase can be facilitated by Kouzes and Posner's (2007) Challenge the Process, in which opportunities are seized and risks taken;

and Enable Others to Act practice, in which collaboration, trust and relationships are fostered.

Institutionalization. In this final phase, the change plan is continuing, and it should be monitored in a variety of ways, which are linked to the original goals and vision of the change plan – the Dream. Tools for measuring and monitoring change are explored more fully in Chapter Three. During the Institutionalization phase, according to Cawsey et al. (2016) the leader should "track the change periodically and through multiple balanced measures to help assess what is needed, gauge progress toward the goal and to make modifications as needed and mitigate risk" (p. 55). Understanding what aspects of a change process are successful can help Cedar's leaders identify and implement new components or adjustments. For example, if a particular program is found to be under-utilized, or unsatisfactory in teacher or student surveys, then district leaders need to know that. The Institutionalization phase corresponds to the Destiny phase in AI, in which the "affirmative capability" of the organization is strengthened to sustain momentum for continued change (Cooperrider & Whitney, 2005). During this final phase, Kouzes and Posner's (2007) principle of Encourage the Heart can be applied.

In summary, AI principles can be applied alongside the Change Path Model in a manner consistent with the elements of both, and inclusive of Kouzes and Posner's (2007) Five Practices. Servant leadership principles, systems thinking, metacognition and empathy shape the overall approach. These principles and practices can be used throughout the change process: in diagnosis, implementation, and evaluation. The alignment of the leadership approaches and change framework is presented in Figure 2.

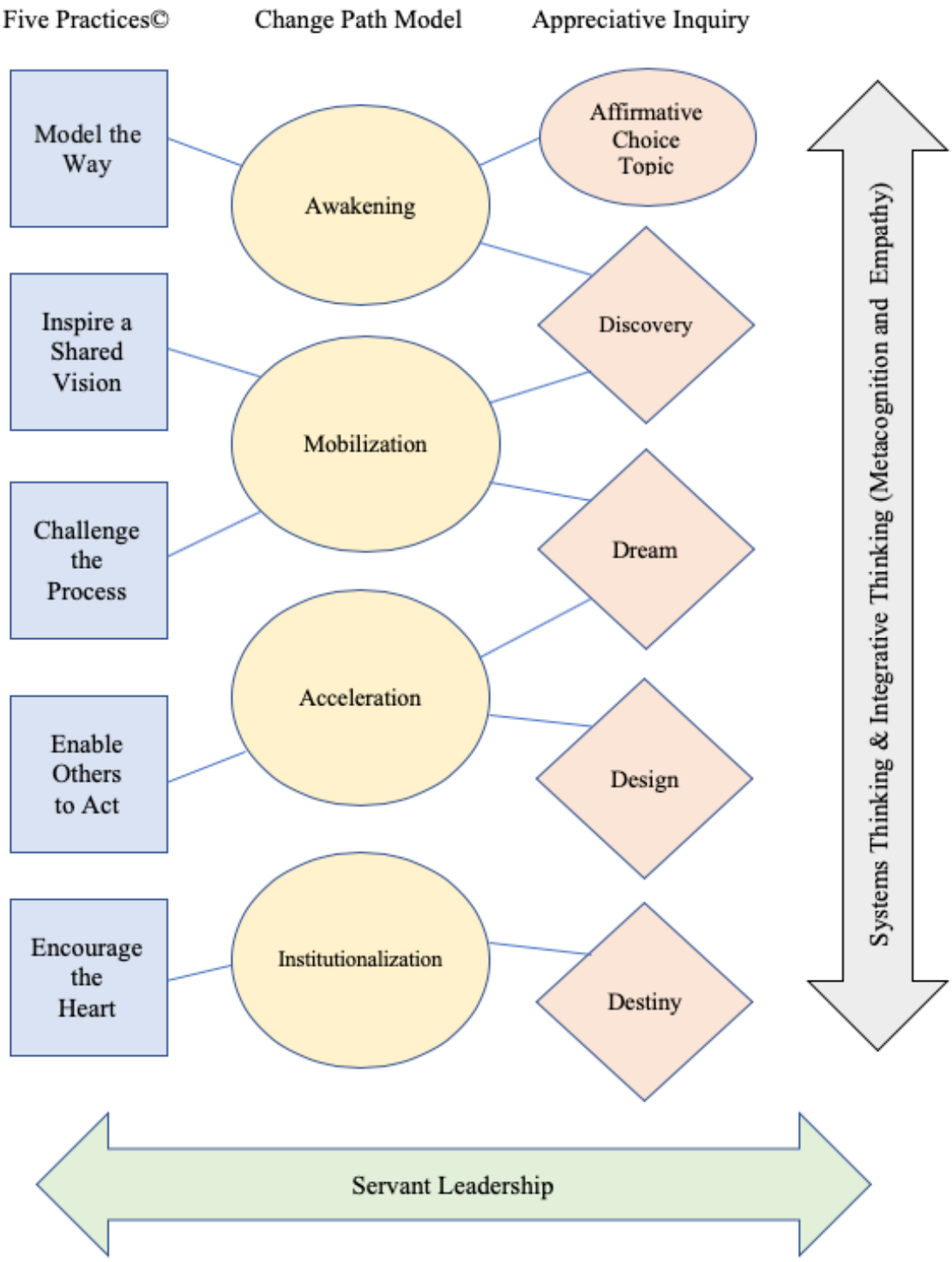

Figure 2. A Hybrid Transformational Leadership Approach for Enhancing the EdTech Ecosystem. Adapted from Five Practices© (Kouzes & Posner, 2007); Change Path Model (Cawsey et al., 2016); Appreciative Inquiry (Cooperrider & Whitney, 2005); Systems Thinking (Senge, 1990); Integrative Thinking (Martin, 2009); Servant Leadership (Greenleaf, 1970).

Critical Organizational Analysis

It is important at the outset for Cedar's leaders to understand *what* needs to be changed, so that change efforts can be focused accordingly. Does Cedar need more computers? More software? More subscriptions to online learning tools? More training for its teachers? Professional learning communities? More technology specialists in schools? What is the precise problem?

Like the leadership approaches and the overall framework for change, there are numerous models for diagnosing organizational problems, and the type of emergent change that Cedar is facing requires careful application of appropriate models. Although the AI model in its purest form does not include the identification of a "problem" – rather, it focuses on an "affirmative choice topic" – AI principles can nevertheless be used successfully in conjunction with more traditional diagnostic models. AI is particularly important because the expertise in terms of what is actually happening in with EdTech in classrooms belongs not to the superintendent or other formal leaders; it belongs to the teachers – the emergent leaders. After careful consideration of a variety of diagnostic tools, I decided to utilize a hybrid model of AI and Nadler and Tushman's (1989) Congruence Model for identifying what needs to change in Cedar.

Appreciative Inquiry as a diagnostic tool. Watson (2013a) argues that utilizing AI as a diagnostic tool helps ensure that the organization's strategic priorities are a foundation for change. AI also provides a way for all voices to be respected and heard, which improves inter-organizational dialogue, as well as reducing future cynicism among stakeholders (Watson, 2013)a. In her case study of managers in higher education organizations in the UK, Watson (2013a) found that AI facilitated a high level of

engagement in management, and moreover, it nurtured relationships, motivation, and innovative problem-solving. These findings are important when we consider the nature and structure of this OIP's problem of practice, with the expertise and information resting in the experience of hundreds of different teachers in the district, and not just in the upper echelon of formal leaders. AI as a diagnostic tool can facilitate a collaborative ethos (Watson, 2013a) which is needed to tackle this problem of practice. Precisely because AI actively seeks input from a range of stakeholders, its use as a diagnostic could hold the key to successful, sustainable change in the area of EdTech in Cedar.

Cedar has already embarked on a diagnosis of the problem through an Open Space Technology meeting of the EdTech Working Group. This approach has generated several areas of initial concern from stakeholders, as described in Chapter One. However, it is acknowledged that there may a sample-selection bias in the participants in the group – only one or two teachers from each school was included, and those who were selected already had an inherent interest in EdTech – and involving a range of stakeholders, including students, via AI may yield additional or different information that could be crucial in the change process. Moreover, if Cedar wants to align its change plan with its overall strategic plan, it could broaden its outreach to include all teachers, all support staff, and all students in the district in the change process by embracing AI practices.

An AI diagnosis involves a rigorous, organization-wide inquiry, and it may involve more than one round of questions. An AI Summit is one way to begin the process, and it could be used by Cedar as a diagnostic tool. Ludema et al. (2003) have described the benefits of AI Summits: they build organizational confidence, they allow for rapid access to information, they encourage a "total organizational mindset," they lead

to “inspired action” and they provide a framework for positive change (p. xiii). They focus on common ground rather than conflict management, and invite whole-system participation (Barrett & Fry, 2005). It is typically held in a physical space, but in COVID-19 times could be held remotely or digitally. By asking questions it can generate valuable data that can in turn be used for evidence-based decision-making. The success of the initial Open Space Technology meeting indicated how much information can be garnered in a relatively short period of time, but students were excluded. The AI Summit could involve all the teachers and all the students in the district. Cedar could identify what strengths and opportunities with respect to EdTech exist among its stakeholders. This could inform the trajectory for the Change Path Model by solidifying what resources are available to make necessary changes, and what gaps exist. It could identify equipment and processes that have been successful in the context of EdTech, or people who have contributed something positive – the so-called “root causes of success” (Ludema et al., 2003). It could also identify what needs to change. Framing appropriate questions would be key to this process. For example, if one question was “What digital tools do your students enjoy?” then Cedar could consider how responses would shape the EdTech plan. If the district decides to strive for the goal of improving equity of outcomes, and improving indigenous learners’ experiences, it would need to design questions in consultation with indigenous educators.

At the heart of AI is the idea of positive storytelling. However, there is currently no framework in place that encourages teachers and students throughout the district to tell success stories of their classroom experiences with EdTech. According to Richards (2016), storytelling can build relationships within an organization, facilitate the co-

authoring of an organization's future, reframe the change narrative, and encourage engagement. Like questions, storytelling could help people overcome their personal resistance to change (Richards, 2016). It could also be an important diagnostic tool. AI principles and practices could thus be a critical part of Cedar's organizational diagnosis, could help inform leadership's thinking, could reach out to a wide range of stakeholders, could bring indigenous voices into the conversation, and could supplement a more traditional approach to an organizational analysis.

Nadler and Tushman's Congruence Model. Nadler and Tushman's (1989) Congruence Model can provide a rigorous and appropriate means for diagnosing Cedar, as it meshes well with the Cawsey et al. (2016) Change Path Model. As an "open systems" model, the Congruence Model is interactive with environmental factors, and provides the systems thinking ecosystem approach that I subscribe to in this OIP. It allows exploration of interrelated and interdependent factors, which will help to diagnose and analyze my complex PoP in the context of Cedar. The Congruence Model is appealing because it does not dictate one particular way to organize, and it specifically acknowledges informal processes, structures and cultural context (Nadler & Tushman, 1989), which will be important to consider in Cedar's case. The model focuses on four parts of the change process: work, people, formal structures and processes, and informal structure and processes. It then analyzes the alignment – or congruence – between them, the external environment, and the organizational context (Nadler & Tushman, 1989). The higher the congruence, the more effective change is likely to be.

Diagnosing a problem, according to Nadler and Tushman (1989), requires organizational and environmental data collection, integration and analysis. Because the

OIP format does not allow original research, I need to examine extant data from Cedar, provincial sources, and BC ERAC to perform a critical organization analysis using Nadler and Tushman's (1989) framework. A visual of Nadler and Tushman's (1989) Congruence Model for Cedar is presented in Figure 3.

