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Designing for a School System that Learns

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by

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Abstract

In a complex and dynamic world young people need to devise ways of adapting flexibly, they need to be prepared to undertake something unforeseen, to renew our common world. Yet education emphasizes conformity and compliance underpinned by the deeply seated metanarratives of scarcity, standardization, fragmentation, and control. These metanarratives are embedded in the learning, teaching, and leadership in our schools and in the very reform initiatives that seek to change them. In this study I endeavoured to disrupt and replace these ideas. I draw on system thinking, design, and designing learning to reframe school system leadership as designing for a system that learns. From a design-based approach I partnered with school district leaders to redesign a school district's strategic plan and implementation process. I share the practical design solutions that were developed in response to the needs of the context and chronicle the iterative design process that was driven by the analysis of empirical data. With the aim of opening up possibilities for how system leaders might practice design for a system that learns, I present a theoretical model featuring four interconnected design principles: divergence and convergence to balance autonomy and coordination; feedback cycles to drive iteration; network connectivity to encourage brokerage between and within systems; and design culture to create the conditions for learning to become a collective responsibility. Finally, I reflect on design-based research, complexity, and Indigenous ways of knowing to expand the space of the possible for future research.

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Chapter 1: Introduction to the Inquiry

With her newly born great granddaughter (my daughter, Mika) in her arms, my 97-year-old grandmother reflected, “I can’t imagine what this little one will see in her life. Change, that’s for sure. More than even I’ve experienced.” I carry this moment with me; it helps position me in this life. I find perspective in the wisdom my grandmother shared. The scope of change that she experienced is staggering. Born to a Métis hunting and gathering family, in her lifetime she saw the advent of indoor plumbing, refrigeration, the automobile, the airplane, the space shuttle, the television and the internet. These new technologies transformed her life and expanded her world and her impact on it. In that moment and in many moments since, I wonder (and worry) about what my daughter’s life holds. Thinking about the changes she will experience is bewildering. As a teacher I ponder what my daughter, and all of our children, will need for a future that we cannot envision. My best answer is that young people need to devise ways of adapting flexibly, they need to be able to imagine things being otherwise and take agentic action to make the world a better place (Greene, 1998). Furthermore, they must be able to do this in a dynamic interplay with the constantly changing conditions of the complex systems within which they interrelate.

My daughter Mika started Grade 1 this year, her school experience shares much in common with the one room schoolhouse my grandmother attended. Rather than adaptability, imagination and agency our schools were designed for, and largely continue to promote, conformity and compliance (Dunleavy et al., 2012; Eisner, 2002). Of course, mine is not the first call for change and this not my first experience trying to change education for students. As a teacher and school leader I have been directly engaged in efforts to transform education for the 21st century (Alberta Education, 2010; Bass et al., 2016; Friesen et al., 2015). Eighteen years into said century and meaningful change has yet to occur (Levin, 2010). At the crux of the predictable failure of education reform is that we are trying to make change in education using the same kind of thinking that underpins the problems. The learning, teaching, and leadership driving educational reform efforts reflect the metanarratives of scarcity, standardization, fragmentation, and control (Jardine, 2013; Davis et al., 2015; Sarason, 1990). We are trying to change education as if it were an industrial assembly line machine. In my dissertation project I draw on system thinking, design, and designing learning to reframe school system leadership as designing for a system that learns. Through a design-based research (DBR) approach I partnered with Rocky View Schools (RVS) to redesign how the district developed and implemented a 4-year school education plan (4YP). The practical outputs designed in this study redefined: the district's learning agenda; the leadership processes that serve to carry out the learning agenda at the district and school level; and who had voice and agency in these processes. The question at the core of my study is "How can school district leaders design for a system that learns? Ultimately, I am in search of hope. I am in search of the conditions from which my daughter and her generation can undertake something unforeseen by us and renew our world (Arendt, 1961). Holding hands with my grandmother and my daughter, I felt this responsibility. I dedicate this work to them both.

Situating the Study

I walk each day from my home near Mohkínstsis (the sharp bend made by the Elbow and Bow Rivers) to and from the University of Calgary. Walking for me is a method of thinking and reflecting. Once a week I extend my walk to include Nose Hill as a climax point in my journey. Nose Hill is a special place. For thousands of years it has been a place of ceremony, of spirituality and of lookout for the Blackfoot People. On my walk it offers me a unique perspective, a broader view. It affords me an opportunity to see the entirety of the path I walk each day. To get a glimpse of the bigger picture. It is my aim to present a frame like that now, a big picture view of the "paradigm" that guides my research (Taylor & Medina, 2013).

Underpinning my study is an ontology of complexity; an epistemology that understands knowledge to be generated by and existing in the interactions of systems; a theoretical framework that construes the school system as a learner, learning as maintaining, and teaching and school system leadership as designing learning; a research attitude of pragmatism; and a methodology of DBR. In this view the paradigm underpinning my work is presented as comprehensive, aligned, and even somewhat linear. Yet, from atop Nose Hill, I cannot hear the creek rushing, nor wonder at tracks in the morning frost. I cannot meet the eyes of a coyote. A coyote that in a heart-racing encounter teaches me much about myself and my place in the world. My walk is more than its topography. It is also more than a string of experiences. My walk, and my research paradigm, are made up of complex interrelationships. For this reason, I explore the ideas in this paper in relation to one another and to my life experiences through a complex narrative structure (Davis, 2008). I endeavour to open up possibilities. To both represent and present complex webs of connections in their interwoven, multivocal character.

Although the view from Nose Hill doesn't reveal the interrelationships and interactions that make up my walk, it does offer a view of a broader web of relations. From Nose Hill I can see the sprawl of human activity below, the river valley carved in the vast prairie, the snow-capped mountains forming a backbone to the west. The view from Nose Hill offers the opportunity to consider how my actions interconnect within grander systems and timescales. From this perspective I am prompted to consider what other directions I could take, to imagine things being otherwise. An overview of my research provides a view to reflect on the connections between my research and a justified conception of what makes a meaningful life (Hostetler, 2005).

In this paper, and in my research, matters of axiology are interwoven in explicit ways. My research is situated in relationships. I situate the problem and context in relation to my experiences. I situate my ideas within the research of my teachers: Brent Davis, Sharon Friesen, Gabriela Alonso-Yáñez, David Jardine, among others. My project sought to contribute to RVS, a community that has sustained me for 25 years as a student, teacher, leader, and parent. My research is framed by questions about how to best live up to my responsibilities to my profession, to my grandmother, to my children and their children. More implicitly, I wrestle with my responsibilities to the land and history of the Blackfoot territory within which I live, teach, and research. I seek ways to honor my Métis ancestry. I explore my relationship with Indigenous ways of being, knowing, and coming to know. From a broad view my research is situated within my beliefs in relationality and reciprocity. These beliefs guide me as I seek a path with heart (Chambers, 2004).

Context

I believe that in order to create meaningful change I must begin by seeking to understand how things came to be the way they are. I must try to identify ways in which historical legacies are at work in the structures, culture, language, and collective experiences of schooling (Friesen & Jardine, 2009). I start in a disruptive and pivotal moment of my classroom teaching practice through which I came to see my own past and future experiences differently (Davey, 2006, p. 8). Reg Crowshoe frames this well: “We can never aspire to make progress without a re-experiencing of the past in us so that we can challenge it directly” (University of Calgary, 2020).

An Interruption

“Why are we doing this?” he said in an exasperated tone, I took a breath to compose my reply yet was interrupted “before you answer that, you can save the part about the test, the curriculum, the report card, the going to university, the getting a good job, the buying a nice house, I know all of that already. What I want to know is why do we have to do this, again?” I must have looked a bit stunned, the rest of the Grade 4 class was waiting with bated breath to see what would happen next. “I’m not sure I understand what you’re asking, Carter,” I replied as I reeled more from his statement than his question. “Let me show you” he said, as he came to the whiteboard. He proceeded to write a row of numerals all the way across the double whiteboards and then a second row directly underneath, then he drew a long horizontal line below both rows and looked at me and said, “If I can do *this* equation can I *please* skip 3 digit by 3 digit?”

I have come to recognize that "Why are we doing this?" is a critical question for education, yet in the moment I didn't have an answer for Carter. Of course, this wasn't the first time I had had a student flippantly ask me, "Why are we doing this?," nor is it particularly uncommon question for teachers to hear. This time however it struck me differently, more than a dozen years later it remains a vivid and important moment in my career, it continues to address me, drive me in my practice. This moment took place in my fourth year of teaching. We were embarking on a new unit in mathematics focused on addition and subtraction. I was introducing centre-based activities designed to help me understand the students' capabilities and needs. The design had students move around to different centres that included a range of ways to explore the concepts through manipulatives, number lines, games, a dramatic play-based scenario, number problems, and through conversation with me. Included in the design was having digital video cameras at several centres for students to reflect on and document their learning and allow me to review the video as formative assessment. What Carter recognized was that 3-digit by 3-digit addition and subtraction cohered to the same base-ten system principles he had learned in Grade 3 or perhaps earlier. What Carter didn't recognize was that through the centres I would have come to see that he understood the base-ten system and would have provided him with new challenges. What Carter intended to ask was why he had to do math questions that he already knew how to do. I imagine he was anticipating having to encounter worksheet after worksheet, followed by quiz after quiz, of problems he could solve before he started. What struck me in Carter's question however wasn't in how he intended it, but in what it revealed about what I was taking for granted. What struck me in Carter's question came in the qualifier he used: "you can save the part about the test, the curriculum, the report card, the going to university, the getting a good job, the buying a nice house, I know all of that already." Carter included this qualifier because he anticipated that my response would harken to this line of thinking, he included this qualifier, because he had already accepted that what we were doing was only really about the test, the curriculum, the report card, which was only really about preparing, ranking and sorting for some distant future. He included this qualifier, because he had already accepted that what we were doing didn't provide any opportunity to generate anything new, it didn't have any relevance beyond the generally agreed upon game of school transaction. What Carter helped me to recognize, and what made this moment so important to my practice, was that my pedagogy *was* immanently linked to "the part about the test, the curriculum, the report card, the going to university, the getting a good job, the buying a nice house." What Carter helped me connect was that my practice revolved around helping students learn largely decontextualized inert facts and skills that had been discovered by others. Knowledge and skills that had a standardized predetermined developmental sequence. Knowledge and skills that the curriculum had determined that they needed, under the auspices that students would need them at some future time. Carter helped me to recognize that although I had reframed my role from delivering knowledge to facilitating the construction of knowledge, I hadn't interrogated the underpinning conceptualization of the nature of knowledge. As I have thought about how to refute the implication that all of what we were doing was playing the game of school, I have come to realize that that was exactly what we were doing. Each of the centres, (word problems, manipulatives, game, scenario), were merely simulations of context, they did not lead to students doing anything with the skill in the community or in the world, they did not create the conditions for students to generate new ideas, to engage with controversy, complexity or challenge. What Carter helped me realize was that the only answer I could give to the question “Why are we doing this?” was exactly “the part about the test, the curriculum, the report card, the going to university, the getting a good job, the buying a nice house.”

Scarcity, Standardization, Fragmentation and Control

How did I get to this place in my practice? Only 4 years before, the Bachelor of Education program I graduated from had as its central focus engendering reflective practice. I had been in a cohort led by David Jardine, I had been encultured to an image of knowledge that is connected to living inheritances, knowledge that is generous, dynamic, and emergent (Jardine et al., 2003). I was immersed in a school where learning meant getting in on the living conversations of the disciplines, it meant engaging in the community and the world, it involved designing experiences that were worth students’ while, it meant doing things that mattered (Jardine, 2008). Yet somehow, devastatingly, only 4 years later, my “innovative” addition and subtraction unit shared nothing in common with the conceptualization of knowledge or vision of practice I was so inspired to carry forward for myself, for my students and for the world. How did I stray so far? What was it that shaped my practice in this way? What was I unable to interrogate or see beyond? Carter’s actions interrupted my practice. David Jardine (2008) taught me that I must stay with a moment like this; in this case the moment has stayed with me. In whiling and tarrying over this moment again and again I have come knowingly “to see, to think, and to feel differently” (Davey, 2006, p. 8). Reflecting on this moment has helped me recognize the “macronarratives” (D. Smith, 2014, p. 2) or “flock of ideas” (Kelly, 2011) that were hidden beyond my consciousness. Carter helped me identify that scarcity, standardization, fragmentation, and control were at work in our school and in my practice.

Scarcity

Our school was caught up in educations’ growing obsession with instrumentalism and accountability (Pinar, 2016). The curriculum I was mandated to “implement” was linked directly to standardized multiple choice, high stakes assessments. It was politicians who were in control of what my students learned, when they learned it, and how they demonstrated their learning (Pinar, 2012). Even though my own Grade 4 students didn’t have to write a Provincial Achievement Test (PAT), on many professional learning days I would work with my colleagues across grade levels to analyze the Grade 3 and 6 scores, and identify shortcomings, in hopes of school “improvement.” The pressure standardized tests put on our school was amplified each year when the results were used by system leaders as an indicator of the success of our school and when the results were reframed and published as school rankings (Cowley & Easton, 2018). Of course, the PAT tests themselves were created for accountability, created to measure “skills” deemed useful for the marketplace (Pinar, 2016) created in part to monitor societies expected return on their “investment” in education (D. Smith, 2014). In addition to standardized testing the metanarrative of scarcity was evident in our assessment practice more generally. Our school academic awards assemblies, held three times a year, were a visible and firmly entrenched representation of our collective acceptance of the school as competition mindset. Although it was never made explicit, as a Teacher I felt pressure to ensure that only a small number of students were celebrated as having achieved "excellence." This manifested itself in assessment instruments and assessment practice that served to create a bell curve. Of course, the same students excelled in this competition again and again. Many more were sent the message that if only they worked harder, they too could be successful. A third group learned again and again that they had no hope of being successful. Of course, many appreciate that school mirrors the "anxiety, competitiveness, and achievement-orientation" (Bellah et al., 1996, p. 87) of business. School, I often heard, should be preparing kids for "the real world," for "the realities of the workplace" (McLaren, 1994). My practice, underpinned by the metanarrative of scarcity, was ultimately modelled after the marketplace and was focused on shaping students into marketable products (Aoki et al., 2012).

Standardization

At the beginning of the school year I was required to submit a schedule that divided our day into 55-minute blocks of time punctuated by the ringing of bells. I had to add up the minutes we would spend on each individual subject in conformity to the government mandated stipulations. I also had to report letter grades for each of these fragments of our learning. The grades were meant to measure students against a standard and were calculated as an average of a myriad of fragmented tasks such as quizzes, assignments, homework and tests. Little flexibility existed as this whole assessment process played out through an online grade book. We were committed by our school administration to post at least three marks a week per subject in order that parents could always know how their students were measuring up to the standard. All of these structural forces can be considered vestiges of the industrial era's efficiency movement (Friesen & Jardine, 2009). Imported directly from the factory floor into education the efficiency movement's legacy includes "standardized procedures; standardized times for the accomplishment of results; sequenced actions (each which could be isolated from the others); and rewards, punishments and methods for teaching the 'workers' to adhere to these standards" (Friesen, 2009, p. 2). My innovative addition and subtraction unit fit this model requiring students to "simply learn by rote and repetition the efficient accomplishment of this one, isolated task and then to either simply repeat that task or get on to the next, equally isolated task at hand" (Jardine, 2013, p. 12). Diversity, (cultural, linguistic, racial, learning tempo, etc.) presents a problem to standardization (Friesen & Jardine, 2009). A critical question becomes who gets to decide on the standard. What gender, what culture, what language, what worldview is enshrined in the standard? In any discussion of standardization we must confront the cultural genocide of Indigenous People through Residential Schools in Canada (Stromquist, 2015). We also must seek to identify the ways in which colonialism and systemic racism continue to be present in education vis-à-vis standardization (L. T. Smith, 2012).

Fragmentation

Feeling rushed to "cover" all of the government issued curriculum was a ubiquitous pressure in our school. Each 55-minute block of our daily timetable was driven towards checking off an expansive list of learner outcomes; in Grade 4 science alone, I was provided with 88 unique bullet points. I perpetually felt as if time was running out, as if the assembly line needed to be moving faster (Jardine, 2013). Well aligned with Taylor's efficiency ideal, the design of this curriculum, was also underpinned by modernist Cartesian thinking (Jardine, 2013). Fragmentation is a hallmark of an "outdated version of the empirical sciences" (Friesen & Jardine, 2009, p. 12) that seeks to isolate things, strip away all of their relations, to get down to that which "cannot be confusable with anything else" (Jardine, 2012, p. 16). In social studies I was charged with helping students develop a sense of place, identity, and belonging in Alberta. Included in the many, many, bullet points one called on me to support students to "recognize the presence and influence of diverse Aboriginal peoples as inherent to Alberta's culture and identity" (Alberta Education, 2005). Sadly, no one of these fragmented bits and pieces was provided any prolonged attention (Jardine, 2013). Rather than supporting students to view Alberta's land, people, and stories in interrelationship, the program of study and my pedagogy treated knowledge as isolated and focused on transmitting as many facts as possible into my students' heads (Friesen & Jardine, 2009). Among the consequences was "the enduring message … that Aboriginal peoples and Canadians occupy separate realities" (Donald, 2009, p. 4).

Control

As a teacher on a probationary contract my principal was required to observe my teaching several times throughout the school year. In the first of these observations I prepared a one-off lesson plan for students to build geometric shapes using toothpicks and marshmallows. The principal came in and sat at my desk. Despite being very nervous, both myself and my students were intent to put on what we thought he wanted to see. When I asked a question, almost everyone put their hand up; when I provided instructions, they were almost over the top in their feigned attention. In debriefing the observation my principal's primary point of criticism was that I needed to have greater control over my students. He instructed that before I spoke to the group, I must wait for each and every student to place their hands in their laps and have their eyes fixed on me. He suggested that I try ringing a small bell for attention, similar to how he "managed" staff meetings. I recognized that his vision of control was inappropriate for the relationship I wanted to have with my students. I only used the bell strategy on his subsequent lesson observations. Yet, I was not immune to the deep-seated culture of control that was embedded in our school and culture. When Carter interrupted the lesson, for example, I had to quell my own instinct to put down the "insubordination." Furthermore, the plan behind my "innovative" addition and subtraction unit was in itself an act of control. It left little room for student questions and ideas to influence the learning. My teaching practice was at times synonymous with instructing, disciplining, directing, lecturing and training (Davis, 2009). Teaching as an act of control has deep roots. Through much of the 20th century, behaviourism was a prominent theory that conceptualized learning as the changing of behaviour (Friesen & Jardine, 2009). Teaching in this frame involves conditioning learners by controlling situations, setting clear and observable expectations, and manipulating change in behaviour through rewards and punishments (Davis et al., 2015). Education as an act of control can be traced back to the middle ages where teaching in the church was indoctrinating, inducting, and converting (Davis et al., 2015). This commitment to control connects to beliefs about the nature of the universe and humans' relationships to God, to each other, and to the natural world (Davis et al., 2015). Western culture continues to hold an anthropocentric perspective and largely think of the natural world as something to be controlled for human purposes (Orr, 2001).

In my classroom teaching this control metanarrative played itself in explicit ways such as attempting to control student behaviour with classroom management and in more implicit ways such as attempting to control student learning through an instrumental view of planning for the one-way transmission of inert knowledge. The only appearance that the more than human world made in my classroom was in the role of victim. In the Waste in our World Science Unit, for example, I presented students with a picture of the world as polluted and ultimately in need of salvation. I fear that what was left in their hearts and minds was a conceptualization of the environment as something external to be controlled and managed for their purposes.

Interruption Needed

Carter interrupted my practice. Although at the time I did not fully recognize the meta-narratives of scarcity, standardization, fragmentation and control this interruption helped me to recognize that I needed to make change and inspired me to keep asking the essential question "Why are we doing this?" As a teacher I reclaimed my practicum teaching practice in search of better answers for Carter and all of my students. I got back to designing experiences to inspire student questions, I got back to inquiry engaged in the living disciplines beyond the school and I got back to scaffolding opportunities for students to create new knowledge and make the world a better place. Yet, I constantly had to navigate the structures of our school and work to try and shift the perceptions and expectations of my students, their parents, my colleagues and administrators. This ever-present tension was an important factor behind my eventual decision to leave the classroom and take on a school and later system leadership position.

At the system level our team had an explicit mandate through the district's strategic plan to transform RVS into a '21st century learning organization.' We framed the change efforts and built the strategic plan on a constructivist theoretical framework (Bass, 2015). Our work precipitated documented change in six areas: "strategic plan, learning, collaboration, trust, communication, and accountability" (Bass, 2015, pp. 111–112); however, transformational change was not brought about by our work (Bass, 2015). Furthermore, it brought about unintended consequences including a perceived decrease in site-based decision making, perceived increase in teacher workload and decreased standardized test scores. As a result of these unintended consequences future strategic plans featured scaled back scope of change, greater focus on aligning the plans' performance measures to the *Provincial Accountability Framework* (Alberta Education, 2020), a reduced emphasis on 21st-century learning and an increased focus on literacy and numeracy (Bass, 2015; RVS, 2008, 2011, 2014). From the perspective of many stakeholders "the pendulum" necessarily swung back in the other direction. Where did things go wrong? Bass (2015) concluded that possible reasons included: the breadth and magnitude of the attempted changes; the lack of courage of political leaders; the concurrent demographic turnover of leaders; and the use of traditional forms of measuring system improvement.