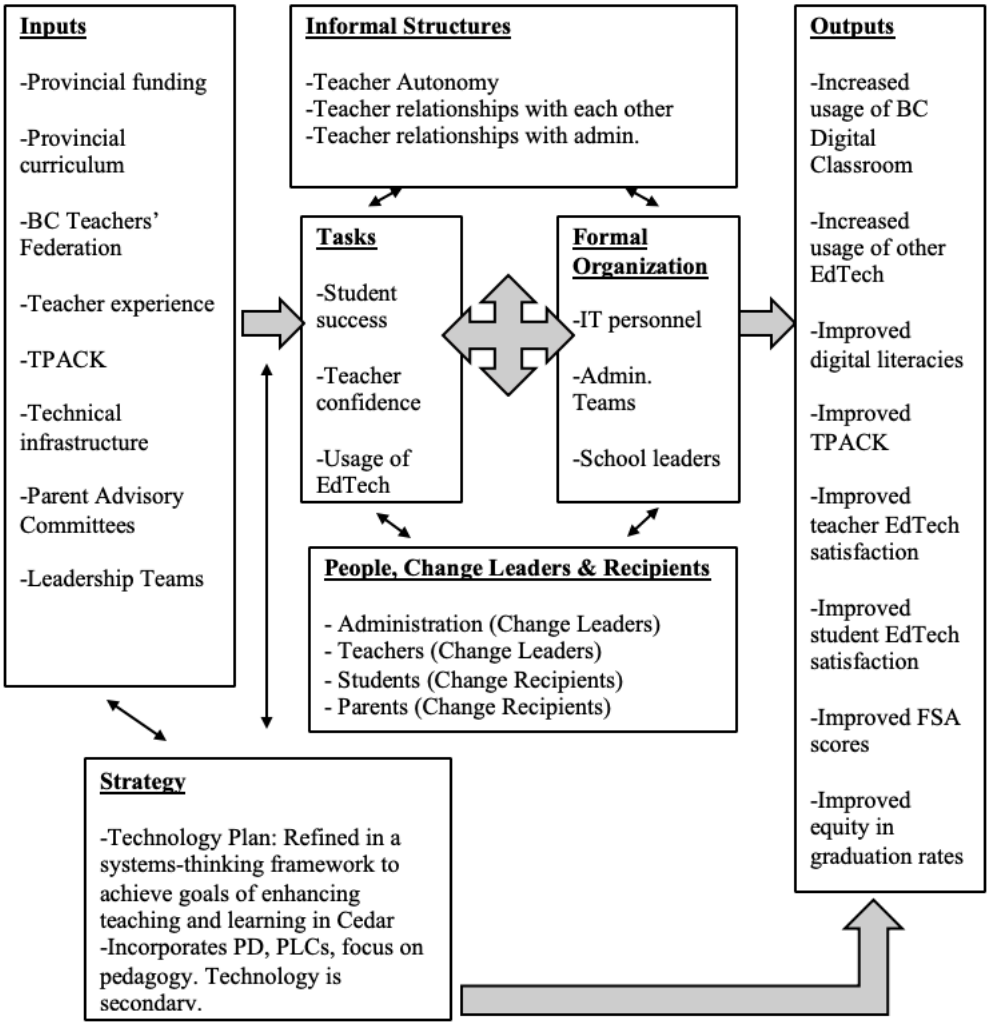

Figure 3. Organizational Analysis of Cedar School District according to Nadler and Tushman's (1989) Congruence Model. Adapted from Cawsey et al. (2016).

Input factors. The Congruence Model's input factors refer to environmental factors, resources, and the organization's culture and history. As described in Chapter One, Cedar is a small, public school district in BC and serves a diversity of communities. Its operations are funded mainly by the provincial government and are based on a per-student formula. Thus, any initiatives must be consistent with budgetary allocations. Cedar is operating in the midst of the most sweeping and profound technological change in education: the widespread use of the internet in classrooms. This has happened over the past two decades, and has forced adaptive change on Cedar.

Cedar's approximately 500 teachers belong to a branch of the BC Teachers' Federation, a powerful union, while its support workers belong to a branch of the CUPE union. This is relevant because collective bargaining agreements dictate working conditions for teachers and non-management staff, and thus any change initiative must consider those agreements. For example, the district could not mandate a skills training program that required teachers to attend mandatory workshops. Cedar also must respect a certain degree of teacher autonomy. The knowledge, skills, experience, and demographics of its teachers are also key factors that influences the organization. With the exception of the most recent graduates from teachers' college, most of Cedar's teachers have not received formal instruction in how to incorporate EdTech into their classroom practice. Thus, most have acquired those skills on the job and largely on their own initiative, resulting in significant differences in teachers' TPACK. Such differences can, in turn, lead to variations in instructional culture between schools.

Cedar's teachers are responsible for delivering the BC provincial curriculum. This is an important point to note: as it stands now, the provincial curriculum does not have a

clearly-delineated set of learning outcomes for knowledge related to computers or acquisition of digital skills. Computer skills are grouped under the large umbrella heading of Applied Design, Skills, and Technology (ADST), which includes skills such as digital literacy and internet safety, but also entrepreneurship, woodworking, metalworks, and food studies. From K-5, the ADST curriculum does not specify any content; in Grades 6-9, ADST is meant to be "exploration years" and content is fluid, and in Grades 10-12, students can specialize and choose courses in subjects such as home economics, and thus a student can graduate without taking any computer classes in high school (BC Ministry of Education, 2020). Moreover, with the exception of the suite of digital products in BC ERAC's BC Digital Classroom (the usage rates of which are low across the province) there are limited provincially-available digital learning materials and guidance for teachers in how to use digital materials. The result is that teachers are accessing their own EdTech products without vetting, as described in Chapter One. This ignores the pedagogical importance of the problem: how are these tools actually improving teaching and learning? It has also led to significant variations in classroom use of EdTech and student outcomes, which has ethical implications.

The technical infrastructure in terms of hardware, software, and subscriptions to EdTech products is also an input factor. Cedar just completed a long-awaited and much-needed rollout of new equipment in early 2020, and schools across the district are now similarly-equipped. However, software and subscription purchases decisions are made by individual schools, and thus, one elementary school might have a particular program, and another elementary school down the road does not. Another input factor is the Parent Advisory Committee (PAC) at each school. PACs can play an important role in a

school's extra-curricular functioning, and often the PAC is involved in purchasing technical infrastructure such as iPads or digital subscriptions for the school. This can lead to equity differentials which should be acknowledged. A district-wide process for evaluating and vetting software, subscriptions, and applications could be considered.

Organizational strategies. This component refers to organizational competencies, strengths, and weaknesses (Cawsey et al., 2016). Cedar has overall strategies for student success and well-being, with a focus on student learning. It also has specific strategies to support student success, including a goal of modern practices, ingenuity, and innovation (Cedar School District, 2016). Within that goal, it has specific objectives of using data and research to guide decisions, and it also endeavours to review and refine its technology plan annually to align it with innovative practices (Cedar School District, 2016). Cedar does not have organizational strategies that specifically address low use of approved EdTech resources and lack of digital literacy instruction, nor does it have specific mechanisms for supporting teachers in their efforts to incorporate EdTech into their classroom practice. It also does not have a plan for how EdTech could be used to improve equity outcomes. These shortcomings could form part of the change process.

Alignment of components. The alignment, or fit, of the components of the change process – the work, the formal organization, the people, and the informal organization – with the input factors and strategy is a key determinant and forms the congruence for which Nadler and Tushman's (1989) model is named. Cedar has an explicit strategy and goal of aligning its technology plan with innovative practices. That is happening slowly; first, with the hardware upgrade, and next, with the EdTech Working Group's collaborative efforts. The work of that group was delayed throughout the 2019-20 school

year due to factors beyond Cedar's control; it held its first meeting in February 2020. Although Cedar's formal structure is hierarchical in nature, the district is well-positioned to achieve change goals if it adopts the transformational and collaborative leadership practices that it aspires to in its strategic plan and that it has demonstrated so far in the EdTech Working Group. In terms of its people, Cedar has specialists in innovation and instruction who are responsible for liaising with teaching staff. Its teachers' technological, pedagogical, and content knowledge (TPACK) has not been formally measured, however, personal observations at more than half the schools in the district reveal a wide range of skills, attitudes, motivation, and hence, computer usage. Moreover, Cedar has not engaged in a technology dialogue with all its emergent leaders – the teachers – and it has not yet facilitated synergies between technical specialists and teachers. Nor has it sought input from its students on use of EdTech. A factor that has impeded this is that optimizing use of EdTech is not perceived to be an emergency – or, at least not a high priority – so it is repeatedly pushed aside in favour of other, more urgent matters.[5] There have been no communication mechanisms in place, for example, to inform or train teachers of the EdTech products – such as BC Digital Classroom – available to them. Finally, in terms of the informal organization – the workplace relationships and culture that facilitate its successful operation – Cedar has recently been in a challenging position, with strained labour relations. On a positive note, the BCTF recently reached a long-awaited collective agreement with the province, which has

[5] This all changed in March 2020, when the world was hit with the COVID-19 pandemic and schools worldwide were suddenly forced to close their doors and embrace online learning. Almost overnight, usage of EdTech to facilitate distance learning became an urgent priority. The outcomes of the district's efforts to implement emergency measures to support continuity of learning opportunities for students may not be fully known for many months.

greatly improved morale. Also, there have been high levels of cooperation between the BCTF, the province, and the district during the COVID-19 crisis.

Outputs being achieved. The outputs of a system are its products. Cedar's output can be measured in a variety of ways, including district usage of the BC Digital Classroom and other EdTech products; district scores on the provincially-administered Foundation Skills Assessment (FSA) standardized test; high school graduation rates, and by analyzing staff and management surveys, which are stated performance indicators in the district's current strategic plan. As described in Chapter One, the district's use of BC Digital Classroom is half the provincial average and declining in both relative and absolute terms (BC ERAC, 2019). This is not an effective use of that digital resource. Linking EdTech usage to student outcomes is complicated and there are multiple factors that affect student outcomes. Still, understanding how Cedar fares relative to other districts could have value. Cedar's scores in FSA, which assesses skills in Grades 4 and 7 in Reading, Writing, and Numeracy, are presented in Table 2.

Table 2

Cedar School District FSA Scores Compared to BC Average, 2017-18 and 2018-19

	Grade 4 Reading		**Grade 4 Writing**		**Grade 4 Numeracy**		**Grade 7 Reading**		**Grade 7 Writing**		**Grade 7 Numeracy**	
Year	2017 2018	2018 2019	2017 2018	2018 2019	2017 2018	2018 2019	2017 2018	2018 2019	2017 2018	2018 2019	2017 2018	2017 2018
Cedar	489	486	2.2	2.2	494	486	493	485	2.1	2.3	488	470
BC Aver-age	485	488	2.1	2.3	484	484	489	485	2.4	2.5	484	485

Note: Data compiled from BC Ministry of Education, Foundation Skills Assessment (2019). To preserve confidentiality of the district, FSA score data are rounded to the nearest whole number.

The results show an interesting trend over the past two years. Cedar's absolute scores and scores relative to the provincial average declined in reading in both grades, and numeracy in Grade 7 from 2017-18 to 2018-19. In writing, Grade 4 absolute scores remained the same (but slipped relative to the provincial average) and in Grade 7 writing, the absolute score increased slightly but is still below the BC average. In no subject across the grades in 2018-19, with the exception of Grade 4 numeracy, did Cedar's students perform (on average) better that the provincial average. While it is impossible to draw any conclusions from two years of data, it is not a positive trend. A troubling issue is the distribution of scores (not presented in a table); in some schools in the district, up to 30% of students are not meeting expectations, based on FSA scores.

Cedar's high school graduation rate for first-time Grade 12 students in all facilities is about 5 percentage points lower than the provincial average (BC, 2020). Another concern in terms of outputs is the significant differential – almost 25 percentage points – in the high school graduation rates of Cedar's indigenous learners, compared to non-indigenous learners. Cedar's indigenous learners also fare much worse than the provincial average, with a differential of more than 10 percentage points (BC, 2020).

Issues to be addressed. Cedar is currently experiencing very low usage of the BC Digital Classroom – about half the provincial average – which is problematic on its own and may be an indicator of larger problems in terms of effective and efficient use of EdTech in the district. It is also experiencing generally declining FSA scores, high school graduation rates below the provincial average, and a large inequity of outcomes between different groups of learners. Observations of teacher and technician frustration with the hardware, software, and online subscriptions indicate that there is room for improvement.

Teachers have pointed out a variety of concerns at the first two EdTech Working Group's meetings. In general, there is a lack of a framework to support teachers' classroom use of EdTech. There are no training programs, no PD activities devoted to EdTech, a lack of in-class support, and inadequate communications to teachers about what digital tools are available to them. A specific change that could to be made is improving usage rates of the BC Digital Classroom. Other specific changes could be identified over the course of the EdTech Working Group's efforts, as well as an Appreciative Inquiry into the situation. A broader goal could be the creation of a learning organization in which pedagogy is supported by technology and evolves accordingly.