A further reflection reveals the meta-narratives of scarcity, standardization, fragmentation, and control. Strategic planning is in its nature "an obsession with an illusion of control" (Mintzberg, 1994, p. 219). Frederick Taylor himself deemed planning "the one best way" (Mintzberg, 1994, p.16). The strategic plan that propelled our actions featured a linear input to output structure organized by six separate goals, dozens of outcomes, associated measures, and 79 fragmented strategies (RVS, 2008). It was written largely by a homogenous group of system leaders and based on consultations with actively involved parents and local business people. Accountability was identified as a preeminent "driver for change" (Bass, 2015, p. 127) and featured heavily in the plan in the form of traditional measures, specifically standardized test scores (RVS, 2008). A scan of the verbs used in the plan's strategies is revealing: "implement, employ, review, monitor, analyze, identify, develop, define, institute" (RVS, 2008). Perhaps most telling was in pushback from Teachers who felt that change was being forced on them without the necessary support (Bass, 2015). The local Alberta Teachers' Association published a research report and in the foreword distinguished between the learning embedded in the RVS' strategic plan: "Professional development intended to bring about improvement is often directed toward delivering district priorities;" and the learning they believed was needed for transformational work: "Professional learning oriented toward innovation tends to be more self-directed, not so much in terms of individual autonomy as in terms of collective professional autonomy and responsibility" (Hargreaves, 2012, p. 24). Ultimately our reform initiative was underpinned by the meta-narratives of scarcity, standardization, fragmentation, and control. We were trying to change learning, teaching, and leadership in the division using the *very practices* we were trying to unseat.

The Sum of All This

The sum of all this and the ways in which it manifests itself in schools is hard to confront. It includes replacing play with structure, freedom with stricture, nature with sterile concrete, and steel. It involves rules, punishments and rewards, bells, and lineups. It demands that children sit still nearly all day. It entails five paragraph writing, plot diagrams, spelling tests, and grammar correction. It calls for neat printing not ideas, lab reports not inquiry, and computation not mathematics. It segregates children from all that is sensuous, beautiful, and natural in the world. It refers to learning as work, encourages uniformity over imagination, and is devoid of magic, wonder, and awe. It imposes homework, because 8 hours of a child’s day is not enough. It demands memorization not creativity, convergent thinking not ideation, the answer “is (a). & (c). or ‘none of the above’” (Jardine, 2008, p. 2). It only asks questions whose answers are already written in the back of the book. It encourages competition not cooperation. It reduces art, music, and dance to extras that more closely resembled craft than expression. It positions Indigenous People, when present at all, as separate and exotic. It features close ended tasks, that limited all that is possible for a child, teacher, or leader to be that which was predefined by an accountability pillar. It is PD to be taught on Monday. It is Aboriginal perspectives to be “incorporated” and “infused” (Donald, 2009). It is school improvement with a research proven effect size. It is specific, measurable, assignable, relevant, time based, SMART goals. It never asks children or teachers to make, create, or do anything that matters. It positions knowledge as disconnected, fragmented, inert, acultural, possessions that are to be accumulated, then regurgitated, then forgotten. It is a whole year dumped from a three-ring binder into the trash. It involves reducing a child's learning to letters on a report card, to be filed for the government. It includes representing an entire school's journey of improvement and learning on an 8.5x11-inch accountability table. It never allows for children or teachers to determine what is important enough to learn, or to have what they learn be relevant to their lives. It involves shaping children into a predetermined outcome with or without their knowing and wanting. It involves predetermining what knowledge is most important and how knowledge can be enacted. It involves a dominance of western epistemologies and a devaluing of Indigenous and other non-western ways of knowing and being (L. T. Smith, 2012). It involves a continued marginalization of Indigenous communities, cultures, and histories (Donald, 2009). It is slow violence, dispersed across time and space, accretive, occurring gradually, and out of sight (Nixon, 2011). The sum of all this is compliance; systematic, institutionalized, assimilation into compliance (Eisner, 2002). The sum of all this is my search to disrupt scarcity, standardization, fragmentation, and control. The sum of all this is my search for a new flock of ideas, for new ways to conceptualize learning, teaching, leadership, and school system change.

Problem, Purpose, and Research Question

In a complex and dynamic world young people need to devise ways of adapting flexibly, to imagine things being otherwise and to take agentic action (Greene, 1998). Yet education emphasizes conformity and compliance underpinned by the deeply seated metanarratives of scarcity, standardization, fragmentation, and control. These metanarratives are embedded in the learning, teaching, and leadership in our schools and in the very reform initiatives that seek to change them. I believe we need to disrupt and replace these ideas if public education is going to create the conditions for young people to undertake something unforeseen by us and renew our common world.

In this study I partnered with school system leaders to redesign a school district's strategic plan and implementation process. I draw on system thinking, design, and designing learning to reframe school system leadership as designing for a system that learns. The practical outputs designed in this study redefined: the district's learning agenda; the leadership processes that serve to carry out the learning agenda at the district and school level; and who had voice and agency in these processes.

My doctoral research was underpinned by the question: How can school district leaders design for a system that learns?

Theoretical Framework

I believe that to disrupt the deeply-seated meta-narratives of scarcity, standardization, fragmentation, and control we need to think different. We can't change education using the same thinking that underpins the problems; we need a new frame. Dorst (2015) describes a frame as an "organizational principle or a coherent set of statements that are useful to think with" (p. 63). A frame can be thought of as a heuristic, a metaphor, a "flock of ideas" (Kelly, 2010), that one draws on to make sense of something. In Chapter 2 I develop a new frame to guide the design work in this project. I conceptualize the school system as a learner, learning as maintaining viability, and teaching and leadership as designing learning.

In DBR, practical and theoretical solutions co-evolve in the naturalistic context (Barab, 2014). DBR requires the researcher to adapt to the emerging needs of the context (Wang & Hannifan, 2005). In this study I began with the new flock of ideas presented in

Chapter 2 and in dynamic interplay with the context focused in on three specific theoretical frameworks: systems thinking; design; and designing learning. These domains proved useful in developing novel solutions, engaging stakeholders, interpreting data, and communicating findings. In Chapters 3, 4, and 5 I chronicle how these domains were employed to address the needs of the research context. In Chapter 6 I draw on these domains to present and discuss the theoretical output of this study. In the forthcoming sections I introduce these domains to foreshadow the theoretical commitments of this research.

Systems Thinking

Systems thinkers seek to conceptualize how things are interconnected and to understand the relationship between a system's structure and behaviour (Meadows & Wright, 2008). Meadows and Wright (2008) provide that a systems thinking lens allows us to "hone our abilities to understand parts; see interconnections; ask "what-if " questions about possible future behaviors; and be creative and courageous about system redesign" (p. 7). A system is any interconnected set of elements that serves a purpose or has a function (Meadows & Wright, 2008). An individual is a system, a classroom is a system, a school is a system, and a school district is a system. Davis et al. (2012) contend that "large-scale initiatives in educational change might be profitably recast in terms of what is known about how to occasion the emergence of and nurture the development of a decentrally networked system" (p. 395). A decentralized networked system is of particular relevance because it enables both considerable flexibility and high adaptability (Davis et al., 2012). A decentralized networked system, in its very character, seeks sustainability through ongoing adaptation in dynamic interplay with its interrelated systems. An important feature of a decentralized network system is "brokerage" (Crossley, 2010). Brokerage refers to a flow of ideas, information, and resources between subsystems (Crossley, 2010). Brokerage supports flexibility as "intelligent action is not possible without a pool of diverse possibilities" (Davis et al., 2015, p. 222). Brokerage is supported by brokers or "weak ties" who act like hubs binding subsystems (Meadows & Wright, 2008). A second important feature of a decentralized networked system is "closure" (Crossley, 2010). Closure is the term to identify the phenomenon that most nodes in the network have connections to other nodes creating "clumps" in the fractal like subsystems (Crossley, 2010). Closure is an important feature of a decentralized networked system because it creates the conditions for social trust, coordination and adaptability (Crossley, 2010). In a decentralized network system "there must be a balance between enough centralized control to achieve coordination toward the large-system goal, and enough autonomy to keep all subsystems flourishing, functioning and self organizing" (Meadows & Wright, 2008, p. 85).

Design

Design can be conceptualized as a disciplined process of innovation particularly well suited for taking up ill-defined problems (Koh et al., 2015). Design fits within a complexity frame because in contrast to a linear problem-solving process in design "the problems and associated solutions coevolve in a symbiotic manner with new task goals, constraints, and insights being generated as the creative problem-solving processes emerge" (Koh et al., 2015, p. 3). Design has a long history in disciplines such as architecture and engineering and is now gaining prominence within the field of education (Koh et al., 2015). This phenomenon is occurring both internationally in countries including China and Singapore (Koh et al., 2015), and within Alberta (Alberta Education, 2016; Quinn et al., 2018). Over the last decade design-based processes have been applied in education to support student learning, teacher practice, and school redesign (Scardamalia & Bereiter, 2018; Friesen, 2009; Friesen & Jacobsen, 2015; Friesen et al., 2015). In this study Norman's (2013) interpretation of the UK Design Council's Double Diamond Model of Design proved valuable as a construct to support the school system to engage in design practice. The Double Diamond Model of design provides a four-stage framework for working through a design challenge. Norman provides that a key affordance of the model is that it is human centred. That is, it has a focus on seeking to understand and respond to the needs of the people that the design is intended for. The model features two diamonds with alternating phases of divergence (increasing the number of possibilities) and convergence (decreasing the number of possibilities). The first diamond focuses on seeking to identify the root causes of the problem and involves engaging with stakeholders to understand their needs. The second diamond supports the development of appropriate solutions and involves the rapid testing of ideas and modifying the approach after each test. Importantly, to Norman, progression through the phases of the model is not linear as through the testing of ideas a designer should always be attentive to adding to, or revising, their understanding of the problem and human needs they are designing for.

Designing Learning

One of the most prevalent ways that design has been applied in education is in relation to improving curriculum and pedagogy (Friesen, 2009; Friesen & Jacobsen, 2015). Galileo Education Network (n.d.) provides that designing learning involves the aspects of design thinking, and in addition draws on what is known about teaching and learning. Designing learning means participating with students in an ongoing "iterative cycle[s] of defining, creating, assessing and redesigning" (Friesen, 2009, p. 5). Pedagogical expertise supports teachers when making instructional decisions in response to student needs (Friesen, 2009).

Designing learning requires the systematic collection and analysis of formative assessment evidence to determine next steps (Friesen, 2009). This scanning of feedback and adjusting accordingly needs to be woven into the sequence of teaching and learning (Friesen, 2009). Designing learning also involves seeking and taking up real problems that are meaningful to the learners, to the discipline, and the broader community (Friesen, 2009).

Research Approach

I employed DBR as a methodological approach because it is ideally suited to create innovation and contribute to theory through praxis (Barab & Squire, 2004). I partnered with RVS to design a system strategic plan and implementation process that sponsors the conditions for learning in the system. This process was characterized by two iterative mesocycles (McKenney & Reeves, 2012) driven by the analysis of empirical data and the development of two practical outputs required in the local context. Data was collected in the forms of a survey conducted with principals and assistant principals (n = 74), a system-wide professional development day engagement secondary data source (n = 1128), a researcher journal, and process documents and artefacts. Following the two mesocycles an evaluation and reflection microcycle featuring interviews with system leaders (n = 6) resulted in a "flexibly adaptive theory" (Barab & Squire, 2004, p. 10) for designing for a system that learns.

Rationale and Significance of the Study

This study resulted in both practical and theoretical contributions. To practical outputs of the study were the RVS 2019-2023 strategic plan and the RVS 2019-2020 Playbook and System response model. I have developed a theoretical model for designing for a system that learns. In partnership with practitioners I will present the outputs of this study to jurisdictional leaders and policy makers in the provincial and national context. Through my dissertation and other scholarly publications, I will put forward the theoretical model to contribute to the research domains of design, learning sciences, leadership and curriculum and learning. Ultimately, I hope that in striving to design for a system that learns and making the process visible to practitioners and researchers, I can play a part in the transformation of education for dynamic times.

Chapter 2: Literature Review Towards a New Flock of Ideas

In this chapter I explore a new flock of ideas, however, it is not my intent to present a binary, nor do I believe that it would be possible to simply replace one perspective with another. Furthermore, in most learning environments “older models of teaching and learning live side-by-side with new understandings of how people learn” (Friesen & Lock, 2010, p. 2). It is impossible to untangle the “webs of belief and practice that currently exist in education” (Davis et al., 2015, p. 2). Complexity thinking offers an alternative to thinking in binary oppositions. From an ecological perspective I endeavour to open up “new interpretive possibilities” by exploring how teaching and leading might be conceptualized grounded in an understanding of learning (Davis, 2008, p. 60). I aim to expand the space of the possible and explore flexible “ends-in-view” which can guide the design and ongoing redesign of my project (Dewey, 1922). The ideas in this chapter emerge and unfold in a complex narrative structure. I begin by conceptualizing learning and teaching in a complexity frame. Next, I develop an understanding of the school system as a learner and consider the corresponding implications for leadership.

Complexity

Only a few steps from our campsite and we were already incredibly alone, in minutes my 8-month-old son was fast asleep, his head at rest on my chest, together we were swallowed up in the magnificence of the Mojave. The seemingly inhabitable desert landscape teems with life heightening one’s awareness of the interconnected network of relationships that is the living world; a constant conversion of energy from one thing into another in an immeasurable community within which we are ineluctably implicated. Each day previous I had set off in a new direction, each step an opportunity to take a new path, each pathway seemingly untraveled, leading nowhere in particular yet opening up to a full bodied sense of awe, a realization that I had reached the limits of understanding as I marveled in the vastness of the more than human world (Abram, 1996). Taken by the wonder of it all I felt at once tiny in relation and yet infinite in kinship, "simultaneously centre and periphery" (Weber, 2014, p. 34). Looking out upon the barrenness of the desert has a way of making you realize how dependent and precarious life is, yet with my son breathing along with the rise and fall of my own chest, I at the same time felt a sense of agency over my place in the cosmos. In Joshua Tree National Park I could almost feel the universe unfolding, I could sense my position in the ever-evolving flow of creativity (Cajete, 2004).

Upon return to my urban life I can't help but notice the sense of separation I have from the natural world. As Orr (2001) puts it "from the modern perspective we cannot see clearly how utterly dependent we are on the "services of nature' and on the wider community of life" (p. 235). In the Mojave Desert the meta-narratives of scarcity, standardization, fragmentation, and control are clearly inappropriate but in our sterile, man-made school environments we lose sight of the complexity we are inextricably interconnected to, both inside and outside of our bodies (Weber, 2014). Increasingly however, we are recognizing that thinking and acting as if we are separate from the natural world "may well be a key contributor to emergent personal, social, cultural, and ecological distresses" (Davis et al., 2015, p. 171). Complexity reframes the relationship between humans and the more that human world. Increasingly, educational research is drawing on complexity thinking (Alonso-Yáñez et al., 2018).

Individual learners, classrooms, schools and school divisions can be appropriately construed as complex systems (Davis et al., 2015). Furthermore, complex systems can be defined as "forms that adapt and assert themselves in an endless choreography with and in other learning systems" (Davis et al., 2015, p. 182). Stated differently, and of particular relevance for education, complex systems *learn* (Davis et al., 2012). In the subsequent sections I will explore conceptualizations of learning, teaching and leading that flock with this umbrella notion of complexity.

Learning as Maintaining Viability

I caught myself in the nick of time as I came upon my 22-month-old son Teddy, perched on his knees on the bench of our piano. My first reaction was to protect him, from what, upon pause, I cannot say. If I had interrupted him, I would have missed recognizing the incredible phenomenon transpiring before my eyes. In the next instant a different instinct drove me to capture the moment. Although I have watched the video again and again, I am still making sense of what exactly was taking place. Ted was gently playing on the keys of the piano and singing, singing the lyrics to the song that was open in the music book. He turned the page and started in on a new song, the song portrayed *on the* page. He worked through the chorus like you might if you were singing along in your car to a song that you only vaguely remember the words. He flipped several pages carelessly with his left hand and resumed singing, again to the appropriate song, all the while gently playing on the keys with his right hand. In awe, I watched, song after song. Suddenly he stopped playing, his demeanour changed as he flipped through the pages. Frustrated he turned, realized I was there for the first time, and said, "Ha Ha This-a-way!" It took me a second to recognize that he was looking for a particular song, the next one he wanted to sing. I snapped out of my state of wonder and helped him find the page. “Daddy play” he said. I encouraged him to keep playing himself, but alas the moment was over, “Daddy play” he insisted. We adopted our usual routine, Ted on my lap, I play and sing, turning the pages as we together enjoy his favourite songs.

As a proud parent is oft to do, I have shared this anecdote countless times. It is similarly received, it inspires smiles and nods of understanding, evokes relatable anecdotes, it rings true, it has verisimilitude (Gadamer, 1989). The experience of being struck by the magic, the wonder, the miracle of a child’s ability to learn is not my experience alone, it has fecundity, it is “something with which we already have deep, unvoiced kinship” (Jardine, 1992, p. 51). Yet, despite the familiarity, or perhaps because of it, this everyday miracle opens up an opportunity to explore the nature of learning.

It is evident in Ted’s moment at the piano, and in all of the moments where very young children amaze us, that learning is a fundamental human behaviour. As Wenger (2008) puts it, “learning is as much a part of our human nature as eating or sleeping” (p. 209). In whatever humans are doing we are learning (Marton, 2014), “participation in everyday life may be thought of as a process of changing understanding in practice, that is, as learning” (Lave, 2008, p. 202). Or, stated differently, learning is life and life is learning. We are unique among species in how much we learn beyond what is genetically imbued; “what makes humans human is what they learn” (Marton, 2014, p. 1). Incredibly, a homo sapiens born 200,000 years ago would be physiologically capable of learning all the same things my children can learn, provided of course, that this far distant ancestor was able to time travel to contemporary society (Harari, 2015). Each generation of humans teaches the next, as Vygotsky contended, “every function in the child’s cultural development appears twice: first on the social level, and later, on the individual level; first between people (interpsychological) and then inside the child (intrapsychological)" (Davis & Sumara, 2002, p. 402). Our collective development of knowledge and skills is driven by our development of tools (Marton, 2014) and learning occurs in dynamic interplay with these tools and the learning environment (Engeström, 2008). The social and environmental influences on learning were evident in Ted's moment at the piano. His learning moment would not have occurred without the interpsychological (exposure to the songs, the sitting on my lap) or the tools (the piano, the piano book). But, what was Ted doing in relation to his environment and social context? Piaget is helpful here as he offers that the individual knower is "engaged in the unrelenting project of assembling a coherent interpretive system, constantly updating and revising explanations and expectations to account for new experiences" (Davis & Sumara, 2002, p. 413). Ted's past experiences played an important role in his learning. Marton's (2014) *Variation Theory* provides that "for every object of learning, and for every learner, there are critical aspects and critical features, which the learners have to become able to discern" (p. 39). From a variation theory point of view, learning involves discerning which aspects of one's environment to attend to (Kullberg et al., 2017). Critical to Ted's moment at the piano then, was his ability to distinguish the piano from everything else in the house, to be able to discern the imagery in the book, to be able to recognize the pattern in the sounds, all of which was stored in his memory as a result of past thinking (Willingham, 2009). Important to recognize in all of this is that although Ted, and all people, are naturally curious, we avoid thinking unless the conditions are right (Willingham, 2009). Thinking is hard and therefore it does not guide people's behaviour in most situations. "Rather we rely on our memories, following courses of action that we have taken before" (Willingham, 2009, p. 14). Unless interrupted, Ted’s future interactions with the piano will reenact his history with it (Davis et al., 2012). Yet, in this moment, Ted did something new, he drew on his past memory and engaged in a new course of action. Ted faced the opportunity for challenge and had the right amount of past experience, stored in memory, to take it on. As a result of this moment of learning he likely experienced a pleasurable feeling connected to a release of dopamine (Willingham, 2009). Although thinking is difficult, and we rely heavily on our memories, we enjoy the success of solving a cognitive challenge (Willingham, 2009).

Taken as a whole, Ted’s moment at the piano reveals that learning: is innate and inevitable; occurs through experience and doing; is fundamentally social in nature; transpires in a dynamic interplay with tools and the learning environment; is unique to each individual’s ability to discern variation, draws on past experience and is avoided when possible but enjoyable when successful. More succinctly put, learning can be construed as taking action to maintain viability.

Teaching as Designing Learning

If learning is conceptualized as maintaining viability what is teaching? Reflecting on Ted’s moment at the piano I can identify some of how my actions as a parent create the conditions for Ted to learn: I introduce him to a range of experiences and safe opportunities to explore the world; I provide him with my attention and opportunities to engage with other adults and children; I provide toys, art supplies, books and instruments; I model ways of engaging in the world; and I pay close attention to his dynamic needs and responded accordingly in an ongoing interplay. Maria Montessori (1912) offers a conceptualization of teaching that aligns with Ted’s moment at the piano: “environment cannot create human power, but only give it scope and material, direct it, or at most but call it forth; and the

Teacher's task is first to nourish and assist, to watch, encourage, guide, induce, rather than to interfere, prescribe, or restrict" (p. XVII). Other scholars have offered different vocabulary: creating tailor-made experiences (jagodzinski, 1992); currere (Pinar, 2016); beginnings (Greene, 1998); curriculum negotiated at the personal level (Aoki et al., 2012); enhancing consciousness (Davis et al., 2015); and most prevalently, teaching as designing learning (Friesen, 2009; Paniagua & Istance, 2018).