Possible Solutions to Address the Problem of Practice

Cedar School District is lacking a framework and a coherent plan for ensuring that EdTech is used efficiently and effectively in its classrooms, and the result is that those resources are being under-utilized district-wide. There are different ways to approach the problem, including leaving the status quo. There are also several active change components that Cedar could accept. This section examines possible options.

Possible option #1: Status quo. Cedar could choose to accept the status quo, and carry on with underutilized EdTech resources, both technical and human. It could acknowledge that there are other issues it needs to deal with, such as school safety, infusing indigenous content into classrooms, or ensuring that students with exceptionalities are provided with adequate supports. As outlined above, its performance on provincial standardized achievement tests places it squarely in the range of provincial averages, but its high school graduation rates are lower than the provincial average, its outcomes indicate equity concerns, and its usage of the BC Digital Classroom is well

below the provincial average. Cedar could choose to be content with the current situation. However, a key component of Cedar's mission is to help students reach their full potential, and it also strives to achieve innovative learning environments (Cedar School District, 2016). If Cedar accepts the status quo, it does so at the risk of not adequately preparing its students for the future workplace. Anderson (2008) argued that it is necessary to incorporate technological literacy, digital literacy, and life skills into the learning process. The BC government has acknowledged the importance of digital literacy (BC Ministry of Education, 2018a). When used appropriately and in conjunction with adequate frameworks, technology has been shown to improve student outcomes (Chauhan, 2016; Comi et al., 2017; Fu, 2016). Technology can also help promote collaborative learning (Anderson, 2008; Larson & Miller, 2011) and thus the status quo could also mean that Cedar's students are missing out on collaborative opportunities that are fundamental to the acquisition of 21st-Century skills. As outlined in Chapter One, one of Cedar's stated goals is that its IT infrastructure will be continuously improving within a professional and collaborative framework (Cedar School District, 2016). Thus, its goals as analyzed in the context of the status quo provide a persuasive argument for change.

Possible option #2: Professional development. Teachers play a crucial role in student outcomes, and the role of the teacher is expected to become even more important in our digital era (Schleicher, 2018). Teacher competencies are a vital element in the successful integration of EdTech into classrooms (Anderson, 2008; Chauhan, 2016; Comi et al., 2017; Koehler & Mishra, 2009; Koh et al., 2017; Larson & Miller, 2011; Prestridge, 2012). Although statistics are not available, few teachers in Cedar have received any formal pre-service training in how to utilize digital tools in classrooms

because it was only recently introduced into teacher training programs in BC. Zipke et al. (2019) found that even when EdTech is taught in pre-service programs, that does not necessarily translate into effective classroom usage of those tools. Thus, professional development is likely the best way to impart the TPACK that teachers need to be able to use digital learning materials successfully in the classroom. TPACK has been shown to have a positive impact on teaching and learning (Koehler & Mishra, 2009) and thus improving TPACK across the district would be desirable. In turn, PD generally has a positive impact on TPACK and teachers' use of EdTech (see, for example, Koh et al., 2017; Morsink et al., 2011) and should be explored by Cedar.

Designing PD activities and ensuring they are appropriate and of sufficient quality so they support successful integration of EdTech in classrooms is important. It will also be crucial for Cedar to ensure that any PD activities are undertaken in a manner consistent with collective agreements. For example, although PD days are mandatory, the district cannot require specific PD activities that a teacher must engage in. There are six non-instructional days each school year which are available for PD activities and teachers can choose from a range of activities. The choice that teachers have in the range of PD activities may be creating a sample-selection bias, which in turn could contribute to further inequities in EdTech usage. For example, if a teacher is interested in EdTech, he or she may choose to attend PD sessions that further increase his or her TPACK, while a teacher who is inexperienced or not confident might be more likely to choose not to attend EdTech PD sessions. This may have equity issues in terms of classroom outcomes.

Research has found that developing competency, confidence, and expertise in technology use is not instant, and it takes time to build those skills (Morsink et al., 2011).

This requires ongoing commitment from not only teachers, but schools and districts. Improving outcomes cannot be done in isolation, and an individual teacher's desire to improve competencies must be supported by broader mechanisms to support ongoing effective PD. Moreover, as Morsink et al. (2011) found, there can be a variety of learning trajectories for teachers, and thus there will not be a one-size-fits-all solution.

Utilizing PD days as a means for addressing this PoP would need to take place in consultation with the local chapter of the BCTF. Another option for Cedar would be to create an additional non-instructional day in the school year devoted specifically to EdTech PD, which would be within its scope and mandate. Better still, any efforts to formalize a relationship between EdTech and PD could be a province-wide initiative for reasons of consistency, efficiency, and economies of scale. This solution could be expensive but effective, as Cedar is not the only BC district struggling with this problem.

Possible option #3: Micro-credentials and digital badges. In recent years, micro-credentials have emerged across various industries and institutions as a means for encouraging further training and skills acquisition (Rimland & Raish, 2019). A micro-credential is a recognition that can be issued by an organization when a participant has completed a particular training program or professional development, and it could be an in-house or third-party credential. A micro-credential could be issued in either paper form, like a certificate, or digitally, in the form of a "digital badge" and it could encompass the completion of a program, or confirm the specific skills or competencies that a teacher has acquired in the process. Jones, Hope and Adams (2018) found that teachers had a positive view of receiving digital badges and in turn, shared those

accomplishments on social media. Digital badges can help provide customized PD learning for teachers (Gamrat, Zimmerman, Dudek, & Peck, 2014) .

Cedar could establish a micro-credential system which would recognize teachers' completion of training programs outside the realm of regular PD. However, in order to do this, a program would have to be created and administered, and teachers would need adequate motivation to use it. Digital badges can impact both intrinsic and extrinsic motivation in students to varying degrees (Abramovich, Schunn, & Higashi, 2013) but there may not be enough intrinsic or extrinsic motivation for Cedar's teachers, and this would require further context-specific study. Gamrat and Bixler (2019) have identified challenges with digital badges, including badge variation, assessment, and badge complexity. The potential costs are high and the potential benefits are unknown.

Another option would be for Cedar to encourage its teachers to complete micro-credentials offered by third parties. An organization called Digital Promise provides an online clearing house for micro-credentials in education. It offers a wide range of micro-credentials from dozens of organizations, including National Geographic, universities, and for-profit entities. Many of these micro-credentials are free, and Cedar could encourage its teachers to participate in those programs during regularly scheduled PD, or during teaching release time. Cedar would need to determine how the credentials could support EdTech integration, teaching and learning.

Teachers' salaries in BC are district-specific and based on two factors: the number of years of teaching, and teacher educational level, designated into categories and determined by the Teacher Qualification Service (TQS). The TQS is a separate entity from the provincial government's Teacher Regulation Branch (TRB), and works with the

BC Teachers' Federation and the BC School Trustees Association. The TQS evaluates teachers' qualifications and is responsible for approving programs and institutions as valid for the purposes of teacher salary increases. Thus, any s alary increments related to either micro-credentials or formal certifications like diplomas and degrees would need to be approved by TQS. One training tool which Cedar could consider is the Ontario Additional Qualification (AQ) endorsement called "Integration of Computer and Information Technology in Instruction." TQS will consider accepting AQ credentials as credits toward increased salaries, but they are subject to certain regulations (BCTF, 2020). Each AQ course costs several hundred dollars, and six AQ courses would be required for a salary category increase, so Cedar would need to balance the costs and benefits, or devise a cost-sharing plan with teachers.

Possible option #4: Professional Learning Communities. A Professional Learning Community (PLC) is defined by Hord (1997) as a community in which teachers and administrators continuously seek and share learning, and act on that learning to enhance their effectiveness for the benefit of student learning. Collaborative work through a PLC can help teachers overcome barriers to successful integration of technology and digital tools. Kopcha (2014) found that situated professional development – that is, support and learning for teachers that happens in the classroom and not off-site – can play a key role in improving teacher confidence and attitudes toward barriers and thus, integration of EdTech. He found that in-school mentors are important (Kopcha, 2014). This could be either technology specialists or teacher leaders. In Cedar, there is a shortage of technology specialists in the schools. There are also part-time IT technicians

in schools, but there is generally insufficient time and mechanisms for frequent and fruitful collaboration with classroom teachers.

Cedar could choose to hire more technical personnel so that each school has a full-time IT support person. This could facilitate the creation of a PLC that is supported by the technical expertise that would enable teachers to focus on pedagogical aspects and innovative, engaging, and inspiring ways to use EdTech in the classroom, instead of worrying about whether a computer will boot up. This could result in the kind of ongoing capacity building that Harris (2011) argued is required for sustainable change.

Possible option #5: Vetting system. Teachers regularly and frequently obtain digital instructional materials from unapproved sources on the internet. For example, a popular website for educators is Teachers Pay Teachers. On that site, educators can download lesson plans and other instructional materials. Over a billion downloads have occurred on Teachers Pay Teachers (Polikoff & Dean, 2019) and some of Cedar's teachers use it. A recent US study which analyzed three popular websites (Teachers Pay Teachers, ReadWriteThink and Share my Lesson) revealed troubling results. While the quality of text was seen to be excellent, and the materials were visually appealing and generally error-free, nearly two-thirds of materials were deemed to be "not worth using" by reviewers, the materials are not as strongly aligned with learning standards as they claim to be, the quality of many tasks is low, assessments are poor, lessons are not cognitively challenging and do not do a good job of increasing students' content knowledge, lessons are not helpful for teaching diverse learners, and lessons do not promote cultural diversity (Polikoff & Dean, 2019). The authors noted that the policy implications are myriad; relevant for Cedar would be the authors' conclusion that school

and district leaders need to decide whether and how they will ensure that the curriculum is followed, and that the market for digital learning materials "begs curation" (Polikoff & Dean, 2019). How can Cedar ensure its teachers are using appropriate tools that are pedagogically powerful and congruent with the curriculum, while still respecting teacher autonomy? Fullan (2013) argued that the solution should be "all about learning" so the quality and pedagogical value of any EdTech should form a cornerstone of a change plan.

Possible option #6: Positive and supportive leadership framework. As described in Chapter One, teachers' attitudes and beliefs toward technology have been found to be key factors in successful use of EdTech (Ertmer & Ottenbreit-Leftwich, 2010; Petko, 2012; Prestridge, 2012). An active promotion of attitudes, motivation, and philosophy toward using computers in classrooms could be considered by Cedar, and leadership can play a role (Hew & Brush, 2007). Hew and Brush (2007) found that facilitating a shared vision for a technology integration plan can be a successful way to reduce barriers to integrating technology. Establishing a supportive, positive framework could start by surveying teachers and students, perhaps using a virtual AI Summit. AI Summits are relatively quick, they build organizational confidence, they provide immediate and comprehensive access to information needed for change, they improve cohesion by encouraging a common mindset, they inspire action, and they provide a framework for positive and sustainable change (Ludema et al., 2003). Leadership could cement its EdTech vision with authentic input from teachers and students.

A proposed solution. Each the options described above could help solve Cedar's problem of under-utilization of digital resources, with the exception of the status quo. The status quo is rejected because it does not align with Cedar's mission, values, and goals.

Cedar has just begun the process of identifying specific EdTech issues from stakeholders via its EdTech Working Group sessions. This should continue and expand to include student input, so it can further identify areas of focus, and specifically, identify pedagogical benefits of EdTech by soliciting input from teachers and students.

Each of the possible options above has costs and benefits, as well as organizational and external constraints. These are presented in Table 3.

Table 3

Improving EdTech Usage: Possible Solutions and Resource Needs

Resource Need	**Status Quo**	**PD**	**Micro-credentials**	**PLCs**	**Positive Leadership Framework**	**Vetting system**
Time	Same	More: Medium	More: High	More: Medium	More: Medium	More: Medium
Human	Same	More: Medium	More: Medium to High	More: Medium	More: Medium	More: Medium
Fiscal	Same	More: Medium	More: High	More: Medium to High	More: Medium	More: Medium
Information	Same	More: Medium	More: Medium to High	More: Medium	More: Medium	More: Medium
Technological	Same	More: Medium	More: Medium to High	More: Medium	More: Medium	More: Medium to High

The literature, although mixed on the benefits of technology in the learning process, is clear that teacher competence, confidence, and corresponding attitudes play a crucial role in EdTech integration and student success. I thus recommend that both

Professional Development and Professional Learning Communities be part of Cedar's change plan. While the discussion of micro-credentials has yielded some interesting concepts, it is likely to be high in resource use, and relatively low in tangible outcomes because teacher salaries are dependent on a formula and cannot, with the exception of the Ontario AQ credentials, be altered by a micro-credential system without changes from outside organizations, such as BCTF and TQS.