Scardamalia and Bereiter (2018) identify the importance of design thinking to fostering knowledge building in learning environments, which they describe as a mode of "improving ideas, realizing their potential, replacing weak ideas with more promising ones, and organizing ideas into larger complex structures" (p. 5). More simply put, teaching as designing learning means engaging in experiences that are worthwhile (Friesen, 2009). Teaching as designing learning then points to a very different mindset and practice then teaching as planning and delivering. Despite the trending nature of the former, the later continues to dominate thinking and practice in schools. Morrison (2013), in her critique of design thinking in education, offers insight into the resistance to teaching as designing learning. She contends that design thinking is not "applicable" for use in schools because it "requires a breadth of knowledge and experience from various disciplines, which is not present in most K-12 students given the stage of their cognitive development and education background" (Morrison, 2013). Of course, this logic holds if learners are insufficient raw material, learning is acquiring previously discovered inscribed in the universe facts and teaching is delivering bite sized fragments for methodical assembly further down the line. In a school system and society gripped by the meta-narratives of scarcity, fragmentation, standardization, and control, design mode is not only seen as inapplicable it "is understandable only as gumming up the works" (Jardine, 2008, p. 1). Unless of course, it lives only as a new name for planning, as another algorithm to drill, as one more thing to implement in a landscape where time is always running out (Jardine, 2013). Yet, when flying in a new flock of ideas, when connected to complexity and corresponding conceptualizations of knowledge and learning, design thinking demands an interruption to schooling as conformity and compliance. In the upcoming sections I continue to explore learning and teaching in this frame and zoom out to consider the system as learner and the leader as designer.

School System as Learner

In the midst of Joshua Tree National Park I could sense my position in the cosmos, my relationship to the complex systems within which my life nests. I didn't sense it the same way, but not only I am inextricably connected to the broader systems in our world, my body itself is made up of an immeasurable network of relationships. My body is like an ecosystem, or its own tiny universe. Although I think of myself as an individual, I am better thought of as a colony. On top of my ten billion cells, there are a hundred billion microbial cells in the bacterial "biofilm" that lines my intestine (Weber, 2014). Biologists are learning more all the time about the influence the diverse bacteria in my body has on my life, ranging from digestion, immunity - perhaps even on my happiness (Weber, 2014). This bacteria ecosystem developed collectively in response to each other and to the events inside my body (Weber, 2014). Some scientists believe that these symbiotic processes of exchange relationship mean that we "should actually speak about all the bacteria on Earth as though they composed a single biological subject" (Weber, 2014, p. 40). The bacteria colony within my body is more than a collection of individuals, this example of interrelationship demonstrates the blurred boundaries between what we think of as individuals and collectives. The relationships among components of a complex system are integral to its character because "these relationships are qualitatively different from the sum of individual actions" (Alonso-Yáñez et al., 2018, p. 7). Complexity thinkers are more interested in how elements of a complex system are connected as a network, then how they are distinct (Davis et al., 2015). In the context of education this conceptualization of the interrelatedness of systems provides that an individual learner, a classroom, a school, a school district is simultaneously an integrated network made up of subsystems and part of a larger system (Davis et al., 2012). A school district is more than a collection of schools, classrooms, and individual teachers and students. The district as whole can be thought of as a complex learning system (Davis et al., 2012). Like any complex learning system, the district developed its character over time through the dynamic interrelationships of students, staff, parents, schools and communities, in interplay with events within the district and in the broader societal context. The school system itself learns. It seeks to take appropriate action to maintain viability consistent with its history in dynamic interplay with the complex systems within which it interrelates. This may help to explain why educational systems are resistant to change. It also offers promise, as we can look to the trans-disciplinary movement of complexity for insights into how to influence a complex learning system and draw on educational research for guidance into how to sponsor the conditions for knowledge production.

Leading as Designing Learning

If a school system is a complex system, what does school leadership look like? Leadership practice underpinning the prior school district planning and leadership model was based on a view of the district as a complicated system (think of an automobile engine or more apropos an organizational structure chart). Complexity thinkers have demonstrated that organizations such as school districts are categorically different from complicated systems; they are complex and share much more in common with living organisms than automobiles (Barabási, 2003). Complex systems feature highly coupled components that make them emergent and highly context dependent (Davis et al., 2015). By contrast, in a complicated system the relationships among the components are fixed and clearly defined. They can be taken apart and put back together (and if done carefully can be expected to work in the same way). More germane to this study, in a complicated system it is possible to predict with high levels of accuracy how adding an input will impact the performance of the complicated system. Behaviour in complex systems are much more difficult to predict. This is because the components and their interrelationships are subject to "ongoing co-evolution" (Davis et al., 2012). Ecological metaphors are helpful here, consider how the introduction of a new species, or the removal of one, can result in dramatic and unpredictable impacts on an ecosystem. The stock market or our own bodies provide additional frames of reference to unlock background understanding of how complex systems behave.

To recap, school districts are complex systems, however school district leaders have been treating them as if they were complicated ones. To further illustrate this point, we can look to Hendriks and Scheerens' (2013) meta-analysis which identified 255 unique studies explicitly focused on the topic of leadership within a 5-year window alone. Vocabulary such as transactional, transformational, pedagogical, and shared are among the more recent, each offering subsets of practices that school leaders perform (Alonso-Yáñez et al., 2018). Leithwood et al. (2006) summarize these practices as: developing a vision and giving direction; understanding and developing people; redesigning the organization; and managing the teaching and learning program. However complex systems resist being directed, managed, understood, developed, or organized; "the best one can do is to create the conditions that will permit their emergence" (Davis et al., 2012, p. 398).

The fractal pattern that exists between individual learners, classrooms, schools, and school divisions is mirrored by an associated fractal pattern between the roles of teachers, principals and superintendents. In this frame, leadership, like teaching, is about designing learning.

Conclusion

I want to restate that my intention was not to create a binary nor do I believe that in this study I can engineer a paradigm change in education. From a frame of complexity, I embrace ambiguity and recognize that the flock of ideas I have explored "is a tremendously limited understanding of an immense and amazing universe that is far beyond human comprehension" (Meadows & Wright, 2008, p. 164). What I have accomplished with this study is to establish an end in view. I return to, revise, and reflect on this end-in-view in Chapter 7.

Chapter 3: Methodology

At the heart of my study is a desire to make a positive contribution to learners through precipitating systemic change. Foundational to this motivation is a lived recognition of the difficulty of making meaningful and sustainable change and a corresponding belief that this difficulty is in large part due to the complexity inherent in the educational project. I believe that DBR is the best approach to support me to precipitate change in a complex system.

Design-Based Research and Complexity

As expanded upon in the second chapter of this proposal I believe education must be conceptualized as a nested set of complex systems or “emergent transphenomena” (Davis et al., 2015 p. 177). That is, individual learners, classrooms, schools, and school systems need to be recognized as complex evolving forms which cannot be understood independent from their context and interrelationships (Davis et al., 2015). In this frame notions of isolating and controlling variables, sterilizing contexts, and contributing universal generalizations are inappropriate. Rather, complex phenomena “must be studied at the levels of their emergence using methods appropriate to those levels” (Davis et al., 2012, p. 379). A DBR approach provides tremendous affordances for conducting research within a complexity frame. Table 1 offers an overview of DBR that I draw on to explore these affordances.

Table 1

Contrasting Design-Based Research With Laboratory Experimentation

Characteristic	Design-based research	Laboratory experimentation
Location of research	Real-world learning environment	Laboratory
Complexity of variables	Multiple types of dependent variables	A few dependent variables
Treatment of variables	Not all variables of interest are known in advance; some emerge during the study	A few variables are selected in advance and remain constant during the study
Unfolding of procedures	Research procedures are flexible and evolve during the study	Fixed procedures are used
Social interaction	Complex social interactions with collaboration and sharing	Isolation of individuals
Reporting the findings	Describing design in practice	Report on whether hypotheses were supported
Role of participants	Experimenters and participants are active and influence the design of the research	Experimenter should not influence the subject and subjects should not influence the design
Goal of research	Produce impact and explain mechanism	Validate theory

Note. Adapted from "Design-based research: A methodological toolkit for engineering change," by S. Barab, in R. K. Sawyer (Ed.), *The Cambridge Handbook of the Learning Sciences* (2nd ed., pp. 151–170), 2014, Cambridge University Press.

DBR is embedded in naturalistic settings ensuring that "the messiness of real-world practice" (Barab, 2014, p. 153) is integral to the research. Because DBR takes place in real world contexts it not only allows for, but requires the researcher to consider multiple and emergent context dependent variables (Barab, 2014). DBR's flexible procedures adapt and evolve in dynamic interplay with the transphenoma under study which ensures that the context becomes interwoven in the design solutions and the theoretical contributions the research (Barab, 2014). In DBR, the researcher is actively engaging in the complex context in partnership and in relation to the complex social interactions of practitioners and participants

(Barab, 2014). In reporting of their research DBR researchers do not "fall into traps of reductive explanation and conclusive certainty" (Davis, 2008, p. 60) but rather aim to uncover events "so that the reader understands their complexity but doing so in a way that lends itself global relevance while at the same time meaningfully capturing the dynamic unfolding of the phenomena" (Barab & Squire, 2004, p. 9). The goal of DBR is to directly "impact practice while advancing theory that will be of use to others" (Barab & Squire, 2004, p. 8) and ultimately depends on complexity to accomplish this central aim. Complexity thinking provides that "changes promoted by agents at one level have an effect on the larger system" (Alonso-Yanez et al., 2016, p. 14). I have attempted to do just that by "iteratively changing the learning environment over time – collecting evidence of the effect of these variations and feeding it recursively into future designs" (Barab, 2014, p. 154).

Characteristics of Design-Based Research

DBR has been gaining notability since its emergence initiated by the work of Allan Collins and Ann Brown in the early 1990s (Easterday et al., 2016). DBR is currently a preeminent methodology in the learning sciences however it continues to evolve (Barab, 2014). I have drawn on some of the seminal voices in the domain to ground the design of my study. I have organized this review of literature around three characteristics of DBR: pragmatic, iterative and emergent, and situated and collaborative.

Pragmatic

DBR is built on an epistemological foundation provided by the pragmatic philosophies of John Dewey and Charles Peirce (Barab & Squire, 2004). "Praxis" is Dewey's (1938) term to describe the interconnectivity between theory and practice. Praxis, for Dewey, is not a unidirectional process, "but a transactive one involving inquiry and through which theory and practice mutually inform each other" (Barab, 2014, p. 155). DBR is a form of praxis aimed at the pragmatist inspired goal of developing "theories that do real work" (Cobb et al., 2003). The pragmatic focus of DBR requires researchers to demonstrate the productive impact of a design solution in a particular context and local outputs and outcomes are important components of the validation process (Barab, 2014). Therefore, true to its pragmatic foundation, the theories put forward by DBR are not "truth independent of the world" (Barab, 2014, p. 162) but rather are judged by their viability "to explain phenomena and produce change in the world" (Barab & Squire, 2004, pp. 6–7). To increase trustworthiness DBR clearly and honestly documents the evolution of the design solution and lays open and problematizes the underlying context and rationale "in ways that allow others to see the relevance of the theory-in-context with respect to their local situation" (Barab, 2014, p. 167). DBR researchers communicate their theories in "their full contextual splendor illuminating process insights while at the same time demonstrating local outcomes" (Barab, 2014, p. 158). Although the emphasis varies between studies, DBR seeks to precipitate both practical and theoretical results (McKenney & Reeves, 2012). A core task of DBR involves unpacking the mechanism or theory of change underlying the design solution emergent in practice (Barab, 2014). Ultimately, DBR seeks to "generate evidence-based claims about learning that address contemporary theoretical issues and further the theoretical knowledge of the field" (Barab & Squire, 2004, pp. 5–6).

Design Driven

To engage in praxis and evolve theory in concert with practice DBR researchers engage in iterative design processes producing continuous cycles of "design-reflection-design" (Amiel & Reeves, 2008, p. 35). DBR models and frameworks vary in their design, however all feature flexibility and most include multiple subcycles of activity (McKenney & Reeves, 2012). Design practices within DBR are "systematic and intentional, but they also include inventive creativity, application of emerging insights, and openness to serendipity" (McKenney & Reeves, 2012, p. 110). DBR does not commit researchers to a specific "theoretical stance, type of data collection, or method of analysis" (Easterday et al., 2016, p. 7), rather DBR can be conceptualized as a "meta-methodology" that integrates other methods within a process (Easterday et al., 2016). Design-based researchers borrow methods (Easterday et al., 2016, p. 2) from widely used approaches such as "survey, expert review, evaluation, case study, interview, inquiry methods, and comparative analysis" (Wang & Hannifan, 2005, p. 10). The interactive, iterative, and flexible nature of DBR allows assessment of designs in practice to yield new insights, questions, and redesigned solutions (McKenney & Reeves, 2012). Driven by these iterative cycles, DBR requires researchers to select methods that are appropriate for the emergent and evolving questions, context, and needs of the participants (Wang & Hannifan, 2005).

Situated and Collaborative

DBR is dependent on the research being situated in a naturalistic context: "It is not simply that DBR happens *in* naturalistic settings but, rather, such research *transacts* with these settings such that the design, the problem, and even the theory are fused with these settings in ways that are not easy to disentangle" (Barab, 2014, p. 156). Design researchers develop partnerships with practitioners that shape the study "from initial problem identification, through literature review, to intervention design and construction, implementation, assessment, and to the creation and publication of theoretical and design principles" (Anderson & Shattuck, 2012, p. 17). DBR evolves in dynamic interplay with "the messiness of real world practice" abreast in "confounding variables, political agendas, and multiple alternative hypotheses" (Barab, 2014, p. 153). Table 2 provides an overview of how the characteristics of DBR were present in this study.

Table 2

Characteristics of Design-Based Research in This Study

Design-based research	Characteristics of this study
Pragmatic	Theoretical input is contextualized in relation to practice.
	Flexible theoretical output emerges from practical design opportunity.
	Practical outputs of the study include the development of a school system 4-year plan and outcomes include building capacity of practitioners.
Design driven	Mesocycles facilitate iteration.
	Empirical evidence is positioned as input to the design and construction.
	Design provides framework for creative solutions to emerge from practitioners.
Situated and collaborative	All phases of the research project are conducted in dynamic interplay and partnership with practitioners in the context of taking up a locally important design opportunity.
	Trustworthiness and credibility is established through detailed documentation of design decisions in response to feedback from the context.

Design-based Implementation Research

Design-based Implementation Research (DBIR) grew out of the DBR field and is specifically focused on supporting the development and adaptation of innovations in educational systems (Penuel et al., 2011). Penuel and Fishman (2012) provide that "DBIR represents a significant expansion of design research—which typically focuses on classrooms—because the focus is on developing and testing innovations that can improve the quality and equity of supports for implementation of reforms" (p. 282). DBIR provides a strong foundation for this study as it provides a model of collaborative, iterative, and systematic research and development aimed at the creation of a sustainable education system (Penuel et al., 2011). Specifically, the design of this study aligned with the four elements of DBIR as put forward by Penuel et al. (2011): "a focus on persistent problems of practice from multiple stakeholders' perspectives; a commitment to iterative, collaborative design; a concern with developing theory related to both classroom learning and implementation through systematic inquiry; and a concern with developing capacity for sustaining change in systems" (p. 332).

Critiques of Design-Based Research

The following critiques of DBR are relevant to this study and have informed my design decisions. Christensen and West (2017) identify that DBR studies produce large amounts of data resulting in demanding data collection, analysis, and reporting. In response to this I have: used a survey design developed in another study; analyzed data throughout the study; involved participants in data analysis activities; and used tables to organize the reporting of data and findings. A second critique of DBR identifies the difficulty of documenting and accounting for all of the design decisions made by researchers and collaborators that influence the research (Design-Based Research Collective, 2003). In response to this critique I have: utilized a research journal to document design decisions; designed a microcycle as the final stage of research that involves an opportunity for participants to contribute their perspective on design decisions; and, conceptualized design-decisions in a theoretical model presented in Chapter 6. A third critique points to the difficulty of managing interdisciplinary teams and maintaining a productive partnership (Christensen & West, 2017). I partnered with a team of people with whom I have preexisting experience working; in the initial stages of the partnership we developed a project charter including roles and responsibilities; I documented my experience of managing our partnership in the research journal and chronicle key themes in Chapter 7.

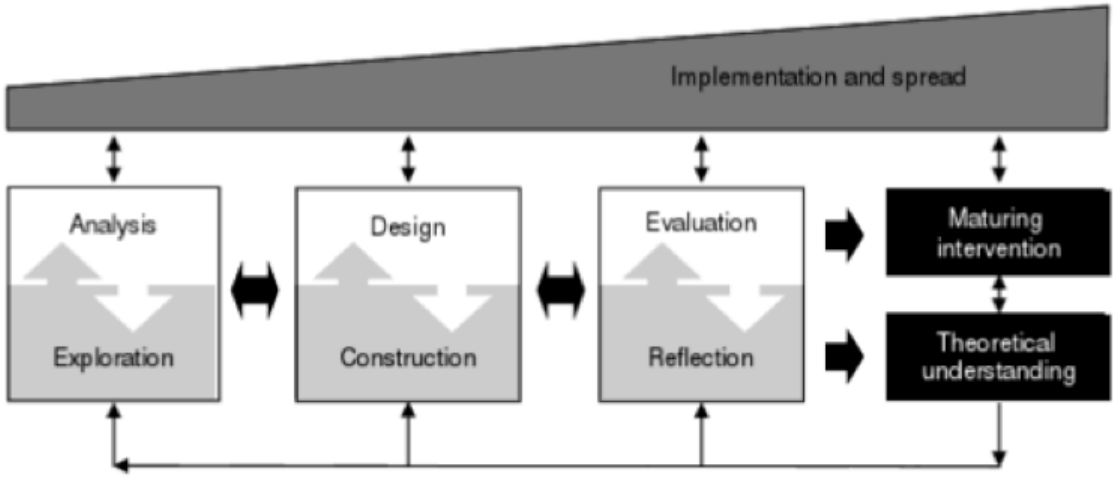
Design of This Study

All DBR features the characteristics explored in the previous section however each study is uniquely designed for the local context (Wang & Hannifin, 2005). McKenney and Reeves (2012) provide a generic visual model to help frame "what the overall enterprise looks like" (p. 73). I will overview this model and use it to present the design of my study.

The generic model consists of three core phases: analysis and exploration, design and construction, and evaluation and reflection (see Figure 1). The analysis and exploration phase involves framing the problem and gaining insight into the needs of the stakeholders (McKenney & Reeves, 2012). The design and construction phases involve generating ideas, creating prototypes, and mapping solutions (McKenney & Reeves, 2012). The evaluation and reflection phases feature analyzing and interpreting data in relation to theoretical understandings (McKenney & Reeves, 2012). In addition to the three core phases of the model implementation and spread occurs across the model intended to demonstrate interaction with practice (McKenney & Reeves, 2012). Arrows in the model indicate the interaction between the phases.

Figure 1

Generic Model for Conducting Design-Based Research in Education



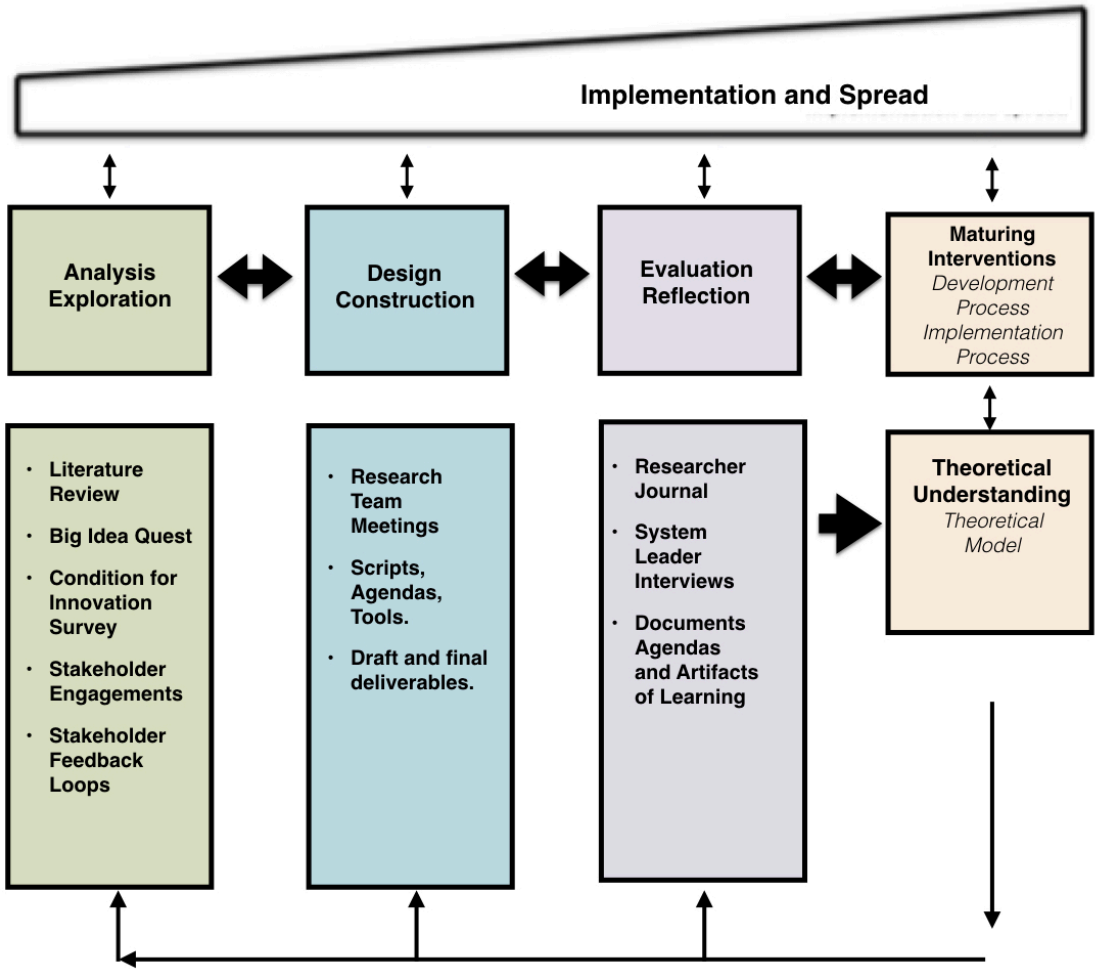
Note From *Conducting educational design research* (p. 77), by S. McKenney and T.C. Reeves, 2012. New York, NY: Routledge.

Inspired by Meyers (2017), I have adapted McKenney and Reeves' (2012) generic model to visualize the design of my study (see

Figure 2) and I have organized my research activities around the three core phases put forward by McKenney and Reeves.

Figure 2

Research Framework

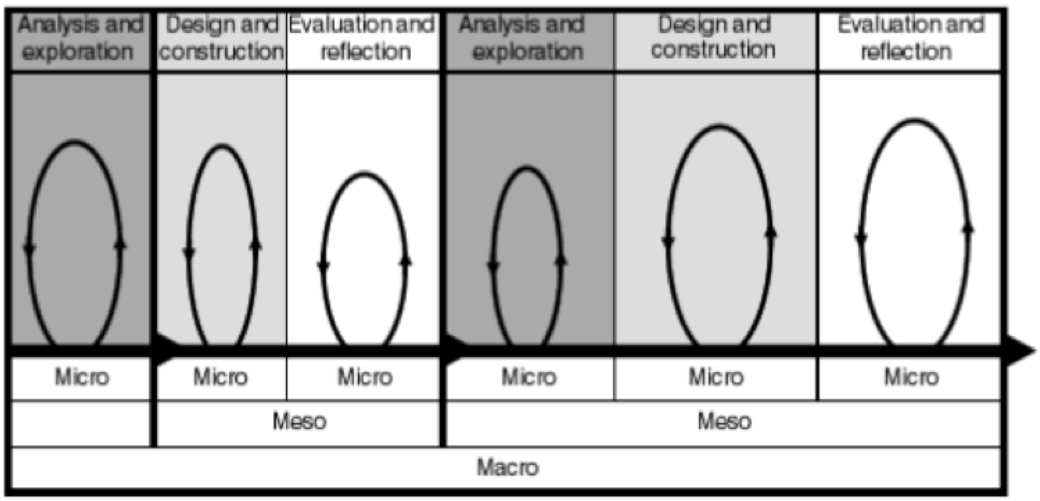


Note. From *Conducting educational design research* (p. 79), by S. McKenney and T.C. Reeves, 2012. New York, NY: Routledge

In addition to the generic model, McKenney and Reeves (2012) also provide a DBR model that conceptualizes DBR in terms of micro-, meso-, and macrocycles (see Figure 3). This model is useful to conceptualize how the phases of a DBR study are sequenced and inform one another. Each time one of the three phases from the generic model is undertaken, one microcycle takes place. Mesocycles contain more than one of the three phases. A macrocycle is comprised of all three phases and often feature varying combinations of micro- and mesocycles. A DBR study can be made up of one or multiple macrocycles.

Figure 3

Micro-, Meso-, and Macrocycles in Educational Design Research



Note. From *Conducting educational design research* (p. 78), by S. McKenney and T.C. Reeves, 2012. New York, NY: Routledge

I have conceptualized my study in terms of micro-, meso-, and macrocycles (see Table 3). In this frame my study features one macrocycle made up of two mesocycles and five microcycles.

Table 3

Research Framework: How Can School System Leaders Practice Design to Occasion the Emergence and Nurture the Development of a Robust and Productive Learning System?

Analysis exploration	Design construction evaluation reflection	Analysis exploration	Design construction evaluation reflection	Evaluation reflection
Literature review Stakeholder engagements	Big Idea Quest Superintendent Working Committee Stakeholder feedback loops Draft strategies and principles	Evaluation of Mesocycle 1 Conditions for Innovation Survey	Stakeholder feedback loops Draft school and system playbooks	System leader interviews All previous data sources
Mesocycle: 4YP development process		Mesocycle: 4YP implementation process		Microcycle: Theoretical model
Macrocycle				

Note. From *Conducting educational design research* (p. 77), by S. McKenney and T.C. Reeves, 2012. New York, NY: Routledge.

The first mesocycle was the school district 4YP development process that produced the RVS 2019-2023 4YP. Reflection and evaluation of the first mesocycle informed the development of the second mesocycle. The second mesocycle focused on the development of the 4YP implementation process culminating in the RVS School Playbook and System Response Model. In the final microcycle I conducted interviews with system leaders and reviewed all previous data sources to develop a flexible theoretical model. In the forthcoming section I provide details about how data was collected and analyzed throughout my study. In Chapters 4, 5 and 6, I chronicle each of the three cycles respectively to present the results of this study.

Research Activities

The research activities in this project took place over the course of 14 months from April 2018 –June 2019. Table 4 presents the research activates in a chronological timeline. In the data collection and analysis section of this chapter I provide details about the data collection activities outlined in the table.

Table 4

Summary Research Engagements With Research Team and RVS' Stakeholders, April 2018–June 2019

Date(s)	Purpose	Stakeholders	Data Collected
	Start of Mesocycle 1		
Apr 25, Jun 11, 25	Frame research partnership	Research team	Researcher notes, slides
May 1,7 16	Initial stakeholder engagements	Trustees, system leaders, school administration, school council, students, business and community representatives	Agendas, artifacts, researcher notes, panel interviews
Jun 8, 14	Analysis of stakeholder engagements	Research team	Researcher notes, artifacts
Aug 27, Sep 7	Stakeholder feedback loop	System leaders, school leaders	Artifacts, researcher notes
Sept 21, Oct 1	Stakeholder feedback analysis and Big Idea Quest design	Research team	Artifacts, researcher notes
October 5	Big Idea Quest	All staff	Artifacts, researcher notes
October 11	Stakeholder	Business and community	Artifacts, researcher

Date(s)	Purpose	Stakeholders	Data Collected
	feedback loop	representatives	notes
October 11, 17, 22, 31; November 8, 15 16, 30	Big Idea Quest analysis and Superintendent Working Committee design	Research team	Artifacts, infographic, researcher notes
November 23; December 6	Superintendent Working Committee engagements	Students, teachers, parents, school and system administration, system administration	Artifacts, panel interviews, agendas, researcher notes
December 7	Superintendent Working Committee analysis	Research team	Artifacts, researcher notes
January 10, 15, 18; February 6	Stakeholder feedback loop	School administration, system administration, trustees, education centre staff, school staff, high schools students	Artifacts, researcher notes
January 28; February 20;	Stakeholder feedback analysis	Research team	Artifacts, researcher notes
February 20	Mesocycle 1 evaluation	Research team	Artifacts, researcher notes
	End of Mesocycle 1 – start of Mesocycle 2		
March 1	Development of conditions for innovation survey	Research team	Researcher notes
March 12	Administration of conditions for innovation survey	School leaders	Survey data, researcher notes
March 22	Survey analysis	Research team	Researcher notes
April 5, 6, 16	School Playbook design	Research team	Artifacts, researcher notes

Date(s)	Purpose	Stakeholders	Data Collected
April 18; May 7	System Response Model design	Research team, school administration	Artifacts, researcher notes
End of Mesocycle 2 – start of evaluation and reflection microcycle			
May 27, 30, 31	System leader interviews	System leader participants	Interview transcripts
June 12, 25, 27	Theoretical model feedback	Research team	Researcher notes

Limitations and Delimitations of the Research

Timeframe

A considerable timeframe is needed to allow for ongoing iterative cycles informed by multiple sources of data (Anderson & Shattuck, 2012). In this study time was limited by my doctoral research timeline and school district's strategic planning timeline. As a result, my study was limited to the development of the plan and the associated implementation model. If not for the limitation of time I would study the implementation of the model and make revisions informed by ongoing data collection. To address this limitation I positioned several data collection and analysis opportunities within the design of the study to inform iteration.

Quantity of Data

Design-based researchers commonly face challenges presented by the quantity of data generated in the course of iterative cycles (McKenney & Reeves, 2012). This challenge is also inherent in a complexity informed paradigm. In my study the school district is comprised of many stakeholders with an inconceivable number of relationships and connections. There are large amounts of publicly available data produced by the system. I was limited in my ability to analyze and pay attention to all of the data. In response to this limitation I made decisions to delimit the data I drew on. I explore this delimitation in the following section.

Data Collection

In response to the limitation of my ability to collect, analyze and utilize the quantity of data available I delimited my data collection. Later in this chapter I provide detailed descriptions and rationale for each of the data points I drew on. Important to these decisions were the theoretical framework explored in Chapter 2 and co-development with my practitioner partners. I endeavoured to select data points to support the research team and the school system as a whole to adopt a design sensibility.

Partnership

Conducting research in partnership requires the researcher to co-design actions with practitioners. As outlined previously building theory in practice is fundamental to the pragmatic epistemological foundation of DBR however it also puts limitations on the research. In my study I needed to work with the RVS' system leadership team to put theory into practice. I did not have any direct opportunities to test theory rather my role was to influence the work the system leadership team carried out. Furthermore, the entire process needed to fit with the scope and timeline set forth by the RVS' Board of Trustees as well as the Alberta Ministry of Education expectations for School District Planning as outlined in the School Act. I have thoroughly documented the design decisions made in relation to these constraints and have provided a detailed description of the barriers and constraints encountered.

Lack of Student Perspective

I decided not to directly collect evidence from students. I delimited my study in this way both for ethical and timeframe considerations. To respond to this delimitation student perspective was indirectly gathered through the student stakeholder engagements. Student voice is also built directly into the implementation model.

4YP Design Opportunity

I chose to situate my study within the design opportunity created by the development of the system 4YP. It is important to acknowledge that there are other ways I might have chosen to investigate my research question. This choice has influenced all of the other design decisions made in this study. I made this choice because of the opportunity to create an intervention that has the scope and scale of a school system 4-year plan. Furthermore, because developing a strategic plan is a common school system practice I am hopeful that this study has relevance to practitioners in other contexts.

4YP Team and Participants

My research project emerged and has been shaped in partnership with system leaders at RVS. Specifically, we formed a 4YP team comprised of myself, six members of the RVS executive and director team and four learning specialists. My research project was fully embedded in the work of this team to develop the school system 4-year plan. As a team we met regularly during work hours, communicated via email, and co-created documents via Microsoft Office 365. As per their regular practice the school system leaders published on a website all of the documents and agendas they create through engagements with various stakeholders in the system. These data sources represent secondary source data (Seale, 2004) and are described in the section on data collection.

Participants in the study included principals, assistant principals, and system leaders. Principals and assistant principals were invited to complete the *Conditions for Innovation* survey at a system leadership team meeting. I decided to recruit school-based administrators for two primary reasons: access and perspective. Firstly, I was provided access by system leadership to recruit principals and assistant principals at a face-to-face meeting. Principals and assistant principals were provided with time in the meeting to complete the anonymous survey. Informed consent was built into the survey itself. I believed that the access I had to this group resulted in the high level of participation as compared to if I had chosen an email recruiting process targeting a broader population (e.g., teachers). Secondly, I believe that school-based administrators offer a unique perspective into the conditions for learning in the system as a whole. Principals and assistant principals have a role that provides them with insight into the practice of teachers throughout their school. Furthermore, they are in a position to be attentive to the structures that support learning in their school.

System leaders were invited to participate in a series of two semistructured interviews. I recruited system leaders via an email recruitment letter (Appendix A). I chose to interview system leaders because they are directly in the position of designing learning at the system level.

Data Collection and Analysis

I collected data from multiple sources and used a variety of analysis methods (see

Table 5).

Table 5

Summary of Data Sources, Data Types, Methods of Analysis, and Purposes

Source	Type	*N*	Analysis	Purpose
Big Idea Quest submissions	Secondary source	1,128	Qualitative thematic analysis using Teaching Effectiveness Framework Development of infographics	Revise goals and outcomes Identify promising strategies to inform Superintendent Working Committee Reflect and evaluate
Conditions for innovation survey	Principals and assistant principals	74	Descriptive statistics visualized by subsection Development of infographics	Conceptualize system needs Input to Discover phase
Interviews	System leaders	6	Interpretive analysis	Theoretical model, findings, and recommendations
Researcher field journal	Observations	1[a]	Interpretive analysis	Ongoing design, theoretical model, findings, and recommendations
Documents, agendas and artifacts	Secondary source		Interpretive analysis	Ongoing design, theoretical model, findings, and recommendations

[a] researcher

Big Idea Quest

Purpose. The Big Idea Quest served three primary purposes. Firstly, to provide an opportunity for all staff to give direct and indirect feedback on the draft narrative, goals, and outcomes developed to that point in the 4YP development process. To this end revisions were made to the draft narrative, goals, and outcomes based on the feedback received. Both a synthesis of the feedback and the resulting changes were communicated back to staff and parents. Secondly, the Big Idea Quest data was designed to provide divergent and broad base input to the development of the 4YP strategies. The Superintendent Working Committee (SWC) used the data visualizations as input to their convergence process. Thirdly, the Big Idea Quest was designed to engage all staff in the 4YP process and introduce the crowd-sourcing tool with the aim of fostering a more distributed network and encouraging the co-creation of knowledge between schools and work sites.

Design. Video facilitation led participants to post six responses via a crowd-sourcing software. The questions were preceded by protocols that included prompts and small and large group collaboration activities. The six questions participants responded to were as follows:

1. Provide direct feedback on the draft narrative, goals and outcomes.
2. Post what inspires you as you embark on the upcoming plan.
3. Share insights focused on what students need.
4. Organize insights into the draft outcomes and other category.
5. Share ways your school is currently meeting these student needs.
6. Ideate new possibilities for how your school could meet the student needs.

Participants and facilitation. The Big Idea Quest represented a secondary data source in this research and the staff members who contributed to the Big Idea Quest were not participants in this research. The data that was analyzed for the context of this study were drawn from a publically available website. The Big Idea Quest occurred on a non-instructional system-wide professional development day. Certified and non-certified staff at both the school and school district levels took part in the professional development day with an estimated 2,500 individuals. The engagement took place at school sites and district work sites. At 53 school sites teachers, educational assistants, administrators, psychologists, therapists, therapy assistants, secretarial, and custodial staff participated. At the education centre school district staff participated in working group teams. These teams included trustees, senior executive, directors, human resources staff, finance staff, maintenance staff, grounds keeping staff, transportation staff, technologists, learning specialists, and secretarial staff. The instructions and protocols were facilitated by a video hosted online. The video was written and produced by the 4YP team. Staff were given the option of contributing to an online crowd-sourcing software featuring a social media design. Staff who created an account could post their responses, like and comment on one another's posts. To create an account staff were required to use their district email account. All posts were publicly visible via the web address. There were 1,128 unique users who logged in and engaged on the crowd sourcing software posting 10,364 unique contributions (idea submissions, likes, comments). The 4YP team monitored the crowd-sourcing site and contributed likes and comments in an attempt to promote interaction as the engagement unfolded.

Qualitative data analysis. I introduced and led a series of meetings to conduct iterative thematic coding (Miles et al., 2014) of the qualitative data for Questions 1, 2, 3, 5, and 6. I designed the process, explained each step to the 4YP team members and provided them with advice and coaching at each step. The process was designed with the goals of: employing a rigorous analysis process; and building capacity of the school system leaders to analyze and use data to inform decisions. A constraint was the limited time that school system leaders had to be involved in the process. A consistent process was employed for analyzing each of the questions however within this process slight deviations were made in the analysis of Questions 3 and 6. I first present the method used across the questions and then chronicle the deviations.

The iterative thematic coding process featured three cycles. In the first cycle, four members of the 4YP team and myself individually coded the same section data from the open-ended responses using a single word or short phrase. Following this first cycle, the team reviewed the codes, collapsed codes and reconciled differences through conversation. This process resulted in the development of a single code set. Where possible codes were established using words used by participants themselves. We developed a point form explanation or short definition for each code. In the second cycle each member of the team reviewed their previously coded data using the new codes. During this review team members identified data where they were unsure of how to code it as well as data that didn't fit in any of the codes. Following this process the team discussed each of these circumstances and revisited the codes. In some cases the discussion resulted in sharpening or broadening the definitions, other times new codes were added or two codes collapsed into a single code. In the third cycle I used the established codes to assign codes to all of the data. I then quantified the codes. The 4YP team met and reviewed the quantified codes and discussed implications to the unfolding 4YP development process. The results of these discussions are detailed in Chapter 4.

In the forthcoming paragraph I present question-specific deviations from the analysis process outlined above. In the case of Question 3 the 4YP team decided to adopt the five principles of the Teaching Effectiveness Framework (Friesen, 2009) as codes. This decision was made following the first cycle of coding. This decision was made in order to cross reference the ideas put forward by the system with educational research into teaching effectiveness. We believed that this could reveal possible avenues towards meeting student needs that weren't identified by the system. Additionally, the researcher revisited the data from Question 3 and identified quotations to support the themes developed from Questions 5 and 6. In the case of Questions 5 and 6 the 4YP team identified that the same codes were applicable to both questions. This decision was made following the first cycle of coding for Question 6 as the team recognized the similarities with the previously coded Question 5.

Numerical data analysis. Question 4 was a multiple choice style question that asked participants to select which of the draft outcomes the student need they had developed most closely fit with or to select "other." We used this selection to organize the data from Questions 3, 5, and 6. This decision was made for two reasons. Firstly, to provide draft feedback on the current outcomes; we believed that through the other category we would identify student needs that were important to staff but that were not yet addressed by the draft outcomes. Secondly, we believed, at the time of making this decision, that the SWC would find this organizational structure helpful to support the development of strategies for each of the outcomes.

Conditions for Innovation Survey

Purpose. The purpose of the Conditions for Innovation Survey was twofold. Firstly as a mechanism for convergence the survey sought to contribute to a system wide common conceptualization of the LEARN design principles and in doing so create a constraint or redundancy to support the implementation process. To this end the survey was developed with the input of the SWC and learning department teams; the survey was organized by the 4YP design principles; and interpreting the survey results was built into the school implementation process. The survey served to create a common understanding of the LEARN design principles because each section provided an explication of a design principle. For example the “Leverage the competence of students and the community to make a positive impact on the life of students, staff, parents, and our world” section featured 15 subquestions that provide direction as to what this design principle entails. The survey results were illustrated as an infographic which was built into the School Playbook. In this way the survey established the framework by which the system interpreted the design principles.

Secondly, the survey was intended to establish a system feedback loop featuring empirical data to provide useful information to inform next steps. To this end the survey findings were used in the School Playbook and by the superintendent design teams to inform implementation decisions.

Design. The survey featured 65 questions organized into an introduction and five subsections. The introduction included the informed consent information and associated question. The introduction also featured a question that asked participants to choose the level of school they represented (high school, middle school, elementary school, or multilevel school). This question was included because the 4YP team believed that analysis by school level would provide the most useful sorting criteria due to the differences that exist between school levels including pedagogy, programming, size, structures, resourcing, and initiative implementations. No other school demographic information, such as area or school size, was included because of the potential to identify specific schools and by doing so compromise anonymity. The five survey subsections were organized by the 4YP design principles featuring the following headings: Leverage the capabilities of students and the community to make a positive impact on the life of students, staff, parents, and our world; engage in purposeful work designed to build foundational skills and competencies through projects that foster deep understanding; appreciate and promote diversity in ideas, cultures and ways of knowing, being and learning; reflect on learning through meaningful assessments to inform and showcase growth; and nurture positive relationships built on trust, support, and care for one another. The five subsections were administered using a 5-point ordinal Likert scale drawn from the Design-Based Professional Learning (DBPL) survey (Chu et al., 2020). To develop the subsection questions I began by analyzing the SWC data and identifying subthemes within each of the design principles. I drew questions directly from the DBPL survey that aligned with these subthemes. I used the DBPL survey because it of its alignment to the Teaching Effectiveness Framework and because it had undergone revisions over time to enhance internal consistency (Chu et al., 2020). I developed new questions for subthemes not addressed by the DBPL survey. The new questions were developed drawing on this study's literature review and the Alberta Teaching Quality Standard. The draft survey underwent three cycles of critique and revision. The first cycle featured critique provided by the 4YP team focused on enhancing alignment between the survey subsections and the SWC design principles. The second cycle featured critique from the Qualtrics software digital reviewer focused on increasing the data quality of the survey elements. The third cycle of review featured a critique by Dr. Man-Wai Chu of the survey's Likert scale design.

Participants and facilitation. The Conditions for Innovation survey was administered by the researcher at a face-to-face school district leadership team meeting. The survey was administered using an online survey tool with built in informed consent. Principals and assistant principals who were present at the meeting were invited to participate; 74 principals and assistant principals completed the survey and agreed to participate in the study. This represents 65% of the total population of 114 principals and assistant principals in the school district.