Vetting resources is an important issue that could have implications for teaching, learning and equity issues. Cedar's teachers are using a wide range of non-vetted resources whose pedagogical benefits are unknown. Cedar could establish a vetting system led by curriculum and technology specialists, which would align with the district's obligation of approving resources for classroom use. The BCTF has argued that teachers should be able to choose their own materials, but if Cedar makes a wide range of quality EdTech products available, Cedar's teachers could enjoy a broad choice of tried and tested technology. They would spend less time searching for their own resources.

A positive and supportive leadership framework and a shared vision for change would provide for ongoing capacity building for district personnel, particularly teachers, to improve their EdTech usage. This is strongly recommended because it would establish the supportive mechanisms that could facilitate the capacity that PD and PLCs create. The leadership framework should be grounded in systems thinking and incorporate the last element of Fullan's (2013) essential triad: change knowledge.

In summary, capacity building for teachers via improved PD and PLCs, an EdTech vetting system, and a supportive leadership framework are recommended. These solutions are further described in Chapter Three.

Leadership Ethics and Organizational Change

As Cedar explores its options for an appropriate change path to pursue in the context of how to optimize the use of EdTech in its schools, its leaders will need to carefully consider the ethical dimensions of such organizational change. The present and future lives of the youngest and most vulnerable people are at stake, and Cedar's leaders must understand how changes will affect the students in the district, as well as other stakeholders. Leaders are in a uniquely important position to ensure that moral and ethical standards are upheld, and this requires a broad and careful look at how change will take place, and what impacts the process and final product will have on stakeholders. Ethical leadership can be broadly defined as a "social, relational practice concerned with the moral purpose of education" (Ehrich, Harris, Klenowski, Smeed, & Spina, 2015, p.199). Burnes and By (2012) noted that all stakeholders have a role to play to ensure ethical outcomes in education. This section explores four domains of ethics in this OIP's context: leadership; quality and content of EdTech; equity in education; and privacy.

Leadership. According to Northouse (2019) "ethics is central to leadership because of the nature of the process of influence, the need to engage followers in accomplishing mutual goals, and the impact leaders have on the organization's values" (p.338). He cited five broad principles of ethical leadership: respect, service, justice, honesty, and community (Northouse, 2019). Sergiovanni (2013) argued that "morally based leadership is important in its own right, but it is also important because it taps what is important to people and what motivates them" (p. 373). Starratt (1991) found that the most successful leaders have strong ethical purposes and strong senses of social justice. Starratt (2007) also argued that at the core of ethical educational leadership is the

recognition that “what our society needs most of all is a fully functioning human being who can participate, contribute, and find fulfillment in the various dimensions of democratic public life” (p. 181).

The US-based National Policy Board for Educational Administration (NPBEA) proposed a set of ethical leadership norms. Those standards include acting ethically and professionally; acting to promote fairness, integrity, transparency, trust, collaboration, learning and continuous improvement; putting children at the centre of education and taking responsibility for their academic success and well-being; protecting and promoting democracy, freedom, responsibility, equity, social justice, community and diversity; leading with strong communication skills; social-emotional sensitivity, and cultural awareness; and providing moral direction for the school and staff (NPBEA, 2015).

Cedar’s transformational leadership (TL) approach to change embodies elements of Kouzes and Posner’s (2007) principles and practices. Burns (1978) argued that engaging in TL involves raising the morality of others. By definition, TL requires the engagement of others and creates connections that elevate morality in both the leader and follower (Northouse, 2019). Embedded in Kouzes and Posner’s approach is the Model the Way element, which involves a definition of values and a promotion of trust, and thus gives leaders the moral authority to lead (Kouzes & Posner, 2007). Honesty is the basis for trust, and it is inextricably linked to ethical leadership. Leaders must be honest, or we won’t trust them. Given the uncertainty inherent in technological change, leaders must also be willing to admit that they may not have all the answers, and therefore, AI could support the ethical dimensions because it is collaborative and seeks the input of stakeholders. Servant leadership embodies ethical principles because it supports

followers' well-being, as Parris and Peachey (2013) found in their meta-analysis of empirical studies of servant leadership. Sergiovanni (2013) argued that servant leadership embodies a "groundswell of moral authority" (p. 375).

The chosen framework for change, which is a blend of AI, Kouzes and Posner, and the Change Path Model, infused with servant leadership, systems thinking, empathy and metacognition, allows for a collaborative, cooperative, and consultative trajectory for change, which paves the way for inclusion of many stakeholder voices. Adherence to this framework supports the ethics of leadership in the change process in Cedar's context.

Quality, content, and business ethics. Who should be providing the EdTech products used in classrooms? On what basis should acquisition decisions be made? As described in the previous section, the quality of digital educational products used in classrooms may not be consistently good. Leaders have an ethical responsibility to create a framework that allows for vetting of those resources so that quality products will be used. The pedagogical value of a product must drive the technology decisions. As a public school district, Cedar has the additional ethical responsibility to spend public funds appropriately. Under-utilization of resources that the district has paid for and not made sufficient efforts to integrate in classrooms is a problem that requires consideration. Moreover, Chapman and Mählck (2004) stated that if technology is not properly used to support learning, then it can actually diminish educational outcomes because resources have been diverted away from other opportunities with better payoffs.

Wright and Peters (2017) noted that when private enterprises become involved in education, they likely do not have the same ethical motivation as schools. Moreover, many of these for-profit companies are entering the EdTech market in a stealth manner

(Wright & Peters, 2017), which complicates decision-making for teachers. With the blurring of lines between the public and private sectors, Cedar's leaders must take the utmost care to ensure that decisions are being made with student learning at the forefront instead of the interests of for-profit companies. For example, Google has expanded its reach into classrooms worldwide, and Cedar is looking to further integrate these "free" products into all its classrooms. While such products may in fact support student learning and classroom instruction, they are not truly free, because Google is collecting data on every single user. The privacy issues will be discussed below, but the issue of the quality of the product, and its true costs, must be evaluated. Also, no matter which products are chosen, leaders have an ethical responsibility to ensure that teachers and staff are trained.

Equity. The widespread use of EdTech has brought new opportunities to students in classrooms around the world. However, technology can also contribute to inequities. According to Schleicher (2019) "there is a great risk that technology will super-empower those with strong knowledge and skills while leaving those with weak foundations further behind" (p.17). Macgilchrist (2019) argued that educational technology has exacerbated inequalities. An important dimension in the social justice component is that student access to EdTech and Internet is not equal for all, resulting in the "digital divide" that further threatens equity. Chapman and Mählck (2004) stated that the positive benefits of EdTech are only fully realized if the negative ones, like inequity, are minimized.

The idea that technology has the potential to both improve and worsen equity must be carefully considered as Cedar decides what EdTech will be used and how it will be used. Given the equity and inclusion goals of its strategic plan, Cedar must seek ways to use EdTech to improve outcomes for its indigenous students. It must also search for

solutions for disadvantaged students. Not all students have equal home internet access, so any homework that requires connectivity may have equity implications.[6]

Cedar must consider the needs of all learners, including those with exceptionalities whose educational journeys require additional supports. Cedar could find guidance in the standards proposed by the International Society for Technology in Education (ISTE). The underlying principle is that leaders use technology to improve equity, inclusion and digital literacy, and those goals can be achieved by ensuring all students have skilled teachers who use technology effectively, by ensuring all students have access to technology that can help support their learning, by modelling appropriate digital citizenship, and by promoting responsible and safe online behaviour (ISTE, 2020).

Privacy. The issue of privacy is significant, and needs to be further explored as the change plan proceeds. Cedar is aware of those issues. For example, it requires parents to sign a consent form that allows their children to use Google products. Still, there are many issues that are not yet fully understood or resolved. For example, students whose work or confidential personal data are stored in the Google cloud may not be fully aware of those implications. In the wake of the Cambridge Analytica data breach in 2018, organizations are increasingly aware of data and privacy, but there are still many more questions than answers. Moreover, students whose parents choose not to allow them to utilize Google products in classrooms will be at a disadvantage as Google becomes the norm in Cedar's schools. Another dimension of privacy is how teachers are using and sharing student data; sometimes teachers may not even be aware of what they are sharing.

[6] At the outset of the COVID-19 crisis, Cedar's leadership showed the vision and resolve to equip students with technology for home use. The district allowed widespread distribution of its devices, such as Chromebooks, to students to take home.

In many cases, data are not shared deliberately but it is a function of a student using an app. Regan and Jesse (2019) argued that simply calling these kinds of issues "privacy" diminishes the broad range of ethical concerns. They argued that under the guise of "personalized learning" many ethical questions arise, including information privacy, anonymity, surveillance, autonomy, non-discrimination, and ownership of information (Regan & Jesse, 2019). In summary, there are multiple complex ethical questions that Cedar will have to address.

Chapter Two Conclusion

Chapter Two has outlined the planning and development phases of a change plan for Cedar School District. It outlined the approach to change, which is a hybrid model of Appreciative Inquiry, Kouzes and Posner (2007), and servant leadership, presented in a systems-thinking framework. This is combined with the Change Path Model (Cawsey et al., 2016) to describe the change process. Next, it proposed AI alongside Nadler and Tushman's (1989) Congruence Model as diagnostic tools for a critical organizational analysis. It was determined that although Cedar has capable and committed leadership, it has low usage rates of EdTech, declining student achievement as represented by provincial tests, inequities in student outcomes, and a current lack of strategies for improving integration of EdTech in classrooms. This chapter explored possible solutions, and proposed a combination of improved Professional Development, Professional Learning Communities, a vetting system, and supportive leadership. Finally, it explored a variety of ethical components. In Chapter Three, the implementation and evaluation of the plan will be discussed, and those ethical considerations will be further considered.

Chapter Three: Implementation, Evaluation, and Communication

This chapter presents the final components of an Organizational Improvement Plan (OIP) that addresses the problem of a lack of a framework and support mechanisms for teachers to effectively utilize educational technology (EdTech) in Cedar School District. In Chapter Two, several possible solutions were discussed, and it was concluded that the preferred approach would have three components: EdTech capacity building for teachers via Professional Development and Professional Learning Communities; creating a district vetting system for EdTech; and creating a strong, positive leadership framework. It was also suggested that Cedar engage in ongoing organizational diagnosis via Appreciative Inquiry, which can set the stage for effective and responsive leadership. The purpose of this chapter is to describe a change implementation plan that aligns with Cedar's goals and priorities; to explore a framework, models, and procedures for monitoring and evaluating change; and to examine strategies for communicating to stakeholders. Finally, this chapter discusses next steps and future considerations.

Change Implementation Plan

As described in Chapter One, Cedar School District strives to ensure its information technology (IT) personnel provide effective, reliable, and secure services and products that meet the needs of staff and students, and that the technological infrastructure will continuously improve within a professional and collaborative framework (Cedar School District, 2016). Currently, there is a gap between the goal and the reality: teachers are not all fully aware of the range of EdTech products available to them; many teachers are using unvetted resources; many EdTech resources are under-utilized; and classroom usage in the district of an approved suite of digital products called

the BC Digital Classroom is low (BC ERAC, 2019). There are no formal mechanisms in place for training or supporting teachers with classroom technology.

Teachers' attitudes, confidence, and skills have been shown to influence both usage and efficacy of EdTech (Anderson, 2008; Chauhan, 2016; Koehler & Mishra, 2009; Koh et al., 2017; Larson & Miller, 2011; Petko, 2012; Prestridge, 2012) and it will therefore be important for Cedar to provide adequate supports for teachers if the district wishes to enhance and optimize EdTech usage to improve teaching and learning. The district has recently completed a major hardware upgrade throughout its schools, but there is no plan yet for training teachers or optimizing usage.

A stated goal for Cedar, as identified by its EdTech Working Group, is to leverage EdTech to enhance teaching and learning in the district. Crucial to the achievement of this goal is the recognition that the responsibility to achieve it extends beyond the IT personnel to include district leaders, principals, teachers, support staff, and students. Achieving this goal will be an iterative, ongoing, relational, and system-wide process, akin to an ecosystem. Like an ecosystem in the natural world, this requires balance and a recognition that many components are vital to the overall health of the system.