Data anlysis. The survey data was exported from Qualtrics and imported into Microsoft Excel. Tables and bar graphs were created to display: comparison of mean between the subsections; comparison of mean between the subsections by school level; comparison of individual question mean and standard deviation within each subsection; and a descriptive analysis by school level. Additionally, Qualtrics was used for cross tabulation to reveal the relationship between the variables of school level and all other questions. Working individually 4YP team members reviewed the data and flagged potential findings. The team then brought forward and discussed the data they flagged. The researcher used notes from this meeting to create a first draft of findings, which were subsequently critiqued by the 4YP team and then revised into three findings per subsection. The 4YP team developed "How might we…" questions intended to frame the findings as questions to inspire action. The 4YP team provided input into what data would be most useful to include in the infographics. The 4YP team decided to provide findings and associated "How might we" questions to scaffold interpreting data and using it forward in the process. Additionally the 4YP team decided to provide tables and graphs of descriptive statistics to allow stakeholders to interpret data that pertains to their context or particular focus. The researcher developed a draft infographic and revised the draft based on research team feedback. The final version of the infographic featured an enhanced visual appeal created by the RVS Communication Department.

Interviews; Researcher Field Journal; Documents, Agendas, and Artifacts of Learning

Interviews. The primary purpose of the interviews was to reflect on and evaluate the interventions and gather insights into the role of system leader as designer in order to contribute to the development of the theoretical output. I sent an email invitation to members of the research team and conducted interviews with six participants. The participant group was made up of individuals from the 4YP team holding leadership positions in executie, director, and specialist roles. I engaged in conversations with participants inviting them to speak to their interpretations of the interventions. I offered regular prompts and asked follow up questions to probe further and prompt examples. The interviews were audio recorded, transcribed, and stored on an encrypted and password protected drive. The analysis of the resulting data is described below as it was conducted in conjunction with the analysis of the researcher field journal and the documents, agendas, and artifacts of learning.

Researcher field journal. I kept a researcher journal to systematically document the research process (Cobb et al., 2003). I took notes during each research activity, event, and meeting. I chronicled the steps taken, design decisions, data analysis procedures, events, insights, and reflections. The analysis of the resulting data is described below as it was conducted in conjunction with the analysis of the interviews and the documents, agendas, and artifacts of learning.

Documents, agendas, and artifacts of learning. RVS documented all phases of the 4YP development process on their public websites, the crowd-sourcing software, and on social media platforms. This documentation included items produced by the researcher, the research team, and by stakeholders in the 4YP development process including the Big Idea Quest and the Superintendent Working Committee. Artifacts included process items such as agendas, scripts, presentation slides as well as documentation of the knowledge produced in the forms of draft models, thinking charts, and sticky notes. Additionally, stakeholder perspective was documented through video on YouTube in the form of panel discussions.

These secondary data sources were analyzed on an ongoing basis by the 4YP team to inform next steps. The data was also analyzed in the reflection and evaluation microcycle to inform the results of this study. The analysis process is described in the subsequent section.

Analysis. Throughout the study I reviewed the research journal, documents, agendas, and artifacts of learning to inform future steps. As a part of this iterative process I added ongoing design decision annotations. Following Mesocycle 1 I conducted a cumulative review of these documents. In this review I generated emergent themes. These themes were carried forward to Mesocycle 2 and informed the design of the school playbook and system response model. Following Mesocycle 2, I conducted a second cumulative review of the documents, agendas, and artifacts of learning, revised the themes, and added new themes. I reviewed the system leader interview transcripts and used the themes as a set of codes. I revised themes and added new themes in response to the interviews. I then returned to the research journal data, organized the data in chronological order, identified phases or events in the development process, identified important design decisions, and synthesized the rationale for each event. I then coded this rationale using the themes. I next drafted a first iteration of the theoretical model featuring a synthesis of the themes represented as design principles. I presented the theoretical model to the 4YP team, documented their feedback, and made revisions to the model and design principles. I then revisited the interview and research journal data and made further revisions to the model. The findings of this analysis are chronicled in Chapter 6.

DBR is founded on a pragmatic philosophical underpinning “where theories are judged not by their claims to truth, but by their ability to do work in the world” (Barab & Squire, 2004, p. 6). Furthermore, the focus of design-based researchers is not to prove that a design "works" but rather to "generate evidence-based claims about learning that address contemporary theoretical issues and further the theoretical knowledge of the field" (Barab & Squire, 2004, pp. 5–6). Important to the credibility and trustworthiness of DBR is the sound generation of the data that drives decision-making (Cobb et al., 2003). The use of multiple sources and different kinds of data strengthens evidence-based claims in DBR (Design-Based Research Collective, 2003). Repeated iterative cycles to refine data collection techniques, the problem, the design and theoretical understandings contribute to the trustworthiness and credibility of the research (Barab, 2014). Because of the importance of the process to DBR a researcher should document the problem and design decisions "so that the reader understands their complexity but doing so in a way that lends itself global relevance while at the same time meaningfully capturing the dynamic unfolding of the phenomena" (Barab & Squire, 2004, p. 9). Developing theory and practice together in context is integral to the value of theoretical contributions within a pragmatic paradigm (McKenney & Reeves, 2012). To this end, credibility and trustworthiness is enhanced through "rich descriptions of context, guiding and emerging theory, design features of the intervention, and the impact of these features on participation and learning" (Barab & Squire, 2004, p. 9).

Ethical Considerations

The University of Calgary's Conjoint Health Research Ethics Board as well as the RVS Research Committee approved ethics applications for this study prior to the collection of data from participants. The following ethical considerations were at the forefront of all phases of this study: informed consent, confidentiality and security of data, assessment of risk and benefits, and role of the researcher.

Informed Consent

Informed consent was obtained from participants prior to the collection of data. In the survey consent was built into the online survey tool (Appendix B). For the interview the consent form was sent to participants via email and provided to them in hard copy (Appendix C). Consent was voluntary and informed. The consent forms included information about the study design, how and for what purposes data will be collected, and how the findings will be disseminated. The forms also listed potential risks and benefits to participants, explain that participants are under no obligation to participate in the study, and that they are free to withdraw from the study without any repercussions up until the time that the data is made anonymous.

Confidentiality and Security of Data

Confidentiality and security of data is an important ethical consideration in conducting research. In this study participants shared information about their practice and needed to be protected from any repercussions in their employment resulting from their participation. I took steps to safeguard confidentiality and security of data in different ways in the various elements of the study. Participants were informed of potential risks and the measures taken to ensure confidentiality and security of any data collected pertaining to them.

Conditions for Innovation Survey

In the Conditions for Innovation Survey anonymity was accomplished through the online survey design. Informed consent was built into the survey and therefore participants did not provide any personal identifying information. They were also not asked any information that could identify their school.

Interviews

Complete anonymity was not guaranteed to participants in the interview process however the following steps were taken to protect participants. I transferred digital audio recordings to password-protected computer and an encrypted drive in a timely manner following each interview and deleted the file from the recording device. I did not share raw transcripts with anyone. Interview transcripts were stored on a password-protected computer and an encrypted drive. In public reports I endeavoured to present data in a manner which protected participant anonymity. Upon completion of the study, all digital files will be retained for 5 years and then deleted as per the University of Calgary Retention Rule.

Assessment of Risk

The risk of harm to participants in this study was minimal. One potential risk was inherent in the job embedded nature of this study as results reflect the practices of the school district as a whole, of the 4YP development process, and of research team. I have been explicit and clear about this risk in the consent form, the recruitment letters, and in the application to conduct research in the school district. A second potential risk in this study was pressure to participate in the study. Research participants need to be protected from undue influence or coercion. One factor that may have contributed to pressure to participate is the commitment by the School District Senior Executive to this study. A second potential pressure to participate arose from my relationship with participants stemming from my former role as a system leader and my role within the study as a researcher partner. To mitigate this risk I took measures to protect participant anonymity where possible, I was explicit regarding the voluntary nature of participation in the recruitment and consent forms, and I made efforts to be transparent through the discussion of these issues with participants throughout the research.

Benefits

The risks of participation in research are weighed against the benefits of participation. Rocky View School District as a whole benefitted from the output of a 2019-2023 RVS strategic plan and implementation process. The system leaders benefitted from developing a model and building capacity towards practicing design at a system level. All participants benefitted from reflecting on their practice through the survey or interview questions.

Role of the Researcher

I was a teacher and leader in RVS for 15 years prior to this research. Prior to that I was a student in the district. This reality precipitates a number of ethical considerations. Firstly, I held trust relationships with many of the participants and potential participants. Connected to this, I felt a responsibility for the success of RVS. In DBR, the researcher does not attempt to approach the project from a position of objectivity however it is important to acknowledge the biases that I hold. I recognize that my biases consciously and subconsciously effected how I analyzed and wrote about the findings. I have attempted to acknowledge and reflect on my perspective throughout the study. I use my research journal for this purpose. Furthermore, I have written my perspective in explicit ways into this dissertation report. Secondly, the relationships I hold with participants had the potential to put pressure on them to participate and may have affected the responses they provided in the interview process. Connected to this, my position as a researcher required me to hold a different relationship with individuals in interactions related to conducting research. I attempted to clearly define roles and responsibilities of both participants and researcher throughout the research process. I articulated a clear definition of the ownership of data and publishing rights in my application to conduct research to the RVS Research Board.

Chapter 4: Findings from Mesocycle 1—RVS 2019-2023 4YP

In this chapter, the first of three chapters dealing with the results of the research, I present Mesocycle 1 and provide detailed chronicles of the development of the practical output or design solution. I aim to provide process insights, demonstrate the local outcomes, and illustrate the context, and evolution of study's theoretical output. Embedded within this chronicle is analysis of the empirical evidence and detailed explanations of how this evidence informed the development process.

School boards in Alberta are required by the Ministry of Education to develop 4YPs in accordance with the parameters legislated in the Education Act and the Fiscal Planning and Transparency Act (Alberta Education, 2018). 4YPs serve both as component of the accountability relationship between the Ministry of Education and as a local planning process. To this end, they must include outcomes and measures mandated by Alberta Education and can also include "local goals, priorities, outcomes and measures that reflect the unique characteristics and circumstances of their communities" (Alberta Education, 2018, p. 2). 4YPs work in tandem with Annual Education Results Reports in which school boards report annual results on both provincially mandated and locally developed measures.

In the spring of 2018, the RVS Board of Trustees directed the superintendent to launch a process to develop the 2019-2023 4YP. Consistent with past practice in RVS the 4YP development process was to include a consultation process with stakeholders including staff, parents, students, and community members. RVS' executive created a 4YP team to plan and lead the engagement process. Included on this team was the superintendent of schools, the associate superintendent of learning, the director of communications, four learning design specialists, and me as a research partner. RVS' executive outlined the purpose of the engagement process to be two fold: firstly, to identify needs in the system to inform the development of local outcomes, goals, strategies, and measures; and secondly, to create a shared sense of direction through a process that gave students, parents, staff, and community voice in the vision of the district. In the subsequent section I provide a detailed account of the design process the 4YP design team engaged in that resulted in the 2019-2023 RVS 4YP.

Forthcoming in the chapter are detailed findings presented with supporting data. This overview of the Mesocycle 1 findings frames the chapter:

1. Direct feedback from stakeholders informed revisions to the draft 4YP narrative, goals, and outcomes.
2. Overlap in the categorization of student needs precipitated a restructuring of the 4YP.
3. Stakeholder ideas informed 4YP design principles and strategies.

Design Process

The Mesocycle 1 4YP design process involved ongoing collaboration between the 4YP team conducted via face-to-face meetings, via video conferencing, email communication, and co-creating documents using collaborative creation software.

Table 6 chronicles this process by stakeholder event and presents an overview of key design decisions.

Table 6

Summary of Design Process for Practical Output 1: School Board 4-Year Education Plan

Date(s)	Event	Stakeholders	Design Decisions
May 1,7, 16	Initial stakeholder engagements	Trustees, system leaders, school administration, parents, students, business, community	Heterogeneous stakeholder groups. Participants went on school tours following protocols for conversations with students, observations of student learning and analysis of artifacts of learning. Small and large group idea generation protocols focused on what we envision for students and what learning will get them there. Subsequent days built on first days to engage stakeholders in synthesis. Developed Twitter hashtag and posted regular content and encouraged stakeholders at engagements to share insights via hashtag. Produced video and published on YouTube featuring participants in panel conversations to make ideas discussed visible to stakeholders not involved in face-to-face meetings.
June 8, 14	Analysis of stakeholder engagements	4YP team	Consolidated and synthesized data. Drafted a learning narrative, goals and outcomes. Learning narrative produced as video with superintendent voiceover and imagery of Rocky View School students engaged in learning.
August 27, September 7	Leader feedback loop	System leaders, school leaders	Leaders provided direct critique of draft narrative, goals and outcomes in face-to-face meeting.
September 21	Analysis of leader feedback	4YP team	Used open coding to identify themes in leader feedback. Made revisions to draft. Communicated feedback themes with examples and corresponding revisions.
October 5	Big idea quest—staff feedback loop and	All staff (school and district based)	Elicited feedback (direct and indirect) from all staff. Generated ideas to inform development of

Date(s)	Event	Stakeholders	Design Decisions
	strategy input		strategies. Facilitated using video protocols and facilitator guide. Superintendent video message focused on trust, innovation, and new kind of plan. Incorporated social media inspired crowd-sourcing tool.
October 11	Stakeholder feedback loop	Business and community	Business and community partners provided direct critique of draft narrative, goals, and outcomes in face-to-face meeting.
October 17, 22	Analysis of big idea quest	4YP team	Employed qualitative data coding process. Used Teaching Effectiveness Framework as coding lens. Developed infographics to use with SWC to interpret Big Idea Quest data. Identified overlap between outcomes and decided to develop design principles and to uncouple strategies from specific outcomes. Identified themes in staff direct feedback. Made revisions to draft. Communicated feedback themes w/ examples and corresponding revisions.
November 23; December 6	SWC engagements	Students, teachers, parents, school administration, system administration	Heterogeneous stakeholder groups. SWC members were led through multistage process to interpret and consolidate Big Idea Quest data. Encouraged SWC stakeholders to share insights via hashtag. YouTube video produced featuring SWC members made ideas visible to stakeholders not involved in face-to-face meetings.
December 7	SWC analysis	4YP team	Developed draft design principles and strategy priority areas. Developed draft design principle continuums.
January 10, 15, 18; February 6	Stakeholder feedback loop	School and system administration, trustees, education centre	Stakeholders in homogenous groups provided direct critique of draft narrative, goals, outcomes, design principles, continuums, and strategies in face-to-face

Date(s)	Event	Stakeholders	Design Decisions
		staff, school staff, high school leadership students, school councils	meetings.
January 28; February 20	Analyze stakeholder feedback	4YP team	Identified themes in stakeholder feedback. Made revisions to create final deliverables. Analyzed system needs. Communicated feedback themes w/ examples and corresponding revisions.
March 7	Board of Trustee approval	Board of Trustees	Video launch focused on development process and foreshadowing implementation process.

Note. 4YP = 4-year school education plan; SWC = Superintendent Working Committee.

In the forthcoming sections I present the findings of the Big Idea Quest and chronicle how this data informed the 4YP design process.

Big Idea Quest

The Big Idea Quest data informed the development of the 4YP in three ways: firstly, direct feedback informed revisions to the draft 4YP narrative, goals and outcomes; secondly, overlap in the categorization of student needs precipitated a restructuring of the 4YP involving decoupling strategies from outcomes and developing design principles; and thirdly, the ideas put forward informed the creation of the 4YP design principles and strategies. In the forthcoming sections I present the data and how it was interpreted and describe the corresponding implication on the 4YP.

Direct Feedback Informed Revisions to the Draft 4YP Narrative, Goals, and Outcomes

Data and interpretations. The following eight themes were generated from participant's responses to the open ended question asking for direct feedback on the draft narrative, goals, and outcomes: reaffirm basic needs; valuing diversity; foundational skills; real-world hands on learning; making teaching visible; deploying resources; barriers to success; and goal/outcome clarification. The subsequent short paragraphs describe these themes.

- Reaffirm basic needs: participants asserted that providing supports to students who need food, sleep, clothing, or shelter was imperative. Connected to this participants suggested that the school district should focus on partnering with parents and community to provide supports for these needs.
- Valuing diversity: participants advocated that "respect for diversity" should be expanded to "valuing diversity."
- Foundational skills: literacy and numeracy was noted as a foundation for all learning. Many participants cited that additional supports are required to ensure students attain these skill sets.
- Real-world, hands-on learning: participants advocated for continuing and expanding the districts' work to provide students with engaging authentic learning.
- Make teaching visible: participants advocated for promoting the sharing of successful teaching practices.
- Deploying resources: participants stated that significant resources would need to be allocated to support the stated narrative, goals, and outcomes.

- Barriers to success: participants indicated that school structures and policies needed to be redesigned in order to achieve the stated goals and outcomes.
- Goal/Outcome clarification: participants indicated that the terms “Connect” and “Network” were interrelated and overlapping. Connected to this many participants suggested making changes to the “Network” goal.

Implications. The 4YP design team used the themes articulated above to make revisions to the draft narrative, goals, and outcomes. The revisions and the feedback themes were shared with all school system staff and parents through a communiqué. The following revisions were made to the draft narrative:

- Reassure that “students are ready to learn” is not lost in the innovation agenda.
- Emphasis that diversity and respect of different cultures and traditions continues to be a focus in RVS.

The following revisions were made to the draft Goals and Outcomes:

- Replace the outcome “Network with peers, parents, and partners” with “Navigate successfully as global citizens.”
- Move from goal 1 “Students are healthy, safe, resilient, and respectful of cultures and traditions” to goal 3.
- Replace “respectful of” with “value diversity.”
- Move from goal 3 “Students demonstrate ownership of their learning” to goal 1.
- Add stem “tailored to their individual capabilities” to outcome “Students meet high expectations and learning objectives” to make outcome more inclusive of all students.

Overlap in the Categorization of Student Needs Precipitated a Restructuring of the 4YP

Data and interpretation. In the Big Idea Quest participants developed need statements and organized those statements by the draft 4YP goals and outcomes. The research team assigned Teaching Effectiveness Framework codes to the need statements. Table 7 organizes the quantification of the codes by the draft goals and outcomes.

The 4YP team interpreted this data to demonstrate some overlap between how participants sought to address the outcomes. For example, "worthwhile work" was the most frequent code assigned for four separate outcomes including one within each of the three separate goals and the other category. The 4YP team identified that some clustering of coding by outcome did exist. For example, within the outcome "Students are resilient, healthy, safe, and respectful of diverse cultures and traditions" 69% of responses were coded with strong relationships representing 37% of the total times that code was assigned. The overlap that did exist called into question the previous practice of developing strategies connected to specific outcomes. This implication is described in the subsequent section.

Table 7

Teaching Effectiveness Framework Codes and Percentages as Organized by 4YP Goals and Outcomes

4YP goals and outcomes	Teacher as designer (% of outcome)	Worthwhile work (% of outcome)	Formative assessment (% of outcome)	Strong relationships (% of outcome)	Total
ACHIEVE: Students are literate, numerate, and acquire core competencies.	24 (18)	72 (55)	23 (18)	12 (9)	131
ACHIEVE: Students meet high expectations and learning objectives.	81 (36)	30 (13)	75 (34)	39 (17)	225
CONNECT: Students are resilient, healthy, safe, and respectful of diverse cultures and traditions.	28 (12)	22 (10)	20 (9)	155 (69)	225
CONNECT: Students engage in real-world, hands-on learning experiences that matter to them.	71 (30)	138 (58)	17 (7)	14 (6)	240
NETWORK: Students demonstrate ownership of their learning, while collaborating with their community.	39 (25)	63 (41)	19 (12)	33 (21)	154
NETWORK: Students make a difference in their life, school, community and the world.	34 (20)	72 (41)	8 (1)	57 (34)	171
OTHER: Your insights did not correspond with any of the outcomes provided.	75 (25)	83 (28)	26 (9)	113 (38)	297
Total	352	480	188	423	1443

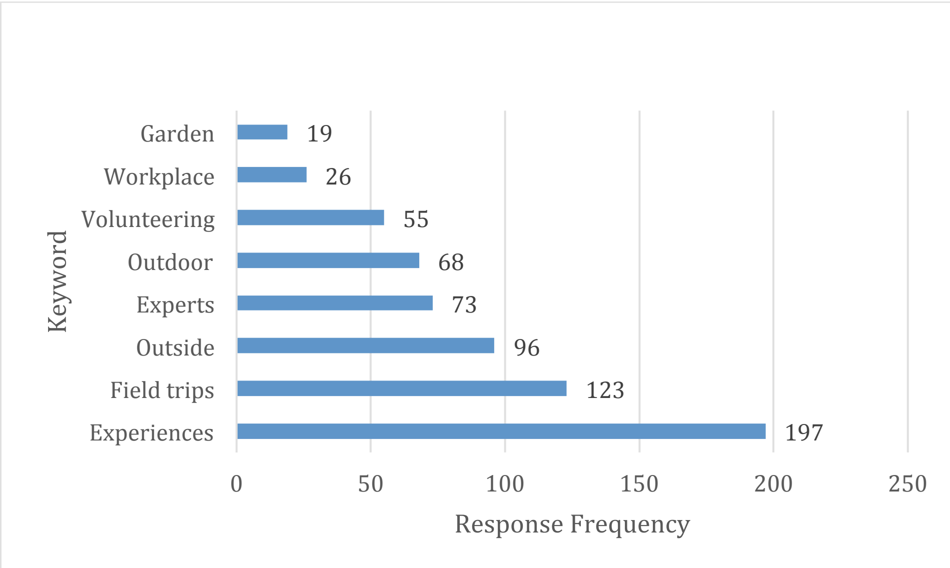
Implications. In past 4YPs in RVS strategies were developed to target specific outcomes. This structural decision resulted in the development, implementation and evaluation of strategies focused on specific outcomes. The overlap identified in the Big Idea Quest caused the 4YP design team to redesign this structure. The 2019-2023 4YP was developed with 6 global strategies deemed priority areas. This decoupling of strategies from outcomes was intended to allow the development, implementation and evaluation of strategies towards multiple outcomes. To further promote interconnectivity between the outcomes, design principles were added to the plan structure. The intention of the design principles was to provide stakeholders with principles to design for in designing, implementing and evaluating strategies.