As outlined in Chapter Two, Cedar has a variety of options, including improving Professional Development, creating Professional Learning Communities, implementing a digital badge system, and establishing a vetting system for improving integration of EdTech in its schools. A district-wide initiative to engage key stakeholders through an EdTech Working Group was held in February 2020. It employed an Open Space approach in which stakeholders (primarily teachers but also some principals) drove the agenda, prompted by the question: How can technology be amplified to enhance teaching

and learning in Cedar School District? Several key issues emerged, and at a subsequent meeting in April 2020, eight sub-groups were created to focus on tackling specific issues.

Inspired by Fullan's (2013) three-fold solution of "make it all about learning; let the technology permeate; and engage the whole system" (p.74) I propose a three-pronged strategy for change. The first component involves building teachers' capacity in EdTech, via improved Professional Development opportunities to enhance TPACK, as well as the creation of Professional Learning Communities (PLCs) designed to ensure long-term success of EdTech integration in schools. Second, Cedar should create an internal system for vetting EdTech resources, which will ensure pedagogical goals are at the forefront of EdTech usage. Third, Cedar should create and maintain a positive leadership framework that promotes continued EdTech integration in a holistic, system-wide "learning organization" (Senge,1990, 2013) context. Together, these three components form an overall strategy designed to enhance the EdTech ecosystem in Cedar School District, and they comprise the preferred solution for Cedar. Their implementation could be facilitated by employing AI principles and practices in an ongoing manner.

Component #1: EdTech capacity building for teachers. Cedar could have high-end computers and excellent digital learning materials, but unless its teachers know how to use those tools properly, those resources will be wasted. The district will thus need to ensure that its teachers are competent in using appropriate EdTech. It will therefore need to have a mechanism is in place for ongoing professional development. Hirsh and King (2017) have argued that as society's expectations for student learning increase, so will the importance of professional learning for educators. Teachers will need to acquire the technological, pedagogical, and content knowledge (TPACK) that has been shown to

improve teaching and learning (Koehler & Mishra, 2009). Harris (2011) argued that flashy policies and innovations may get attention, but in the absence of appropriate implementation and sustained capacity building, they will likely fail. In Cedar's case, capacity building should focus on building TPACK among staff, but it could also include the development of an EdTech ecosystem that facilitates ongoing capacity building.

A PD framework could be established using an AI Core Group Inquiry. This form of engagement features a small group of people asking questions and conducting interviews. Core participants would be principals, teachers, and representatives of the teachers' union. Leadership would need to ensure that a cross-section that represents the district's range of interests is selected. A Core Group Inquiry could identify content and processes for teacher PD, including perhaps periodic PD sessions that develop TPACK, or other options for capacity building, such as time allocated at staff meetings to engage in EdTech discussions. Professional development has been shown to improve TPACK (Koh et al., 2017; Morsink et al., 2011). However, Dudar, Scott and Scott (2017) noted that PD often fails because it does not change teacher behaviour, and there are often gaps between theory and practice. This highlights the importance of a process like AI which includes teacher input from the start and recognizes their key role.

Hirsh and Killion (2009) outlined eight principles of professional learning:

1. Principles shape our thoughts, words, and actions;
2. Diversity strengthens an organization and improves its results;
3. Leaders are responsible for building the capacity in individuals, teams, and organizations to be leaders and learners;
4. Ambitious goals lead to powerful actions and remarkable results;

5. Maintaining the focus of professional learning on teaching and student learning produces academic success;
6. Evaluation strengthens performance and results;
7. Communities can solve their most complex problems by tapping internal expertise; and
8. Collaboration among educators builds shared responsibility and improves student learning.

Citing Hirsh (2011), Dudar et al. (2017) noted several elements of successful PD: high expectations from leaders; collective responsibility for student learning via best practices; sufficient time for planning, learning, and professional support; clear and measurable goals; research-based content; in-class follow-up; defined roles for teachers to be facilitators and coaches; and partnerships between external agencies and the district to further enhance professional learning. By applying as many of these principles and elements as possible, Cedar can craft a framework for effective PD. This will be an iterative process and will require ample and ongoing feedback from teachers.

The nature of the problem of practice necessitates ongoing attention to change. That is, organizational improvement is not a one-stop fix that ends with installing a particular type of technology in a classroom, or having occasional PD workshops. EdTech products and processes are constantly changing, and teachers will need to be equipped to adapt to these changes and embrace usage of appropriate tools on an ongoing basis. Establishing permanent PLCs could facilitate this, and could be achieved via an AI Positive Change Network. This approach encompasses AI principles, and focuses on the training of a few members of the organization in AI, who are given the means by which

they can "initiate projects and share materials, stories, and best practices" (Ludema et al., p. 12). Team members might include IT specialists, district leaders, teachers, and librarians. The combination of PD and PLCs would build EdTech capacity in the district, and teachers could select which aspects of each would be relevant to their own context.

Component #2: Vetting system for EdTech resources. If the pedagogical value of EdTech is at the forefront of Fullan's (2013) triad of pedagogy, technology, and change knowledge, then there should be a mechanism for ensuring that EdTech products used by Cedar's teachers are high quality, impactful, and support excellence in teaching practices. Lindl (2017) cited four pillars of her own organization's rubric for evaluating resources: engagement, pedagogy, support, and privacy. She also summarized things that decision-makers should look for in their evaluation of EdTech: products are ongoing, transparent, adaptable, and suggested that they ask the EdTech provider about customization, connectedness, equity, and technological requirements (Lindl, 2017). Koç (2014) created two separate evaluation frameworks for EdTech: a software/ hardware logistical evaluation and a pedagogical evaluation. These could be adapted for Cedar's context and used by district staff to establish a comprehensive evaluation system which could address the goal of leveraging EdTech to improve teaching and learning, as well as equity issues. It would also align with the district's responsibility of approving resources, recently transferred from the Ministry of Education to individual boards.

Component #3: Establish a positive, strong leadership framework. This final component is crucial so that the other elements can be implemented in a sustainable manner. Leadership must create a positive environment that encourages meaningful teacher and student participation in the change process, and must respond to stakeholder

concerns. Leadership could use a variety of strategies to ensure ongoing dialogue and participation, including AI events that solicit feedback from teachers and students. Leadership must equip itself with change knowledge criteria, which Fullan (2013) argued are vital: motivating people to change, helping them learn, leveraging the whole group, and accomplishing these on a system-wide basis. Fullan (2013) identified eight crucial components of change knowledge: focus, innovation, empathy, capacity building, contagion, transparency, elimination of non-essentials, and leadership.

A summary of the proposed change strategy is presented in Table 4.

Table 4

Strategy for Enhancing the EdTech Ecosystem in Cedar School District

Change Path Model Phase	**AI Step**	**Goals**	**Priorities**	**Stakeholder Questions**	**Time-line**
Awakening: Why Change?	Discovery: Appreciating	Affirmative Choice topic: How can Cedar leverage EdTech to improve teaching and learning?	Diagnosis; gap analysis; building need for change; ensuring equity is addressed	What do teachers and students want? What is working? How can equity be improved?	Fall 2020
Mobilization: What is the organizational structure?	Dream: Envisioning Results	Define positive framework for change	Understanding and managing stakeholder reactions	How will teachers and students respond? How will leaders react?	Fall and Winter 2020-21
Accelerating: Empowering and building momentum	Design: Co-constructing	PD opportunities, PLCs, vetting resources	Engaging and empowering people and processes, build capacity	How will teachers engage in PD and PLCs? How to facilitate?	Winter and Spring 2021
Institutional-ization: Measuring and evaluating change	Destiny: Sustaining	Enhance the ecosystem through a positive leadership framework	Assessing usage of EdTech tools and outcomes, including equity	How will leaders and teachers sustain the ecosystem?	Fall 2021

Note: Adapted from Cawsey et al. (2016) and Cooperrider and Whitney (2005).

Managing the Transition. There are many issues that can arise during a change process, and change can fail if those issues are not properly addressed. Armenakis and Harris (2009) noted that effective organizational change is rare. Hall (2013) pointed out that implementing change is not an easy endeavor, and that there is limited appreciation of the complexities and challenges related to change. The purpose of this section is to identify and describe potential challenges in Cedar's change plan that must be understood and addressed to achieve success.

Understanding stakeholder reactions. Anticipating, understanding, and managing stakeholders' emotions and responses throughout the change process is critical. Dudar et al. (2017) noted that teachers' actions can "make or break a change initiative" (p. 48). Guskey (2002) found that change can be a difficult process for teachers. Cawsey et al. (2016) argued change often leads to emotional upheaval for people, and leaders need to be adequately prepared for that. Achinstein and Ogawa (2006) argued that some teachers may be reluctant to embrace change out of "principled resistance." Change recipient participation in the change process is a key factor for success (Armenakis & Harris, 2009). Armenakis, Harris, and Feild (1999) identified five key beliefs of change recipients that support successful change: discrepancy, appropriateness, efficacy, principal support, and valence. Discrepancy means there is the belief that change is required; appropriateness means that the change initiative is the right one for the problem; efficacy means a belief that the change will be successful; principal support means the formal leaders are committed to the change initiative, and valence means the change recipient will benefit from the change (Armenakis & Harris, 2009). For successful change in Cedar, this means that teachers must believe that improvements in EdTech are needed;

that the approach that Cedar's leaders take will work in each teacher's own context; that increased usage of EdTech will improve both teaching and learning; that district leaders are committed to ongoing support for teachers; and that teachers themselves will benefit from enhanced EdTech.

AI is a solid approach in this case because it incorporates teacher, administration, support staff, student and family participation in an authentic manner at the outset, and it becomes the means for managing stakeholder concerns. The AI process helps leaders understand any issues that could lead to resistance, and allows them time to mitigate or resolve those issues with the direct participation of the stakeholders. For example, Cawsey et al. (2016) noted that engagement and two-way communications can minimize the negative impacts of change. Ford and Ford (2009) argued that resistance is a resource, because it can increase the leaders' awareness of the problem, allow the leaders to focus on the purpose, and adapt change plans accordingly. AI can identify any missing stakeholder beliefs described above, and remedy those deficits. It also provides for the incorporation of emotions in the change process. AI is a positively-focused approach. However, this presents a key consideration: change leaders must focus energies in positive ways, but must not let that positivity eclipse legitimate concerns (Cawsey et al., 2016). Ignoring concerns could result in stakeholder frustration, hindering the process. Cedar will need to find balance between AI's positivity and stakeholder concerns.

Engaging and empowering. To ensure ongoing effectiveness of its change plan, Cedar will need to adequately support Professional Development, which generally takes place outside the classroom, and Professional Learning Communities, which happen in the workplace and provide ongoing supports for teacher learning. District teachers trained

through high-quality PD aimed to support TPACK could design and lead effective PLCs. A body of literature exists on the success of PLCs (Hord, 2008; Vescio, Ross, & Adams, 2008) and how to establish effective PLCs (see, for example, Richmond & Manokore, 2011). Cedar will need to decide what its PLCs will look like, and how they will be used to support EdTech. Cheah, Chai and Toh (2019) found that personal and contextual factors can inhibit TPACK acquisition via PLCs, and that should be considered in Cedar's context so as to improve likelihood of success. For example, a teacher may have experienced success working with a particular process or group of people, so those factors should be discussed. Using AI, Cedar could explore PLC strategies that focus on teachers' personal factors.

Additional resources. Effective use of EdTech will depend on more than just computers, software, and competent teachers. The entire ecosystem will need to be improved and continually protected to ensure that it thrives. That means that the relationship between Cedar's formal leadership and teachers will need to be respected and nurtured; this is particularly important in this case because teachers are emergent leaders, as described in Chapter One, and there are shifting power dynamics. Adjusting to these shifts may require additional resources; for example, if teachers are to contribute more to the EdTech dialogue or PD, they will require release from teaching time.

The role and responsibility of the BC Ministry of Education needs to be clarified. The Ministry has transferred responsibilities to school districts in the area of digital resources, but there is no additional funding or framework so far to support fulfillment of those responsibilities. Thus, a dialogue with Ministry personnel could improve the overall EdTech ecosystem, and Ministry involvement could create efficiencies province-wide.

Potential issues. In a public school district, costs are a consideration. A thorough analysis of costs and options for enhancing the EdTech ecosystem will need to be performed by Cedar. Some aspects of the change plan may not be feasible, so modifications may have to be made. For example, if a full AI Summit is not manageable because of either costs or other constraining factors, district leaders could apply other AI approaches, such as Core Inquiries, which focus on smaller groups. However, Cedar must balance the workability of smaller groups with any perceptions of excluding stakeholders.