Stakeholder Ideas Informed 4YP Design Principles and Strategies

Data and interpretation. Eight themes were generated from the combined participant responses to Questions 5 (“share ways your school is currently meeting these student needs”) and 6 (“ideate new possibilities for how your school could meet the student needs”): beyond the school; cultural experiences; make learning visible; project based learning; school redesign; spaces and tools; teacher as designer; and well-being. The themes were used by the Superintendent Working Committee (SWC) as input to the development of strategies. To this end the SWC was provided with infographic style visualizations created for each theme. The visualizations included keywords associated with the theme displayed in word clouds with the font size representative of the frequency of the word used by participants. Also included in the infographics were student need statements selected to illustrate the theme. Figures 4 to 11 present the data.

Figure 4

Responses to Beyond the School

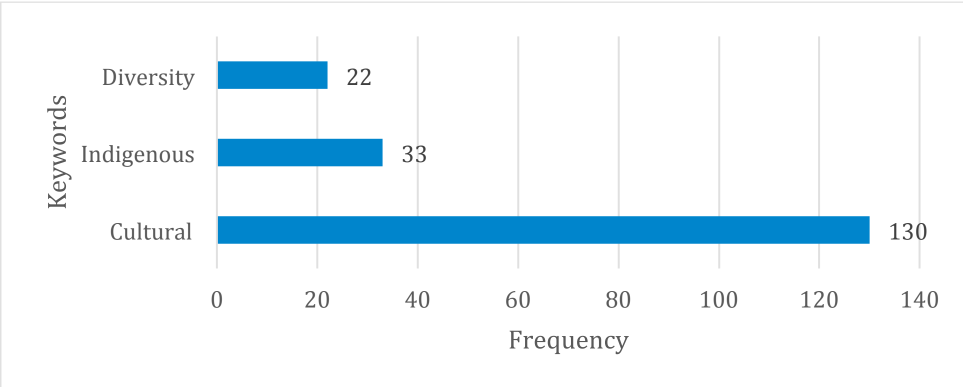


On the topic of beyond the school, students' need statements were as follows:

- Students need to get out of the classroom so that they can engage in authentic learning experiences.
- Students need an alternate environment for learning so that they are able to apply their learning in a real-world experience
- Students need the opportunity to build relationships (within various communities, mentorships, etc.) so that the collaborative (listening and sharing) learning opportunities are authentic.
- Students need to interact with experts in their learning so that they see how their learning connects to the real world.
- Students need to have opportunity to give back to the community so that can be a positive member, feel good, get a larger perspective.
- Students need community involvement so that they can be introduced to new passions.

Figure 5

Responses to Cultural Experiences

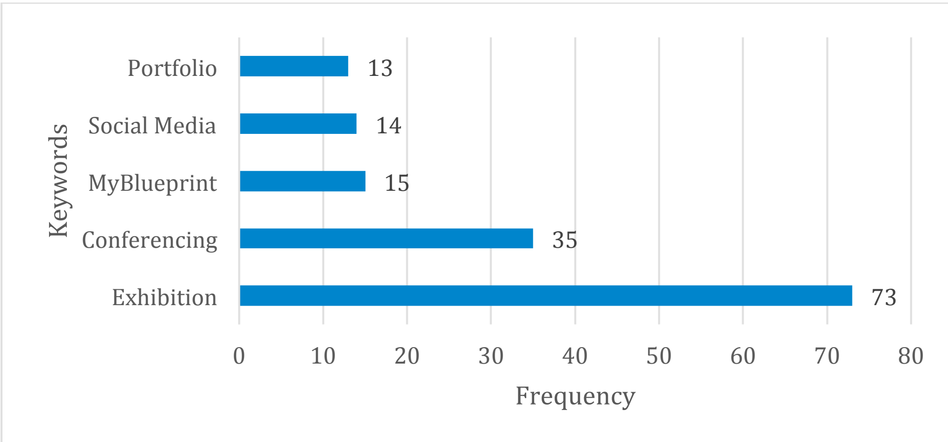


On the topic of cultural experiences, students' need statements were as follows:

- Students need more cultural and beliefs understanding for other students.
- Students need exposure to diverse communities and environments so that they can build global awareness.
- Students need to understand cultures and language to be part of a complex, problem solving global community.
- Students need to see themselves reflected in the staff that teach them.
- Students need to feel safe and accepted inside and outside the classroom so that they can feel comfortable with a diversity of cultures and traditions.
- Students need to know Canada's Indigenous Peoples stories so that they can build relationships that are based on fostering empathy and compassion moving forward.
- Students need more cultural and beliefs understanding for other students.

Figure 6

Responses to Make Learning Visible

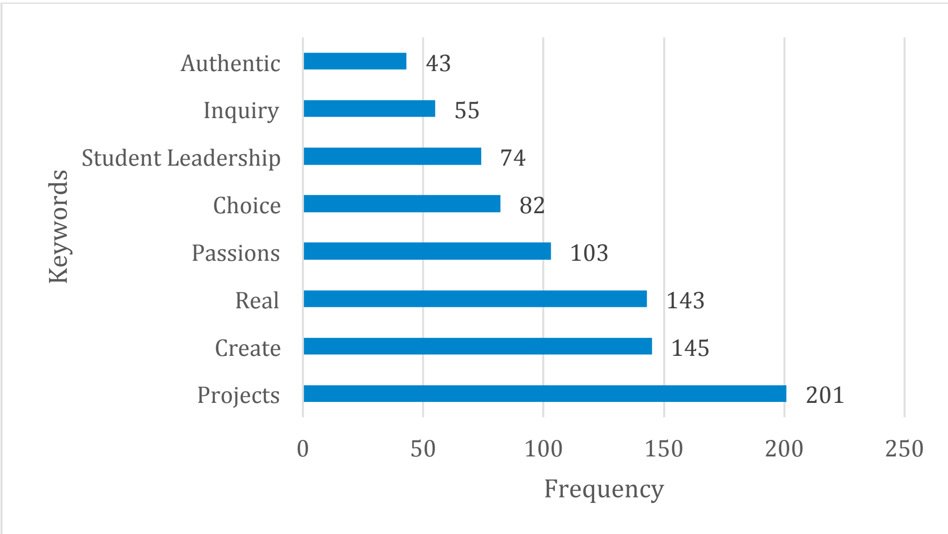


On the topic of making learning visible, students' need statements were as follows:

- Students need to have a real, authentic place to show their learning so that they can buy in and apply the info, and feel it is authentic and worthwhile.
- Students need time to reflect on learning and life experiences so that they develop a deeper understanding of themselves and learning outcomes.
- Students need ownership of their learning.
- Students need their learning seen as a continuum.
- Students need to be part of their own assessment so that they understand their successes and challenges.
- Students need to be proud of the learning process not just the end result so that they value themselves as learners.
- Students need to be held to high expectations so that they keep pride and quality of work.

Figure 7

Responses to Project-Based Learning



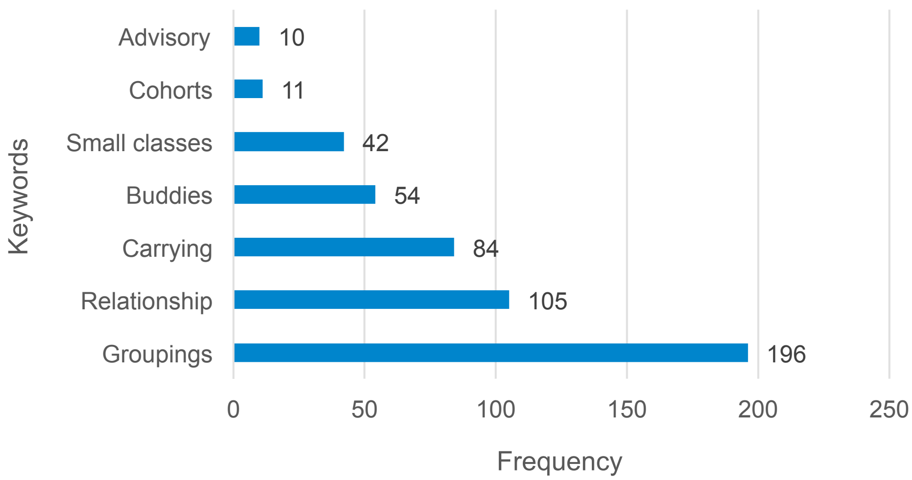
On the topic of project-based learning, students' need statements were as follows:

- Students need a wide range of opportunities to be included and where their physical, academic, and social challenges are not a barrier to their learning
- Students need access to resources and current technologies so that they can create and participate in authentic learning experiences.
- Students need the time and flexibility to learn so that they can reach their potential.
- Students need creative spaces so that they can think outside the box.
- Students need opportunities to collaborate so that they can share ideas, get feedback, are encouraged to reflect, and promote ideas.
- Students need access to real and the right tools in order to engage authentically.
- Students need access to technology so that they can explore the world.
- Students need a wide range of opportunities to be included and where their physical, academic, and social challenges are not a barrier to their learning

- Students need access to resources and current technologies so that they can create and participate in authentic learning experiences.

Figure 8

Responses to School Redesign



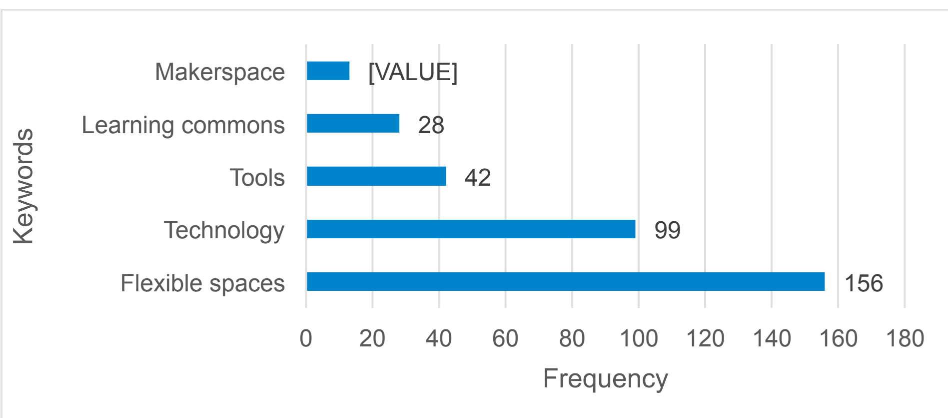
On the topic of school redesign, students' need statements were as follows:

- Students need time to explore and delve into real-world experiences so they can truly connect with and understand the importance of their learning.
- Students need assistance when having difficulty learning so that they can continue to learn.
- Students need access to coaching (teacher time) so that they can get meaningful feedback to help them grow as learners
- Students need the right advocates and teachers to protect and inspire so that their social/emotional safety needs are met.
- Students need adults who are invested in their learning so that students are pushed to be their best.

- Students need smaller class sizes so that they can feel supported and have more meaningful connections in authentic learning environments.
- Students need 'time' to explore and delve into real world experiences so that they can truly connect with and understand the importance of their learning.
- Students need access to coaching (teacher time) so that they can get meaningful feedback to help them grow as learners
- Students need the right advocates and teachers to protect and inspire so that their social/emotional safety needs are met.
- Students need adults who are invested in their learning so that students are pushed to be their best.

Figure 9

Responses to Spaces and Tools



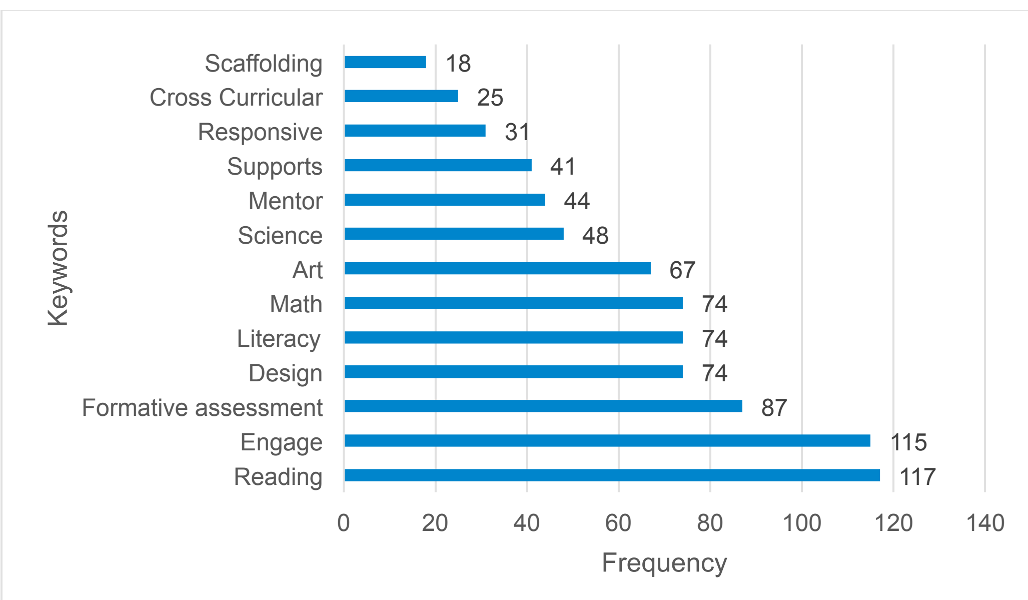
On the topic of spaces and tools, students' need statements were as follows:

- Students need to be included where their physical, academic, and social challenges are not a barrier to their learning.
- Students need access to resources and current technologies so that they can create and participate in authentic learning experiences.

- Students need the time and flexibility to learn so that they can reach their potential.
- Students need opportunities to collaborate so that they can share ideas, get feedback, are encouraged to reflect, and promote ideas.
- Students need access to real and the right tools in order to engage authentically
- Students need access to technology so that they can explore the world.
- Students need to be included where their physical, academic, and social challenges are not a barrier to their learning.
- Students need access to resources and current technologies so that they can create and participate in authentic learning experiences.
- Students need the time and flexibility to learn so that they can reach their potential.
- Students need creative spaces so that they can think outside the box.

Figure 10

Responses to Teacher Designer

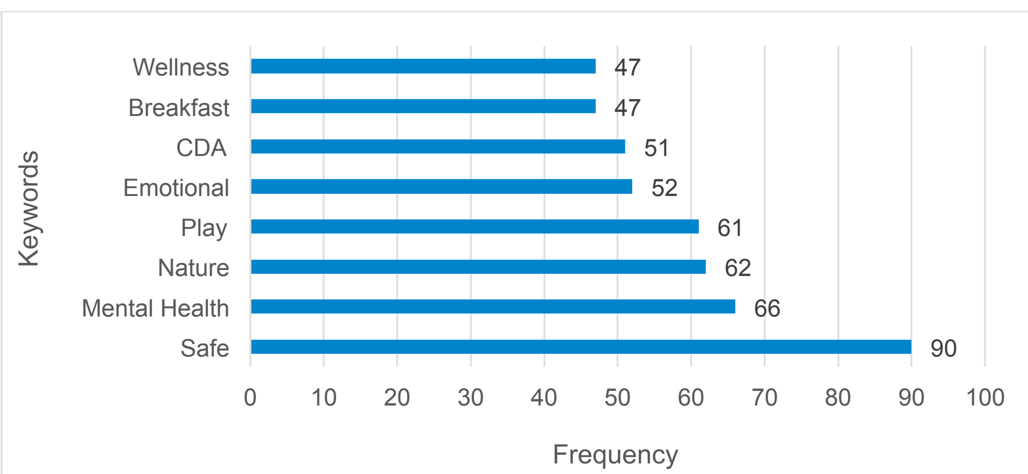


On the topic of teacher designer, students' need statements were as follows:

- Students need to become literate and numerate through real world experiences.
- Students need creativity and innovative opportunities to become designers of their own learning.
- Students need a broad learning approach with multiple entry points so learning can happen at a variety of ability levels.
- Students need to be taken outside of their comfort zone and placed into their learning zone.
- Students need opportunities to experience pressure and failure in a safe environment so that they can learn resilience and that the process of learning can involve frequent failures.
- Students need rich and varied learning in literacy, numeracy and competencies so that they enjoy learning.

Figure 11

Responses to Wellness



On the topic of wellness, students' need statements were as follows:

- Students need their basic needs to be met so that they can engage in learning.
- Students need expert teachers, so that students feel safe, loved, and valued.
- Students needs a sense of belonging, safety, trust, happiness, patience, and forgiveness so that they can develop and persevere with strong self-esteem.
- Students need a safe and respectful environment so that they have the confidence to be their true self to be able to connect to their passions.
- Students need to build strong relationships so that they can feel safe and cared about.
- Students need to feel respected, safe, and understood even if they feel different or look different.
- Students need to play so that they can develop socially, physically, and emotionally.

Implications. Over the course of two full working days the SWC followed a series of design protocols working with the eight themes and data from the Big Idea Quest. Following the SWC engagements the 4YP design team analyzed the input of the SWC and created the 4YP design principles and strategies that were moved forward in the 4YP development process. The design principles were organized into the mnemonic LEARN: (a) Leverage the talent of the learning community to make a positive impact on the life of students, staff, parents and our world; (b) engage in purposeful work designed to build foundational skills and competencies through projects that foster deep understanding; (c) amplify and value diversity – in ideas, people, ways of knowing and ways of being; (d) reflect on learning through meaningful assessments to inform and showcase growth; and (e) nurture positive relationships built on trust, support and care for one another. The strategies were organized into priority areas and the SWC created essential questions to frame the strategies. Table 8 illustrates the priority areas, strategies, and essential questions.

Table 8

Priority Areas, Strategies, and Essential Questions Developed by Superintendent Working Committee

Priority areas	Strategies	Essential questions
Student engagement	Enhance and measure student voice in the co-construction of learning.	How might RVS engage and measure student voice in the co-construction of learning?
		How might RVS engage all students in community service?
Diversity	Develop and implement a system-wide diversity framework.	How might RVS reimagine social, emotional, and behavioural supports to garner different results?
		How might RVS teach students to value diversity?
Instructional practices	Align and coordinate pedagogical approaches, from building foundational skills to project based learning to inclusion, across all K-12 schools.	How might RVS align and coordinate pedagogical approaches—from building foundational skills to project based learning and inclusion—across all K-12 schools?
		How might RVS resource schools to build a cohort of instructional coaches in every building?
		How might RVS systemically move learning beyond the classroom, while increasing community involvement?
Make learning visible	Enhance the visibility of students' learning journey and growth across all grades.	How might RVS showcase learning in a systemic and ongoing fashion?
		How might RVS integrate outcome-based reporting in a secondary school setting?
System redesign	Redesign RVS' collaborative and organizational structures	How might RVS redesign its collaborative and organizational structures to maximize resources,

Priority areas	Strategies	Essential questions
	to maximize resources, professional learning opportunities, teamwork and innovation. Redesign RVS' evidenced-based planning framework for schools and the jurisdiction.	professional learning opportunities, teamwork and innovation? How might RVS redesign its evidenced-based planning framework for schools and the jurisdiction? How might RVS build parent to support student in achieving the plan's outcomes?

Note. RVS = Rocky View Schools.

Description of Practical Output 1: RVS 2019-2023 4YP

The 2019-2023 RVS 4YP was approved by the Board of Trustees on November 28, 2019 (see Appendix E). As outlined in the previous sections the plan was developed engaging students, parents, staff, trustees, business/ community leaders, and service providers during a 15-month design process led by the 4YP team. The final plan features a learning narrative, goals, outcomes, performance measures, design principles, and priority areas. In a departure from past 4YPs, the 2019-2023 4YP was developed with design principles and six global strategies decoupled from outcomes. The intention of these structural changes was to move beyond past planning practices that precipitated an implementation practice that involved focusing on goals in isolation and extensive action planning characterized by forecasting, lag measures, and reporting. The restructure provides for the development and implementation of actions towards multiple outcomes. It also provides for the development of context specific lead measures to be created in the process of developing strategies and actions. Design principles were created to further promote interconnectivity between the outcomes and to provide stakeholders with interconnected principles to use as a conceptual framework for use in the design of student learning, professional learning and school design actions within the School Playbook and System Response Model.

Conclusion

The Mesocycle 1 findings and practical output presented in this chapter represent the first phase of our experience designing for a school system that learns. Mesocycle 2, presented in the forthcoming chapter, provided an opportunity to build on, refine and further test the design work from Mesocycle 1. In Chapter 6 I explicate the design work from Mesocycles 1 and 2 and present a theoretical model.