It will be vital for Cedar to ensure that the British Columbia Teachers' Federation (BCTF) is supportive of the elements of the change process. BCTF's perspectives and priorities regarding EdTech, PD, and PLCs will need to be further explored. For example, prescribed PD may be problematic from BCTF's perspective, and if a district initiative is not consistent with BCTF's values, implementation of the change plan will be difficult.

Building and maintaining momentum. Cedar will need to identify and clarify its specific activities and goals so that resources can be directed into the achievement of those goals. Short-term activities, such as an AI Summit that identifies the vision and priorities for change, will need to be communicated to stakeholders. Medium-term goals might include higher participation of teachers in PD activities, creation of effective PLCs, teacher satisfaction with PLCs, and higher usage of certain EdTech products. Those goals will need to be measured to assess the change process. Long-term goals include ongoing use of PLCs, a supportive leadership framework that continues to evolve in a systems-thinking context, improved student outcomes, and improved equity.

Limitations and challenges. Appreciative Inquiry can be a powerful framework for change, and many organizations have used it successfully (Cooperrider & Whitney,

2005). Bushe (2015) has found that AI "leads to transformational change when it addresses or creates enough disruption to evoke self-organizing processes that are focused on what is widely desired" (p. 6). There are three key limitations to consider. First, there is the chance that an organization-wide AI Summit might not be possible to achieve, and thus may not capture a full range of stakeholder perspectives. AI requires commitment from all stakeholders, and particularly those in power, and it is not as effective if participants' experience is limited (Shuayb, Sharp, Judkins, & Hetherington, 2009). Second, as Bushe (2015) noted, telling stakeholders "we don't know what the change will be, but it will be good" is not confidence-instilling (p. 6). The third issue that has been critiqued is that AI focuses on the positive and thus may minimize the very real negative experiences of stakeholders (Shuayb et al., 2009). However, as Cawsey et al. (2016) and Ford and Ford (2009) noted, voicing those negative perspectives may help improve the change process. Whitney and Trosten-Bloom (2003) said that problems are not dismissed in AI, but they are just not used as the "basis of analysis or action" (p. 18). Recognizing these limitations can help Cedar navigate the change process effectively.

In summary, the three-component change implementation plan encompasses multiple dimensions. The plan focuses on improving teachers' TPACK via improved PD and the creation of PLCs, a vetting system for EdTech resources, and a positive leadership framework that embraces change knowledge and strives for a long-term goal of creating an effective learning organization that enhances these capacities.

Change Process Monitoring and Evaluation

The purpose of this section is to describe how Cedar School District's change plan for enhancing its EdTech ecosystem will be monitored and evaluated. This OIP uses the

monitoring and evaluation framework as described by Markiewicz and Patrick (2016) and applies a Constructive Inquiry (CI) approach that aligns with the overall change implementation plan. CI employs a pre-determined and purposeful blend of both AI and traditional qualitative and quantitative approaches to evaluation, so that the evaluation process can best meet the needs of stakeholders (Howieson, 2011). I propose that Cedar merge the traditional evaluation approach of the Concerns-Based Adoption Model (Hall, Wallace, & Dossett, 1973; Hall & Loucks, 1978; Hall & Hord, 2011) with AI. This section thus outlines the monitoring and evaluation framework; discusses AI as an evaluation tool; describes the Concerns-Based Adoption Model (CBAM); proposes a hybrid CI model that incorporates both AI and CBAM to explore tools and measures that can be used to measure progress and assess change in Cedar School District; and considers any potential refinements of the change plan.

A framework for monitoring and evaluation. As a change plan is being implemented, evaluation of a change process is necessary so that progress can be tracked. Cawsey et al. (2016) noted that during this Institutionalization phase, the change is tracked, measured, assessed, and modifications are made as appropriate. Markiewicz and Patrick (2016) argued that an overall framework that incorporates both monitoring and evaluation is essential to help guide informed decisions about a program's future.

There is a distinction between monitoring and evaluation. Markiewicz and Patrick (2016) defined monitoring as "the planned, continuous and systematic collection and analysis of program information able to provide management and key stakeholders with an indication of the extent of progress in implementation, and in relation to the program performance against stated objectives and expectations" (p. 12). Monitoring focuses on

what is being done and how it is being done. Evaluation, which Markiewicz and Patrick (2016) defined as "the planned, periodic and systematic determination of the quality and value of a program, with summative judgment as to the achievement of a program's goals and objectives" (p. 12) extends beyond monitoring to analyze program performance and to identify a deeper understanding of it. Evaluation can be formative or summative, and builds upon observations from the monitoring process.

Markiewicz and Patrick (2016) described an integrative and interdependent approach in which evaluation and monitoring are inextricably linked. Marrying the two leads to synergistic results, according to Markiewicz and Patrick (2016), and is characterized by "a common focus on answering evaluation questions" (p. 18), thereby improving accountability and learning. This approach aligns well with AI because a monitoring and evaluation framework is especially worthwhile when the organization is "committed to learning what works best for its intended beneficiaries and to adjusting its delivery model based on those learnings" (Markiewicz & Patrick, 2016, p. 3). This description fits Cedar well; its leaders have demonstrated a commitment to crafting a plan that is responsive and stakeholder-driven.

Monitoring and evaluation frameworks can address multiple purposes: results, management, accountability, learning, program improvement, and decision-making (Markiewicz & Patrick, 2016). Markiewicz and Patrick (2016) outlined nine content components of a monitoring and evaluation framework: introduction to the framework, program theory and logic, evaluation questions, monitoring plan, evaluation plan, data collection, management and analysis, reporting and communication strategy, and data collection and reporting formats. A summary of the components is provided in Table 5.

Table 5

Monitoring and Evaluation Plan for Cedar School District

Content	Brief Description	Considerations for Cedar School District
Introduction to the framework	Context, background, parameters and functions	How did we get to our current plan for improving EdTech? What is our purpose? Approaches? Stakeholders?
Program theory and logic	Efforts and intended results	What are our short-, medium- and long-term EdTech goals? How do we achieve them? Stakeholder roles?
Evaluation questions	Appropriateness, effectiveness, efficiency, impact, and sustainability	Is our EdTech change plan appropriate? What is its purpose? How will we determine whether it is working? What tools and processes do we use? How do we engage stakeholders throughout?
Monitoring plan	What is being monitored?	Align with evaluation plan. What EdTech aspects are we monitoring? Performance indicators? For what purpose? How will teachers react? How will we respond?
Evaluation plan	What is being evaluated?	Align with monitoring plan. What EdTech aspects are we evaluating? Performance indicators? For what purpose? How will teachers react? How can we respond?
Data collection	Data collection, management, analysis and synthesis	How will we collect and analyze the data? Qualitative vs. quantitative? How will we make conclusions and program improvement?
Reporting and communication strategy	Dissemination of reports for accountability	What aspects of the evaluation do we communicate, and to which stakeholders?
Implementation	How is the framework put into place?	How do we use AI to monitor and evaluate the program?
Data collection and reporting formats	Tools for data collection	When do we use AI vs. traditional evaluation approaches?

Note: Columns 1 and 2 adapted from Markiewicz and Patrick (2016).

Markiewicz and Patrick (2016) advocated early planning for evaluation and monitoring. Cawsey et al. (2016) argued that measurement and control of a change process must begin at the plan's inception and not at the end of the process. In Cedar, leaders are currently at the beginning of designing a change plan, so now is the time for an evaluation framework.

Appreciative Inquiry in evaluation. AI is a positive, inclusive, stakeholder-driven, inquiry-based approach to the change process. This OIP proposes that Cedar School District include AI philosophies, strategies, and tools to monitor and evaluate the change plan, in conjunction with traditional methods, described below.

Including stakeholders in the evaluation process through "participatory evaluation" in which evaluation personnel are partnered with primary users can contribute to the utility and success of the evaluation. This idea was explored almost three decades ago by Cousins and Earl (1992), whose meta-analysis found that organizational learning is supported by participatory evaluation. Coghlan, Preskill and Catsambas (2003) cited four similarities between a participatory stakeholder approach to evaluation and AI: both AI and collaborative evaluation are characterized by social constructivism and involve questions and dialogue; both view inquiry as ongoing, iterative, and integrated into the environment; both are structured and process-driven; and finally, both use results of the inquiry for further decision-making. Given the nature of the AI process, it may also provide data that might not otherwise have been gathered. Cousins and Earl (1992) argued that participatory evaluation is particularly useful in educational settings.

Watkins and Mohr (2001) noted that AI in evaluation is grounded in three core beliefs. First is the notion that "the intervention into any human system is fateful and that

the system will move in the direction of the first questions that are asked" (p. 182); second, observers are not objective; and third, AI in evaluation "gives the benefit of continuity" (p. 183). MacCoy (2014) found that evaluators using AI have reported that the combination of its appreciative questions, reframing with positivity at the core, and generative features (which generate new understandings) lead to solid assessment.

Bushe (2018) cited five benefits of using AI in evaluation: 1) it results in information that has the greatest potential of being used because it includes many stakeholders; 2) it gathers better information because of its large group format; 3) it results in inclusion of groups who may otherwise have issues with participation; 4) it can be used in cases where there might be fear or skepticism of the change; and 5) it is a more congruent approach to evaluation. Coghlan et al. (2003) also noted benefits of AI in evaluation: it increases validity of data, it builds evaluation capacity, it empowers people to promote social change, and it is more democratic. These benefits are likely applicable in Cedar's case and align with the nature of the problem and the large number of stakeholders. Moreover, collection of valid qualitative data will help leaders refine the change plan as it progresses.

Watson (2013b) argued that evaluating complex change demands an approach that will account for multiple realities, divergent stakeholder perspectives, and a variety of activities, and that AI provides the structure to achieve those, and it can thus be effectively used as an evaluation tool. She further maintained that AI can be used to capture both the negative and positive aspects of a program, and found that in her application of AI to evaluation, the result was qualitative data in the form of narratives that described individual and collaborative learning that affected organizational

performance (Watson, 2013b). As she also used AI in her organizational diagnosis, she reported that AI was a "natural progression to a collaborative approach" (p. 396) and the same continuity of approach could be applied in Cedar's case.

Rogers and Fraser (2003) stated they do not expect that a sole evaluation model will be sufficient for any particular evaluation. They suggest three criteria for evaluating an evaluation method: Is it plausible? Is it practical? Does it work? They report that AI has a mixed score, arguing that there is a risk that its focus on positivity could encourage unrealistic and even dysfunctional behaviours, and is not as likely to be useful if inadequate performance needs to be discovered, concluding that it could be an appropriate complement to other evaluation methods (Rogers & Fraser, 2003). McNamee (2003) noted that AI can yield rich qualitative data in evaluation. However, AI is not ideal in cases where evaluators want quantitative data (Bushe, 2018). Finally, AI demands excellent facilitation skills (Watkins & Mohr, 2001) and prolonged engagement which can take a long time (Elliott, 1999). Given these potential shortcomings and difficulties, Cedar should consider additional approaches in its evaluation process.

Concerns-Based Adoption Model. The Concerns-Based Adoption Model (CBAM) is a robust and long-standing method of diagnosis that can help organizations assess the results of their change implementation plans. It has been used for nearly 50 years across a range of contexts, countries and cultures (Hall, 2013). It was first developed by Gene Hall and his colleagues in 1973 (Hall et al., 1973) and has been refined over the decades by Hall and various colleagues. Dudar et al. (2017) called the CBAM a well-structured approach to measuring change, and have attributed CBAM's success to its foundations: it was based on research on teaching about teaching and thus is

relevant; it was based on comprehensive research; and it has been validated and refined over decades of practice.

There are three underlying core assumptions to the CBAM, according to Hall (2013): First, change is a process and not an event; second, organizational change does not occur until the people within it actually change; and finally, change is a personal experience for individuals. These assumptions are not inconsistent with AI, and thus the two approaches can be used in a complementary fashion. Importantly, a CBAM approach can be utilized when AI does not capture the data desired, or if AI is too cumbersome.

There are three diagnostic dimensions that can be utilized in CBAM: Stages of Concern; Levels of Use; and Innovation Configurations (Hall, 2013). Each is described below, and possibilities for using them in Cedar's context are discussed. A table summarizing the dimensions is presented in the following section, which describes Constructive Inquiry, the blended model that incorporates both AI and CBAM.

Stages of Concern. Stages of Concern (SoC) reflect the personal aspects of change. People can express their perceptions and emotions about the change process (Hall, 2013). Hall and Hord (2011) delineated seven SoCs: Unconcerned, informational, personal, management, consequence, collaboration, and refocusing. Cedar could use surveys to measure stakeholders' SoC.

Levels of Use. Levels of Use (LoU) represent the extent to which people are using an innovation (Hall, 2013). It does not take a binary approach to use; rather, it places people on a spectrum based on their use of the innovation and thus can provide richer data. LoU has eight levels: Non-use, orientation, preparation, mechanical user, routine, refinement, integration, and renewal. Cedar could ask its teachers questions about their

use of EdTech, using a branched interview approach, in which the interviewer selects subsequent questions based on responses (Hall, 2013). Hall (2013) noted that a simple questionnaire does not work for LoU because it is a behavior measurement and thus tautology.

Innovation Configuration. The Innovation Configuration (IC) measures the fidelity of implementation (Hall, 2013). That is, how is the adopted innovation actually being used in practice? Is it being used effectively and for its purpose? Cedar could garner technology integration data from teachers by direct observation and interviews and summarize it in an IC map to identify where further alignment is needed (Hall, 2013).

There are two other factors that influence the CBAM: the change facilitator and the organization's resource system. Along with the three dimensions described above, the CBAM can provide Cedar with a tool for measuring and monitoring the success of its plan. It will be done in the broader context of the blended Constructive Inquiry model.

Constructive Inquiry: A blended approach to evaluation. Patton (2003) argued for the "principle of situational responsiveness: matching the evaluation approach to the needs, assets, and interests of primary intended users" (p. 96). Context always matters, and change leaders must look closely at their own circumstances and choose the best fit. Howieson (2011) noted that innovative projects require innovative evaluation methods, and in her evaluative study of an Australian child safety program, she proposed blending Appreciative Inquiry with more traditional evaluation methods. She argued that AI does not ignore more traditional evaluation forms; rather, it provides for their usage within a constructivist framework if the evolution of the AI process demands it (Howieson, 2011). In other words, when AI cannot provide change leaders with the full range of data they

need in their evaluation, or if there are other shortcomings in with AI, then other approaches can be used, but only if necessary (Reed, 2007).

In Cedar's case, it will be necessary to gather both qualitative and quantitative data in a relatively timely fashion. Merging AI and CBAM in a CI framework for evaluation at the outset is a way that Cedar can remain consistent with the overall AI approach to change, but also fill in any missing data gaps, whether qualitative or quantitative. This will result in the best understanding of the change process, and provide for the most appropriate and comprehensive data to help Cedar's leaders better understand the change process. A summary of how both AI and CBAM can be used in the monitoring and evaluation phase is presented in Table 6.

Table 6

Measures and Approaches to Data Collection using Constructive Inquiry

Information Sought	**Measure**	**Approach**
Usage of BC ERAC Digital Classroom	District usage data from BC ERAC	(Externally collected)
Current usage of and satisfaction with other digital products	SoC: Teacher and student surveys, observations	CBAM
What needs to change?	SoC: Teacher and student surveys and AI Summit	AI and CBAM
Technology Integration	IC: Teacher survey, observations, IC map	CBAM
Efficacy of PD	IC: Teacher survey, observations, IC map	CBAM
Willingness of teachers to participate in PD	LoU: branched interview	AI and CBAM
Willingness of teachers to participate in PLCs	LoU: branched interview	AI and CBAM
Efficacy of PLCs	IC: Teacher survey, observations, IC map	CBAM
TPACK acquisition	LoU and IC interviews, surveys, and observations	CBAM

Finally, as Cedar's leadership embarks on the evaluation process, it should consider answering the following guiding questions for professional learning related to EdTech. Understanding how PD affects TPACK will be crucial. These questions were developed by Hirsh and King (2017) and provide a framework for understanding the factors that will be key to monitoring, evaluation and ultimately, program improvement.

- How does EdTech advance learning?
- How does it support best practices in teaching?
- What can leaders do to support EdTech integration?
- How will the EdTech support leaders?
- How will limited resources be allocated?
- How will data be used to help define teachers' needs?
- How will EdTech support those needs?
- How will EdTech be used to monitor new learning?
- How does EdTech address unique teacher needs?
- How are users made aware of the expectations and outcomes?
- What evidence exists to support how technology improves learning?
- What supports are provided during the change plan implementation?
- How is successful implementation defined?
- How will EdTech help students and teachers achieve outcomes?

Utilizing both AI and CBAM in a CI approach to evaluation, and understanding the type of data that is needed to assess how the change plan is working will help Cedar's leaders understand what needs to be refined. Howieson (2011) reported that blending AI and other measures allowed her evaluation to be constructive across disciplines.

Revising and refining the change plan. Depending on the results of the Constructive Inquiry, Cedar will need to be open to revising and refining the change plan. The represents the final stages of both the Change Path Model, Institutionalization, and the full Appreciative Inquiry 4-D cycle, Destiny, which focuses on empowering and improving. District leaders may need to adjust proposed timelines or revise specific goals. They may need to reconsider strategies if the CI finds shortcomings in the change plan. Such changes will ensure long-term success and sustainability of the change plan. Whatever those changes may be, communicating them to stakeholders will be crucial. The following section outlines the role of communication throughout the change process.

Plan to Communicate the Need for Change and the Change Process

Effective, ongoing communication is vital to the success of a change plan. Armenakis and Harris (2001) stated that leaders' failure to understand the importance of a consistent change message can result in negative responses to change. Klein (1996) argued that change often fails because insufficient thought is given to communicating change. Beatty (2015) found a high correlation between communication efforts and successful change. Ford and Ford (1995) argued that language itself can produce intentional change, and that change is a communication-based and communication-driven phenomenon. Burnes and By (2012) noted that leaders have a responsibility to provide ethical clarity about their approaches in the change process in order to ensure successful change. The purpose of this section is to discuss communication as it relates to building awareness of the need for change, and to develop a strategy for Cedar to communicate clearly and persuasively to relevant audiences.

Building awareness of the need for change. Klein (1996) argued that change is particularly difficult when the present circumstances are reasonably comfortable for people. At this time, there is no readily visible EdTech crisis in Cedar. Teachers have functioning computers. Students generally have access to iPads, Chromebooks, and desktop computers to varying degrees across the district. Internet connections may sometimes be slow, but they usually work. Many stakeholders may not see the urgency for change. However, at Cedar's inaugural EdTech Working Group session in February 2020, in which a small group of teachers and administrators met to discuss EdTech in an Open Space meeting format, participants identified multiple inconsistencies and questions in the EdTech domain, as outlined above. District leaders are currently digesting the results of that stakeholder-driven meeting, and in the coming months will develop a strategy for leveraging the use of EdTech tools to enhance teaching and learning in the district. Beatty (2015) proposes that leaders understand at the outset the "why," the "what," and the "how" of change. In turn, stakeholders will need to be convinced that even though there is not an emergency, they will be better off with the change implemented.

If Cedar proceeds with the recommendations of this OIP and holds an AI Summit, it will be crucial to communicate the outcomes following the summit. The summit would identify stakeholders' perspectives. Ludema et al. (2003) outlined vehicles that could be used to communicate summit outcomes. They are presented in Table 7. It is important to note that even if Cedar does not employ an AI approach, the vehicles and benefits are still relevant and should be used to build support for the change plan.

Table 7

Communication Vehicles to follow an Appreciative Inquiry Summit

Communication Vehicle	Benefits
Videos with talking points	- Provide a visual experience of summit activities - Communicate information quickly and easily - Give summit perspective to organization members not in attendance - Cost-effective
Newsletters/ emails	- Provide clear, concise and fast dissemination - Wide diffusion throughout the organization - Can be used to communicate progress of change effort - Cost-effective
Face-to-face meetings • Large groups • Small groups • Individual meetings with supervisor • Team meetings with supervisor • Leadership presentations to employees	- Build higher trust and durability of message - Ensure continuity of message and eliminates incoherence - Easier to customize message to particular audience - Build higher commitment levels for the change - Provide an opportunity for immediate feedback - Can be used to communicate progress of change effort - Provide opportunity for those not in attendance to join innovation teams
Summit proceedings	- Document summit activities from start to finish - Provide a permanent record of what transpired - Serve as a communication tool for those who attended - Document plans and actions
Story books	- Communicate the summit outcomes in story fashion with pictures and quotes - Foster creativity in communicating the summit message
Progress maps	- Visibly record the progress of each innovation team - Serve as a way to track and celebrate success - Serve as a self-management/ motivation tool for all innovation teams
Website	- Easy access and availability - Provides clear, concise, and fast dissemination

Note: Adapted from Ludema et al. (2003).

Cedar should develop a communications strategy prior to the next steps of the change process. Irrespective of the leadership approach that Cedar ultimately adopts, this

OIP proposes utilizing three message-conveying strategies as described by Armenakis and Harris (2001): persuasive communication; active participation; and managing internal and external information. I recommend that Cedar consider seven key principles of organizational change communication as outlined by Klein (1996). They are:

- Redundancy of the message is linked to retention of the message
- Using a variety of media is better than using only one
- Face-to-face communication is better and clarifies ambiguities
- Communication from management the most effective way of sharing information, even though the change process might be participatory
- Supervisors are the principal communicators of the organization's information
- Opinion leaders can influence others
- Information that is personally relevant matters more than abstract concepts

In addition to these, I suggest commitment to an additional fundamental principle in communications: honesty. Cawsey et al. (2016) pointed out that the leader's integrity can be an "antidote to cynicism and skepticism" (p. 239), thus facilitating the change process, in addition to being the ethically correct approach. These fundamental principles can be applied to all stages of the change process, even if the objectives of each phase are different. During the Change Path Model's (Cawsey et al., 2016) Mobilization Stage, it is crucial at the outset to communicate the need for change, determine how the issues will be presented to change recipients, and to manage affected stakeholders.

Armenakis and Harris (1999) identified five key message components in the change process: discrepancy, efficacy, appropriateness, principal support, and personal valence. Discrepancy should be considered as Cedar contemplates communicating the

need for change. Discrepancy relates to whether stakeholders believe change is necessary. Armenakis and Harris (2001) noted that individuals must believe there is something wrong in order for them to be motivated to change. For Cedar, the way that the need for change is communicated is crucial because it may be that not all teachers and other stakeholders believe things need to change. Participants in the EdTech Working Group demonstrated enthusiasm for change, but there is likely a sample selection bias and it cannot be assumed that EdTech is a priority for all teachers. This underscores the importance of an effective communication strategy to convey the need for change. The next four components – efficacy, appropriateness, principal support, and personal valence – will be covered the in next section, which discusses a communication strategy.

Communication strategy. It is important to engage stakeholders and address their concerns at every stage of the process. Beatty (2015) described four key components of a communication plan: change leaders need a coherent communication strategy; they need to use appropriate means of transmitting information; they need to be sure that middle managers support the change; and they need to persevere with communications throughout the entire change process.

A communications strategy for Cedar can be developed based on Beatty's (2015) Communications Model, which provides a comprehensive framework for crafting an effective plan. Armenakis and Harris's (2009) components will also be considered, and Klein's (1996) principles will be followed as the strategy is developed and implemented. Finally, considerations specific to certain phases of the change plan are presented.

Beatty (2015) suggested that leaders answer following questions as a basis for application of the Communications Model:

1. What roles and responsibilities will people have in the communication plan?
2. What guidelines should be put in place, and what is the objective of each communication?
3. What stakeholders have an interest in this change? How much communication is necessary for each group?
4. How will effective messages be tailored to the needs and interests of each stakeholder group?
5. What are the best media to use for each communication and each stakeholder?
6. Who should communicate with each stakeholder group, and how can consistent and effective communication be ensured?
7. How will the effectiveness of the communication be assessed and improved?

To develop the communication plan for Cedar, the following context-specific responses to Beatty's (2015) questions are suggested.

1. Roles and responsibilities. Cedar's assistant superintendent chairs the EdTech Working Group, and has assumed responsibility for managing the change process; thus, he would be responsible for overseeing the communications plan. EdTech Working Group members may contribute content as appropriate, and emergent leaders would be encouraged to correspond directly with the assistant superintendent, but responsibility for disseminating information would rest solely with him. A Core Team, comprised of

technology specialists, the director of learning and curriculum, and a district teacher leader would advise the assistant superintendent.

2. Guidelines and objectives. The communication guidelines will be based on Klein's principles outlined above. Prior to each communication's dissemination, the assistant superintendent would review communication goals with the Core Team.