Chapter 5: Findings from Mesocycle 2—4YP Implementation Process

In Alberta the Education Act along with other legislation outlines the accountability relationship between the Ministry of Education and school authorities. As described in the background of practical output 1 this includes the responsibility for school authorities to develop 4YPs and Annual Education Results Reports and submit them to the Ministry of Education. Within this relationship school authorities are responsible for the implementation of the plans and have autonomy to develop local planning processes and accountability frameworks for schools within their authority (Alberta Education, 2018). Prior to this research project the 4YP implementation process in RVS involved district level staff developing and implementing action plans and individual schools developing and implementing School Education Plans (SEPs). The district level process involved assigning a "Most Responsible Person" (MRP) for each of the 4YP's strategies. The MRP developed a quarterly action plan and reported on its implementation to the superintendent of schools. The school level SEP process required schools to submit a plan that mirrored the district 4YP. This process had schools adopt the district goals, outcomes and measures. Schools were required to develop local strategies. The SEP process took place in the spring of the preceding school year to align with school budgeting. Principals were tasked with developing an SEP and submitting it for review and approval to the superintendent of schools. School principals determined their own SEP development process but were required to sign that they had developed the plan in consultation with staff and with advice from school council. Schools were required to post their approved plan to their school website. Connected to the SEP schools were required to complete a School Annual Results Report in the fall. This report required principals to connect the SEP they had developed in the fall to their schools' performance on Alberta Education Accountability Pillar Online Report Initiative (APORI) data. This data included teacher, parent and student satisfaction survey results, standardized test results and high school completion, scholarship and transition to post-secondary education results (Alberta Education, 2018).

The purpose of the second mesocycle of this project was to redesign the RVS' 4YP implementation process to align with the 2019-2023 4YP. It is important to note that this design opportunity was not foreseen at the outset of this project. The need for this work emerged in the development of the 4YP as it became clear to 4YP team that the new plan required a different implementation process. Several factors contributed to this development. Firstly, the 4YP team was inspired by the momentum of the stakeholder engagement process through events such as the Big Idea Quest. It demonstrated to the 4YP team that stakeholders in the system had important ideas and when empowered were able to precipitate significant action and progress. The 4YP team recognized that in contrast to this success the former 4YP implementation process delineated a top down command and control accountability structure. Secondly, the stakeholder engagement events and Big Idea Quest analysis process revealed to the 4YP team the importance of feedback cycles. The team recognized that the former process relied on standardized lag measures that did not provide timely and relevant information to inform the development of next steps at the school or district level. Thirdly, the decision to decouple strategies from outcomes demanded a new action planning process that would utilize the LEARN design principles to develop actions that would target multiple goals. I decided to continue my research partnership and develop a second mesocycle for two primary reasons. Firstly, I recognized the value to the school district as the success of the 4YP would depend on how it was implemented. Secondly, I recognized an opportunity to further explore my research question. The second mesocycle was designed to further explore, refine and test the emerging themes from Mesocycle 1 while responding to the needs and constraints within the practical context.

Later in the chapter I provide more descriptions and chronicle supporting data for the findings. This overview of the Mesocycle 2 findings frame the chapter:

1. Administrators indicated that teacher collaboration between schools, contributions to online professional learning communities and use of social media to make learning visible to be low relative to other concepts in this principle.
2. Administrators reported student voice in learning and student leadership in school direction as areas for improvement.
3. Administrators indicated that teacher and staff collaboration is more prevalent than teachers co-designing learning and assessment and teachers receiving feedback on instructional practices.
4. Administrators indicated that authentic learning is an area for growth.
5. Building foundational literacy and numeracy skills was reported as higher than developing these skills across subject areas or applying these skills to purposeful work.
6. Administrators indicated that applying big ideas and developing competencies across subject areas are areas for growth.
7. Administrators identified Universal Design as an area of growth as compared to higher averages for targeted and intensive supports.
8. Administrators reported that teachers and staff havea strong understanding of the diversity profile of the school and they identified incorporating students' cultural

strengths as an area of growth.

9. Administrators reported designing learning and accessing resources to support learning about First Nations, Métis, and Inuit as areas for growth.
10. Administrators reported that collaboratively designing assessment criteria with students as an area for growth.
11. Administrators at high and middle schools reported that designing opportunities for parents to help students to reflect on growth over time and set learning goals is an area for growth.
12. Administrators reported that an area of strength is teacher assessment practice in regard to formative assessment, the collection of observations, conversations, and product and outcomes based assessment.
13. Administrators reported Nurture Positive relationships as an area of strength in our district.
14. Administrators identified inviting and involving FNMI community members in the school community as an area for growth.
15. Forty-five percent of administrators selected strongly agree when asked about teacher participation in ongoing professional learning in learning communities.

Design Process

The 4YP team collaboration workflow established in Mesocycle 1 and described previously continued in Mesocycle 2. This involved ongoing communication and decision-making regarding next steps and responsibilities. Table 9 chronicles this process by event and presents an overview of key design decisions.

Table 9

Summary of Design Process for Mesocycle 2: 4YP Implementation Process

Date(s)	Event	Stakeholder	Design Decisions
March 1	Develop conditions for innovation survey	4YP team	Aligned to design principles Questions developed with feedback from 4YP team Questions developed drawing on Teaching Effectiveness Framework and DBPL survey
March 12	Administer conditions for innovation survey	School leaders	Collect empirical data to inform next steps Develop shared language and initial scope for LEARN design principles
March 22	Survey analysis	4YP team	Illustrated as infographic Embedded into playbook and system response model with accompanying analysis and ideation process
April 4	School Playbook Design	4YP team	Developed playbook concept and identified user needs Developed draft model drawing on Norman (2013) and Mesocycle 1 design themes
April 5	System response model Design	System administration	Researcher led learning department in review of survey and playbook concept to test possibilities for system response model
April 6–17	Playbook Development	4YP team	Developed detailed scaffolding for schools in the form of a workbook and video facilitation resources
April 18	System Response	4YP team	Developed system response model based on Norman (2013)

Date(s)	Event	Stakeholder	Design Decisions
	Model Design		and design themes
April 18	Theoretical model design	4YP team	Researcher shared preliminary draft of theoretical model and received feedback from 4YP team
May 7	Feedback on School Playbook	School administration, system administration	Introduced playbook to school and system administrators and solicited formal feedback
May 8–15	Revised playbook	4YP team	Revised playbook based on school and system administrator feedback
May 21	Feedback on System Response Model	System administration	Introduced playbook to learning department and solicited feedback
May 21–27	Revised System Response Model	4YP team	Revised system response model based on system administrator feedback

Note. 4YP = 4-year school education plan; design-based professional learning DBPL.

In the forthcoming sections I present the findings of the Conditions for Innovation survey results and chronicle how this empirical data informed the design process of the School Playbook and System Response Model.

Conditions for Innovation Survey

The Conditions for Innovation survey was positioned as an input to the 4YP implementation process. The survey served three primary purposes: firstly, it provided a prototype for how to develop a system feedback loop featuring empirical data; secondly, it served to develop a shared language and initial scope of the LEARN design principles for staff throughout the system; and thirdly, it offered a snapshot of how school administrators viewed the needs of the system in relation to the design principles to be used by stakeholders to inform next steps. To these ends the survey results were embedded in the School Playbook and System Response Model. A video facilitation was developed to lead staff in a process to reflect on the survey results, consider them in relation to their own perspective and generate insights to explore in their own context. Infographics were developed for staff to interact with the survey results. The infographics featured an overview and then presented data by each of the five LEARN design principles. The overview included: the number of participants; the participation percentage of the total school administrator population; participation by school level; the survey's 5-point scale; the overall mean by design principle; and the overall mean by design principle by school level. Each of the LEARN design principle sections featured: the survey's 5-point scale; a table with the mean and standard deviation for each question provided as numeral; a bar graph visualization the mean per question by school level; researcher generated findings, bar graphs visualizing the data to support the findings; and a how might question intended to reframe the finding as an opportunity. The findings were intentionally generated to be accessible to stakeholders.

The leverage section of the survey sought to ascertain the capabilities of students and the community to make a positive impact on the lives of students, staff, parents, and the world. Three findings were significant. For the first, L1, administrators indicated that teacher collaboration between schools, contributions to online professional learning communities, and use of social media to make learning visible were low relative to other concepts in this principle (see Figure 12). Administrators also reported student voice in learning and student leadership in school direction as areas for improvement (L2; see

Figure 13). For the third finding under leverage, L3, administrators indicated that teacher and staff collaboration was more prevalent than teachers codesigning learning and assessment and teachers receiving feedback on instructional practices (see

Figure 14).

Figure 12

Finding L1

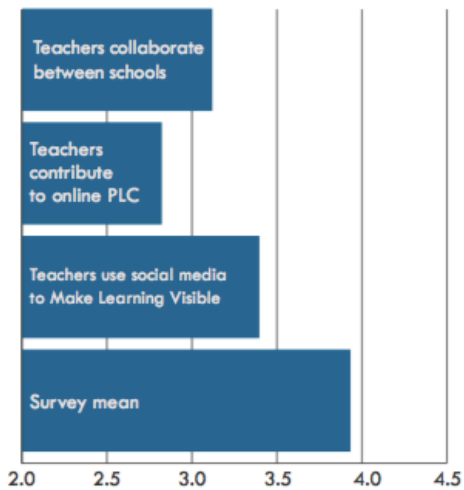


Figure 13

Finding L2

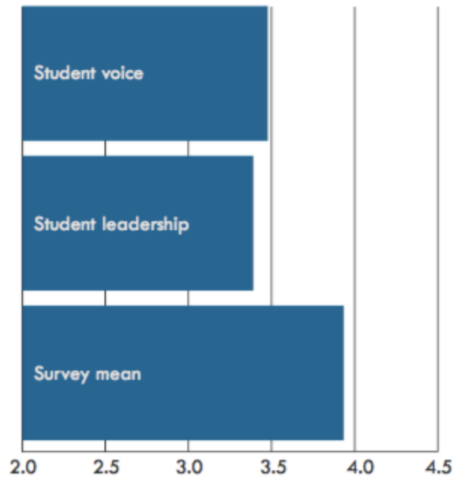
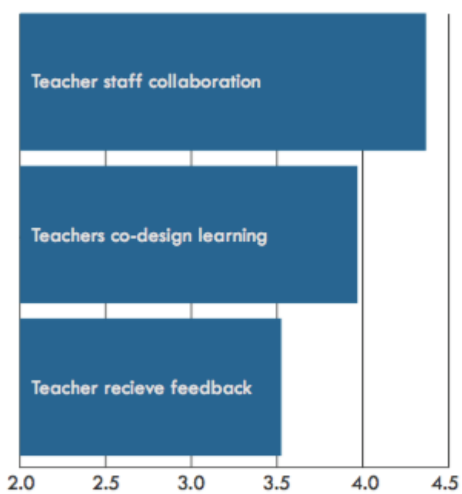


Figure 14

Finding L3



The engage section of the survey sought to ascertain engagement in purposeful work designed to build foundational skills and competencies through projects that foster deep understanding. There were three findings. For the first, E1, administrators indicated that authentic learning is an area for growth (see

Figure 15). Next, building foundational literacy and numeracy skills was reported as higher than developing these skills across subject areas or applying these skills to purposeful work (E2; see

Figure 16). Administrators also indicated that applying big ideas and developing competencies across subject areas are areas for growth (E3; see

Figure 17).

Figure 15

Finding E1

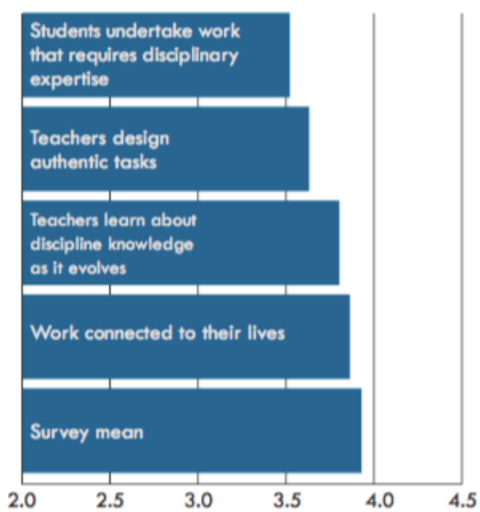


Figure 16

Finding E2

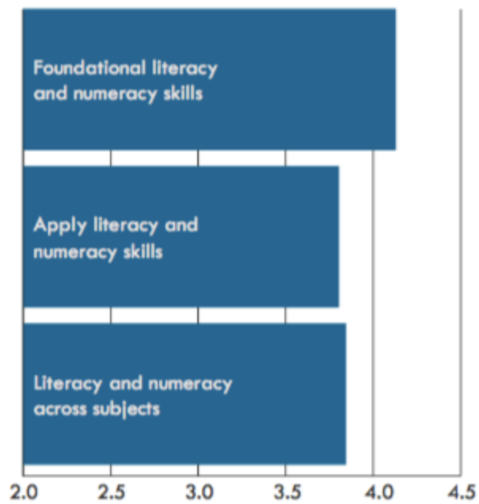
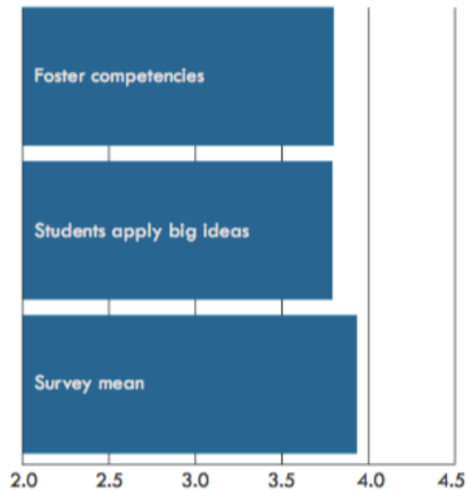

Foundational literacy and numeracy skills
Apply literacy and numeracy skills
Literacy and numeracy across subjects
2.0
2.5
3.0
3.5
4.0
4.5

Figure 17

Finding E3



The appreciate section of the survey sought to determine appreciation and promotion of diversity in ideas, cultures, and ways of knowing, being, and learning. For the first finding, A1, administrators identified Universal Design as an area of growth as compared to higher averages for targeted and intensive supports (see

Figure 18). Administrators also reported that teachers and staff had a strong understanding of the diversity profile of the school and they identified incorporating students' cultural strengths as an area of growth (A2; see

Figure 19). Finally, administrators reported designing learning and accessing resources to support learning about First Nations, Métis, and Inuit as areas for growth (A3; see

Figure 20).

Figure 18

Finding A1

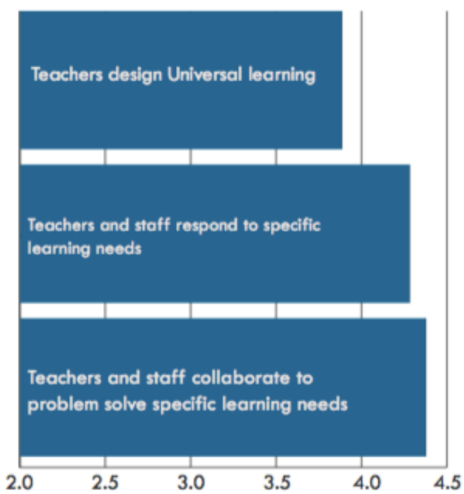


Figure 19

Finding A2

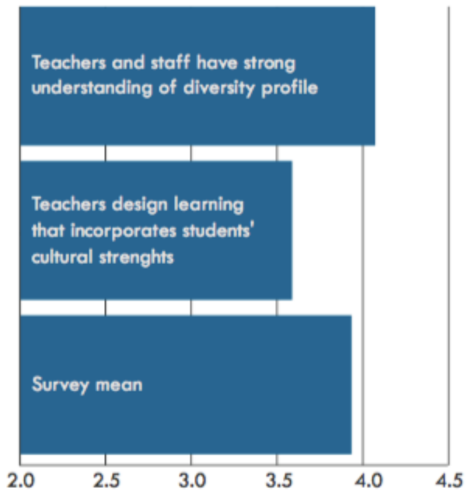
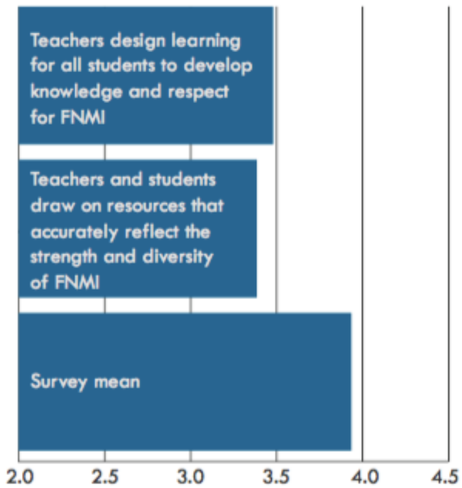

Teachers and staff have strong understanding of diversity profile
Teachers design learning that incorporates students' cultural strenghts
Survey mean
2.0
2.5
3.0
3.5
4.0
4.5

Figure 20

Finding A3



The reflect section of the survey involved reflection on learning through meaningful assessments to inform and showcase growth. For the first finding, R1, administrators reported that collaboratively designing assessment criteria with students as an area for growth (see

Figure 21). Administrators at high and middle schools reported that designing opportunities for parents to help students to reflect on growth over time and set learning goals is an area for growth (R2; see
Figure 22). Administrators also reported that an area of strength is teacher assessment practice in regards to formative assessment, the collection of observations, conversations and product and outcomes-based assessment (R3; see

Figure 23).

Figure 21

Finding R1

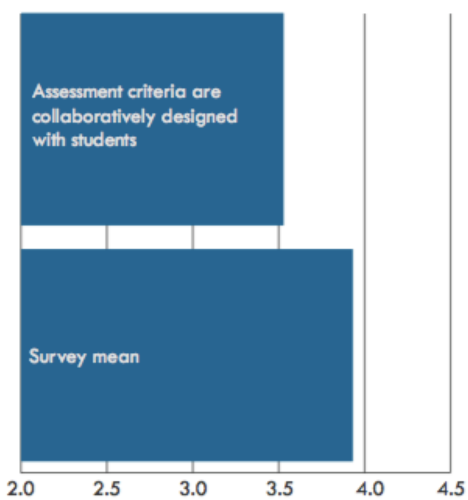


Figure 22

Finding R2

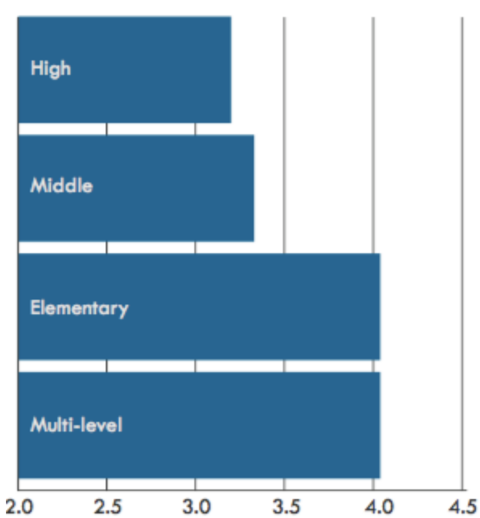
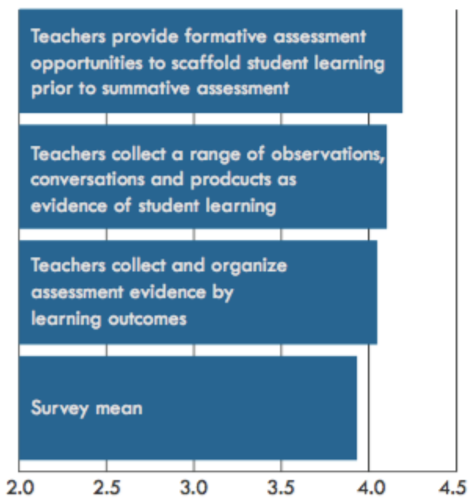


Figure 23

Finding R3



The nurture part of the survey looked at nurturing positive relationships built on trust, support, and care for one another. Administrators reported nurturing positive relationships as an area of strength in our district (N1; see

Figure 24). They identified inviting and involving FNMI community members in the school community as an area for growth (N2; see

Figure 25), and 45% of them selected strongly agree when asked about teacher participation in ongoing professional learning in learning communities (N3; see

Figure 26).