3. Stakeholders. The key stakeholders are the district's teachers and to a lesser extent, school administrators. Some aspects of the change plan will affect students and possibly families. Because the teachers will be most affected by the change, they will need to feel that they have sufficient information at every step of the way. They will want to know how Professional Development and Professional Learning Communities will affect their schedules and workload, and they will want to know how the change plan will be beneficial to them. Understanding any potential issues in advance via consultations will be important for Cedar's leaders. Minimizing teacher resistance will be key to the change plan's success, and that can be facilitated by appropriate communications.

4. Creating effective messages. The district will need to ensure it understands the "why" and the "why now" (Beatty, 2015) of the change plan in order to craft messages that effectively build support for it. It must also delineate the goals of the program. Understanding how the outcomes will benefit Cedar's teachers and students will be key in developing communication lines.

5. Best media. With specific attention to Klein's (1996) principles, Cedar's leadership will need to choose the best means for information dissemination at each step from a wide range of media, ranging from email and websites and social media to face-to-face meetings. There are advantages and disadvantages to each type, and these will

need to be carefully considered for each communication initiative. Leaders should also take advantage of opportunistic moments to communicate. For example, schools in the district typically have monthly staff meetings that could facilitate face-to-face discussions with administration.

6. Who communicates with each stakeholder group? Beatty (2015) noted that the person responsible for communications must have credibility with each group. Communications to the EdTech Working Group and to teachers should come from the assistant superintendent. Notices to parents could come from principals or teachers.

7. How will the communication's effectiveness be assessed and improved? District leaders could use the EdTech Working Group (comprised of teachers and administrators) to act as a focus group for communications. Although there may arguably be a sample selection bias in the group, feedback on the quality and efficacy of communications could be constructive. Leadership could also seek feedback from the broader group of stakeholders using periodic surveys.

As Cedar's leadership crafts its communication strategy for the various stages of the change plan, it will want to consider Armenakis et al.'s (1999) message components of efficacy, appropriateness, principal support, and personal valence, as discussed in previous sections. Efficacy encompasses individuals' confidence in their own ability to succeed (Bandura, 1986). If people don't feel confident that they can succeed in the new environment, they won't support the change initiative. Thus, Cedar must communicate adequately that the PD and PLCs will support teachers as the district moves to improve EdTech usage. Appropriateness refers to the idea that people agree that the particular change being proposed is a good fit for them. The change messaging must effectively

communicate that the changes are appropriate. If it cannot, then perhaps the plan itself needs revision. The next component is principal support, which means that change recipients feel supported by change agents and other leaders. Finally, the concept of personal valence refers to the idea that change recipients will benefit from the proposed change. Change leaders should ensure that benefits – as well as discomforts – are properly conveyed through good communications. Dudar et al. (2017) described a variety of forms of teacher resistance, and successful communications can help reduce potential resistance.

It is worthwhile to note that the evaluation stage must be executed with particular care. Monyatsi, Steyn, and Kamper (2006) found resistance among teachers to evaluation of their performance. There is general resistance in Cedar to the concept of performance evaluation. Although the integrative evaluation and monitoring framework that Cedar could employ to chart the success of the EdTech plan and would not evaluate teacher performance *per se* – and in fact, Markiewicz and Patrick (2016) specifically noted that their framework evaluates program and personnel – Cedar would need to approach evaluation of the change plan carefully and communicate it appropriately to avoid any misunderstandings which could in turn, jeopardize support for the change plan.

In summary, the change process is complex. It is best supported with a carefully-executed communication plan that considers stakeholders, different phases of change, methods of communication, underlying principles, and organizational context.

Chapter Three Conclusion

This chapter has described a change implementation plan for Cedar School District to enhance its EdTech ecosystem in order to improve teaching and learning. The

plan has three components: first, a plan to build teacher capacity in EdTech by improved Professional Development opportunities and a framework for ongoing Professional Learning Communities to support teachers in the classroom; second, a comprehensive system for vetting EdTech resources; and third, a supportive leadership framework. The chapter has suggested a Constructive Inquiry framework for monitoring and evaluating the change process, as well as a strategy for communicating change throughout the entire change process. The ultimate, long-term goal for Cedar is to have a learning organization (Senge, 1990) that effectively utilizes EdTech. Successful implementation of the proposed change plan could support this goal.

Next Steps and Future Considerations

This Organizational Improvement Plan (OIP) has presented a change plan that was designed to support the enhancement of the EdTech ecosystem in a small school district in British Columbia where I work as a teacher. It identified and explored a problem that school districts around the world are facing: EdTech is not living up to its full potential because of a lack of supports for teachers, which has resulted in under-utilization and missed opportunities. This OIP has examined ways that leaders can create supportive frameworks and processes for teachers so they can optimize the use of EdTech to improve teaching and learning.

It was with much enthusiasm and hope that I joined Cedar School District's EdTech Working Group, and over the past few months I have had numerous fruitful discussions with various members of the district leadership team. Everyone has been optimistic about the possibilities and the promise of the highly-motivated group to bring about change in the district. The Working Group's initial meeting proposed the question

of how to "amplify technology to enhance teaching and learning in Cedar." The meeting revealed a variety of concerns from teachers, including software, hardware, equity, access to devices, digital citizenship, mental health and technology, using technology to improve teacher collaboration, and using technology to improve student learning. District leadership was deeply engaged, took this feedback away, and planned another meeting to seek further stakeholder input.

In March 2020, the COVID-19 pandemic began to explode across the world. That terrible crisis, which is still in full force at the time of this writing (August 2020) has thrown the whole world into a kind of chaos and dislocation that has not been seen in peacetime during any living person's memory. In an effort to stop the spread of coronavirus, human activity on the planet has screeched to a crawl, with people around the world being told to stay home. By early April 2020, about 90% of the world's schools had closed. This is, quite simply, unprecedented. Schools, districts and countries moved their classrooms into cyberspace. BC opened its schools in June 2020, but only at partial capacity. The province is planning a full return to the classroom in September 2020, but intense public debate indicates disagreement about how to do so safely.

Besides the devastating human dislocation this crisis has spawned, it has also revealed both promise and peril in the area of EdTech. Teachers around the world have been able to connect with their colleagues and students on video conferences. But countless students worldwide remain disconnected, both literally and figuratively.

Many of the issues I explored in this OIP – equity, privacy, the impact of EdTech on educational outcomes, teacher competence and confidence with digital tools, the lack of vetted educational materials – have been thrust into the limelight as educators and

leaders have had to quickly figure out the best ways to continue the educational process. Some jurisdictions declared they would move to online learning; others, like British Columbia, declared simply that schools would be responsible for providing "continued learning opportunities." Leaders and teachers are struggling to define what that means. IT specialists have scrambled to set up protocols and training for staff. Teachers have been trying to figure out how to teach remotely. Students miss their friends, teachers, classroom, and routines of school. Nobody believes that the physical classroom can actually be replicated online, but people are trying. In the meantime, the question of mental health has surfaced, perhaps in ways not seen before, as youngsters around the world cope with drastic changes and insecurity in their lives. Technology may help them cope with newfound isolation, but it may also complicate things. It may also create new problems that we don't even know existed.

The external shock of COVID-19 has created the very sense of urgency described by Kotter's (1996) model that I had initially rejected. Although I stand by my choice of the Change Path Model as a framework for change, the sense of urgency is clearly powerful. It is forcing rapid, unprecedented changes and innovation in educational technology and processes. It is altering our educational culture, and quite possibly, our entire human culture.

The EdTech Working Group reconvened (remotely) in April 2020, and while further meetings are not planned at present, leadership has launched the district into a stakeholder-driven trajectory for change that will continue irrespective of whether schools are physically open. It will need to balance the immediate needs and stresses generated by COVID-19 with the longer-term vision for change.

Cedar's leadership has made it clear that it intends to bring a strong teacher voice into the change dialogue and process. As a teacher myself, I embrace the opportunity to express my views and be part of the solution. Fullan (2013) noted that the teacher as a change agent is crucial. As an emergent leader, I find Cedar's approach energizing, empowering, and inspiring. Hall (2013) pointed out that organizational culture is a crucial factor in successful change. Hall also noted that the relationship between leadership and the social construction of culture can affect implementation success (Hall, 2013). Hallinger (2003) underscored the importance of leadership in the change process. The current leadership in Cedar is highly engaged and motivated, is aware of the problems, and has demonstrated a sincere commitment to stakeholder-led transformational change. The COVID-19 crisis is testing the leadership capacity in ways previously not envisioned. So far, leadership has responded to the crisis in a manner that has inspired confidence and hope. When in-class learning was suspended, leaders moved quickly to implement a plan that would allow students in need of technology to borrow district devices for home use. The long-term benefits of the strength of the leadership shown during this crisis may be bigger than any of the factors explored in this paper.

Senge (2013) wrote about the importance of seeing the "big picture." He argued that we can't solve problems by picking them apart; we must approach them in a larger context. It is only by jettisoning the idea that the world is made of separate, unrelated forces that we can embrace the idea of a learning organization in which we are constantly growing together. If there was ever doubt that we are interconnected in this world, the coronavirus – which originated in one person in a faraway land – has put that to rest.

The COVID-19 crisis and the questions it raises for EdTech in general and my own teaching context in particular simply cannot be answered at this time. However, the current circumstances bring my mind full circle back to the core values of education that I discussed at the outset of this OIP: the principles and philosophies of Swiss educator Johann Pestalozzi. As noted in Chapter One, Pestalozzi believed in the importance of the relationships between home and school, and students and teachers. Pestalozzi believed that education must make us better people. He believed that trust and gratitude are essential. In two hundred years, these principles have not changed, but our technological world certainly has. The COVID-19 crisis has made it clear that EdTech is no longer just a peripheral piece of our kit, but has become as central to our pursuit of these ideals as are the printing press, teacher education, and the safe classroom. This OIP was developed in a calmer time, but the urgency that the COVID-19 crisis has brought to all education shows that the ideas described here may be useful as we all try to learn how to develop the full promise of technology to help us pursue our goals.

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Appendix

Readiness for Change in Cedar School District

Readiness Dimension	Score
1. Has the organization had generally positive experiences with change?	1
2. Has the organization had recent failure experiences with change?	0
3. What is the mood of the organization: upbeat and positive?	1
4. What is the mood of the organization: negative and cynical?	0
5. Does the organization appear to be resting on its laurels?	0
6. Are senior managers directly involved in sponsoring the change?	2
7. Is there a clear picture of the future?	1
8. Is executive success dependent on the change occurring?	0
9. Has management demonstrated a lack of support?	-1
10. Are senior leaders in the organization trusted?	1
11. Are senior leaders able to credibly show others how to achieve their goals?	0
12. Can the organization attract and retain capable, respected change champions?	2
13. Are middle managers able to effectively link senior managers with the rest of the organization?	1
14. Are senior leaders likely to view the proposed change as generally appropriate for the organization?	2
15. Will the proposed change be viewed as needed by the senior leaders?	2
16. Does the organization have scanning mechanisms to monitor the environment?	0
17. Is there a culture of scanning and paying attention to those scans?	0
18. Does the organization have the ability to focus on root causes and recognize interdependencies both inside and outside the organization's boundaries?	1
19. Does "turf" protection exist in the organization?	0
20. Are senior managers hidebound or locked into the use of past strategies, approaches, or solutions?	0
21. Are employees able to constructively voice their concerns or support?	1
22. Is conflict dealt with openly, with a focus on resolution?	1
23. Is conflict suppressed or smoothed over?	-1
24. Does the organization have a culture that is innovative and encourages innovative activities?	1
25. Does the organization have communications that work well in all directions?	1
26. Will the proposed change be viewed as generally appropriate for the organization by those not in senior leadership roles?	1
27. Will the change be viewed as needed by those not in senior leadership roles?	1
28. Do those who will be affected believe they have the energy needed to undertake the change?	1
29. Do those who will be affected believe there will be sufficient resources to support the change?	1
30. Does the reward system value innovation and change?	0
31. Does the reward system focus exclusively on short term results?	0
32. Are people censured for attempting change and failing?	0
33. Are there measures or assessing the need for change and tracking progress?	1
34. Does the organization attend to the data it collects?	0
35. Does the organization measure and evaluate stakeholder satisfaction?	1
36. Is the organization able to carefully steward resources and meet deadlines?	1

Adapted from Cawsey et al. (2016). Scores can range from -10 to 35. The higher the score, the more likely the organization is ready for change. Cedar's score is 23.