Figure 24

Finding N1

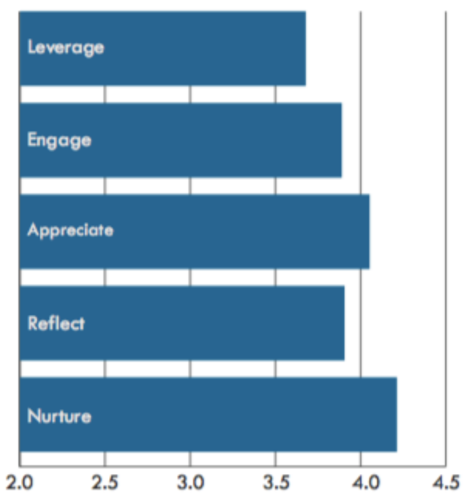


Figure 25

Finding N2

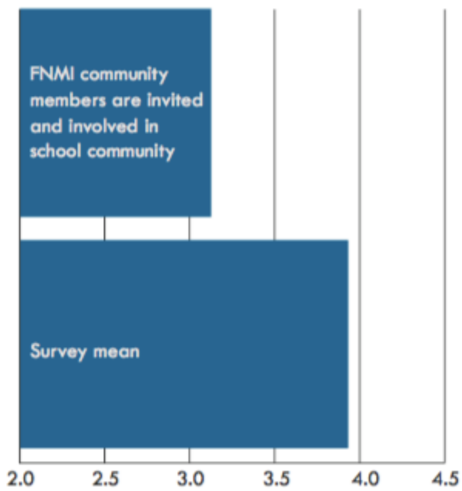
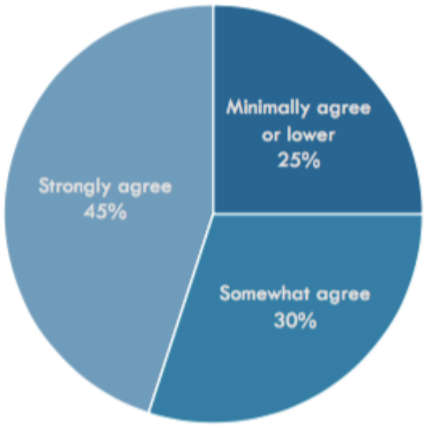

FNMI community members are invited and involved in school community
Survey mean
2.0
2.5
3.0
3.5
4.0
4.5

Figure 26

Finding N3



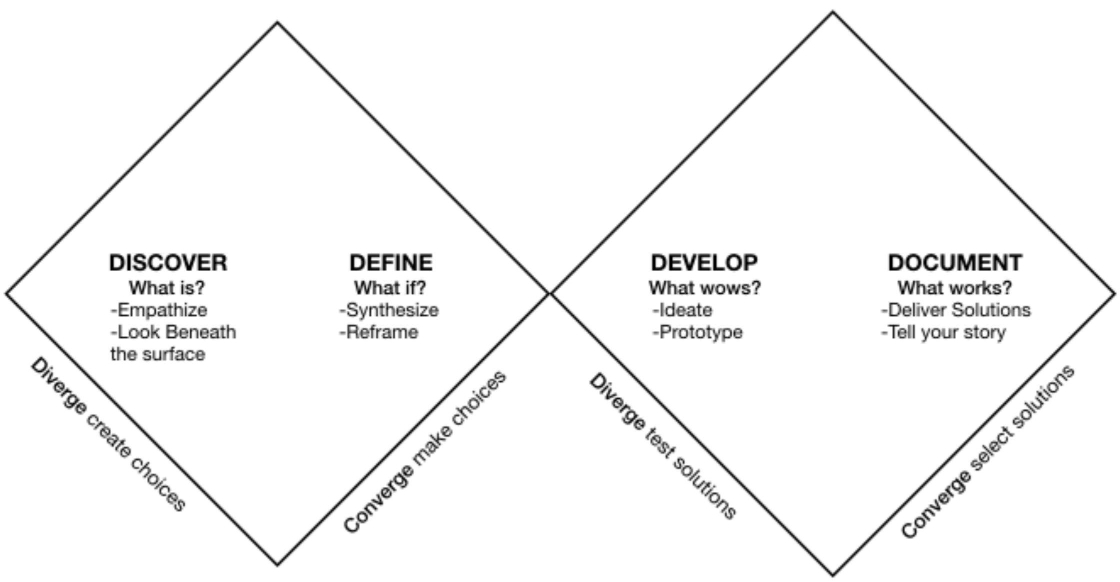
Description of Practical Output 2: RVS School Playbook and System Response Model

Mesocycle 2 resulted in the creation of two interconnected practical outputs the School Playbook and System Response Model. Together these deliverables replaced the previous SEP process, the School Annual Results Report process, the associated district approval processes for both SEP and School Annual Results Report and the school district 4YP action planning process. The School Playbook is the process used at the School level and the System Response Model is employed by system leaders. The processes interconnect and have been intentionally designed with flows of feedback and response between the processes. In the forthcoming sections I describe each of these outputs, illustrate the interconnection between the processes and identify learning and insights carried forward from Mesocycle 2. I begin by describing the double-diamond design model that underpins both the System Playbook and the System Response Model.

Double-diamond design model. Central to the design of both the School Playbook and System Response Model is a double diamond design model built on Norman (2013) which is an adaptation of the the double-diamond design process developed by the British Design Council in 2005 (Design Council, n.d.). Figure 27 illustrates the model as provided to schools in the School Playbook.

Figure 27

RVS' School Playbook Double Diamond Design Model



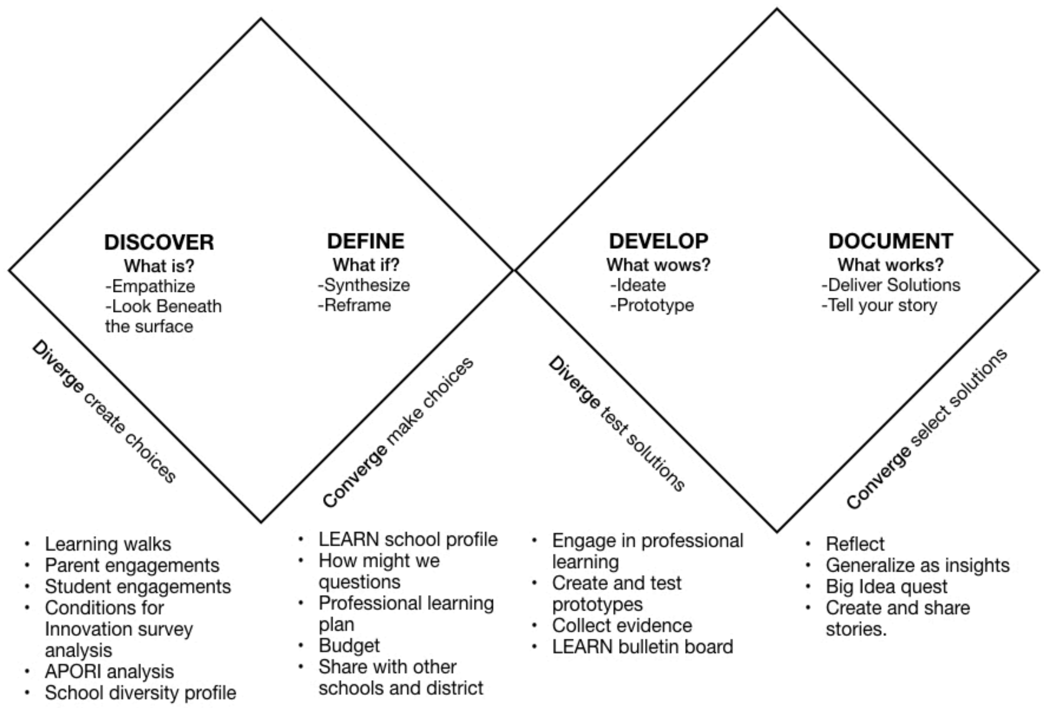
The decision to work with the Double Diamond Model of Design emerged within the process and was selected because it conceptualized the modes of divergence and convergence identified in the design work from Mesocycle 1. The RVS model modifies Norman's (2013) interpretation of the Double Diamond Model to have a final stage labeled the final stage as document. This change was made to conceptualize the continuous iterative nature of the RVS' model.

School Playbook. The School Playbook is a guide for school action teams to lead their school community in a design thinking process "to obtain a deep understanding of [their] students' needs" (RVS, 2019b) and "develop and test possible solutions and document, reflect and share stories with RVS' learning community" (RVS, 2019a). The Playbook features a step-by-step scaffolding including engagement tools, workbook pages, and detailed agendas. The process begins with the forming of a school action team featuring school administrators, teachers and support staff. The school action team is charged with using the Playbook to lead the larger school community which includes planning engagements, facilitating engagements, synthesizing data and sharing documentation with the district. Profession learning opportunities were planned for school action teams aligned with the phases of the playbook. The format features .pdf slides and supporting video facilitation for key process steps. The Playbook is divided into four phases provided to schools as two editions: a Spring Playbook featuring the Discover and Define phases; and a Fall Playbook featuring the Develop and Document phases. The Discover phase involves gathering insights about how the 4YP LEARN design principles currently exist in the school and identifying school needs, strengths and unique opportunities. The Playbook provides instructions and tools to support the following Discover phase steps: an analysis of the Conditions for Innovation survey infographic; learning walks in the school to observe teaching and learning, and look for evidence; a school council engagement; student focus group interviews; an analysis of available APORI data; and a the development of a school diversity profile intended to identify the unique composition of learning needs in the student population. In the

Define phase schools analyze and synthesize the Discover phase data. In the Define phase schools: frame design opportunities in the form of "how might we" questions; create a professional learning plan for the upcoming school year intended to support staff to develop possible solutions; and develop their school budget. At the end of the Define phase school administrators present the outputs of the define phase in face-to-face meetings with other schools in their area and system leaders. In the Fall Playbook the Develop and Document phases involve engaging in professional learning, developing promising solutions, testing solutions by taking-action and documenting insights. Instructions and tools support the development of prototypes; testing of prototypes; documenting evidence; collaboratively analyzing evidence; and generating insights and future prototypes. Schools are provided with a bulletin board template designed to document and make visible prototypes and emerging insights. Throughout the Fall Playbook opportunities were planned for schools to share design stories with other schools, system leaders and the community. Opportunities to share design stories include a second iteration of the Big Idea Quest; continued use of a dedicated 4YP Twitter hashtag; video storytelling workshops; a system blog featuring guest bloggers from throughout the division; a gala event for students to deliver TED-style talks about their learning; and face-to-face sharing opportunities at school administrator leadership meetings, board meetings and joint school council meetings. Figure 28 illustrates the School Playbook process.

Figure 28

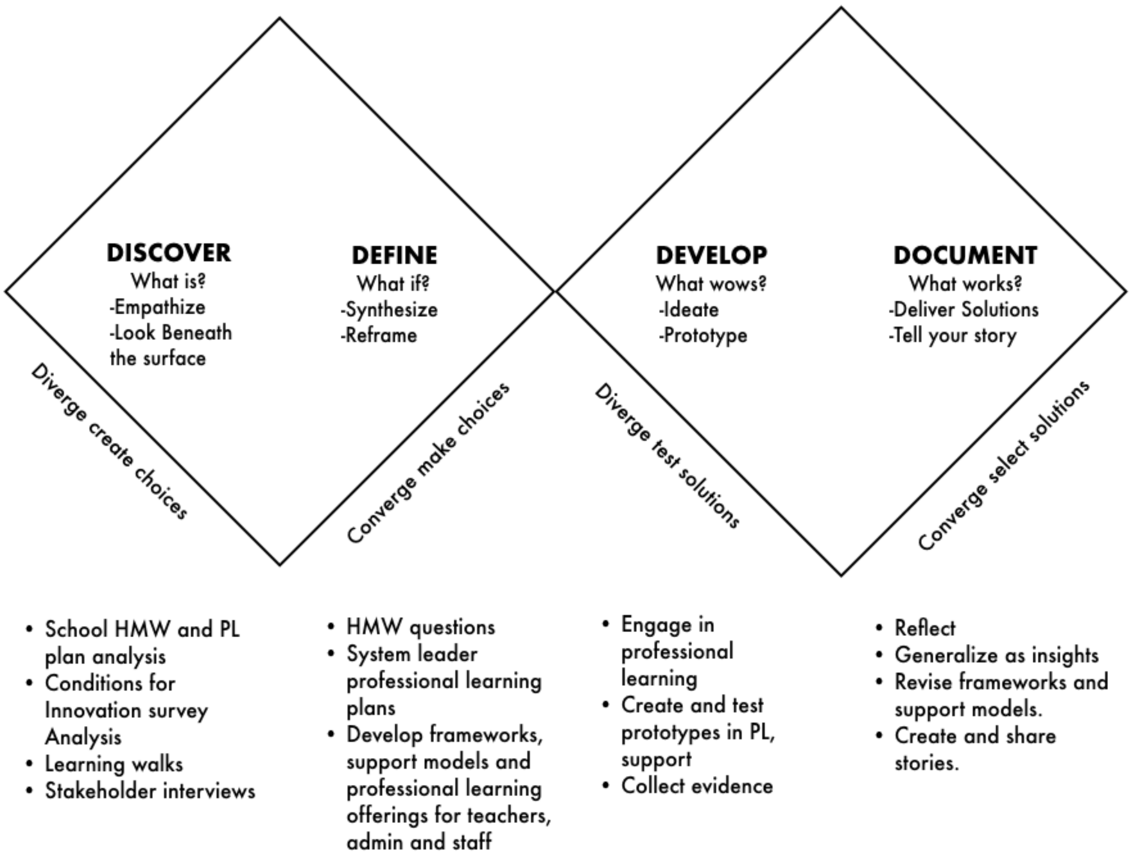
School Playbook Process



System Response Model. The System Response Model is conceptualization of how the School district will use a design thinking model to use the School Playbook process to identify needs and develop and test solutions in the system in relation to the 4YP. The System Response Model involves the work of system leaders in the Learning and Schools Departments as well as superintendent design teams. These teams were formed for each of the six 4YP priority areas and were made up of a mix of school based and school district staff members. System leaders use the System Response Model to inform how they work to provide support to schools within their portfolio of responsibility. The superintendent design teams use the System Response Model to move forward the 4YP priority area they are responsible for. The System Response Model draws on the double diamond design model outlined previously. In the Discover phase it involves analyzing the Conditions for Innovation survey infographic; anaylizing the output of the School Playbook Define phase including the school ‘How might we’ questions and proffesional learning plans; learning walks both looking at conditions for learning in schools and conditions for learning at district professional learning opportunities; and interviews with stakeholders. In the Define phase system leaders and superintendent design teams create HMW questions, develop learning plans for their own learning in relation to the HMW questions; and develop frameworks, support models and professional learning offerings to guide their work with schools. The Develop phase involves the development of prototypes, testing and collection of evidence within the context of the frameworks, support models and PL offerings that make up their work. The Document phase involves analyzing evidence, generating insights and sharing stories. The System Response Model draws on the same documentation tools and opportunties as the School Playbook. This includes bulletin boards at the distrcit office and the expectation for system leaders and superintendent design team members to share system level stories alongside school stories in the following opportunities: Big Idea Quest; continued use of a dedicated 4YP Twitter hashtag; video storytelling workshops; a system blog featuring guest bloggers from throughout the division; a gala event for students to deliver TED-style talks about their learning; and face-to-face sharing opportunities at school administrator leadership meetings, board meetings and joint school council meetings. Figure 29 illustrates the System Response Model process.

Figure 29

System Response Model



Relationship between School Playbook and System Response Model. The School Playbook and System Response Model processes were designed with flows of feedback and response between them. The School Playbook outputs provide inputs to the System Response Model designed to support system leaders to respond to the needs, experiences and successes at the school level. The System Response Model outputs are designed to provide coordination between schools. Inputs and outputs flow in the School Playbook (see Figure 30) and System Response Model (see Figure 31) as well as between the school and system design processes (see Figure 32).

Figure 30

School Playbook Inputs and Outputs

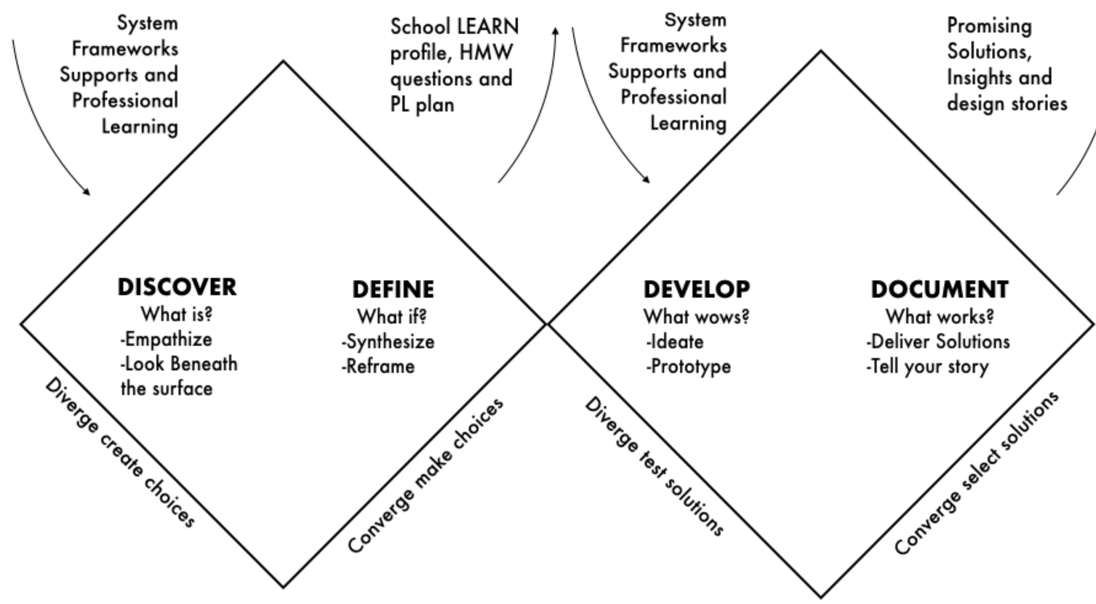


Figure 31

System Response Model Inputs and Outputs

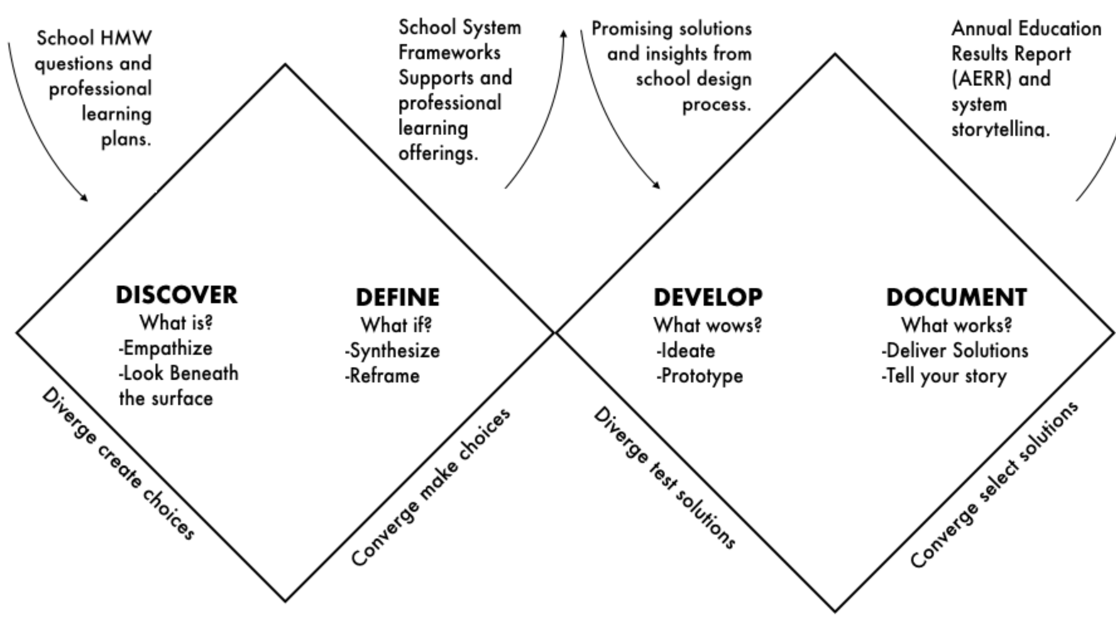
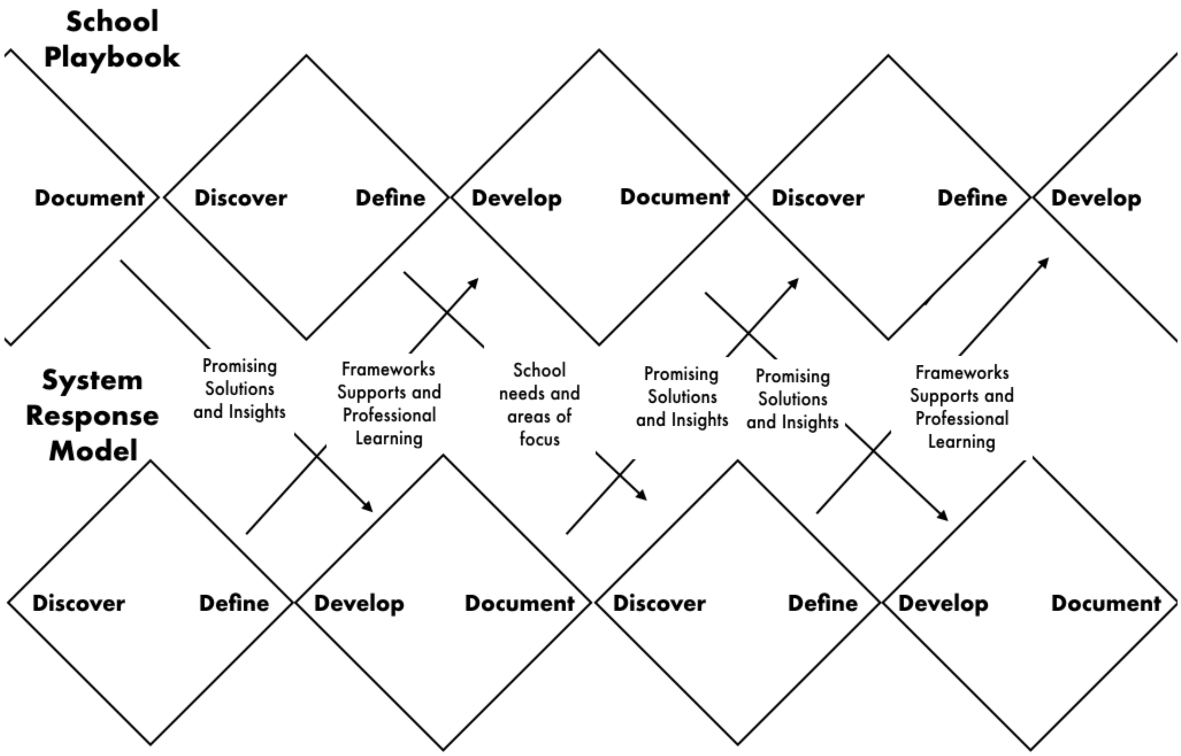


Figure 32

School Playbook and System Response Model Inputs and Outputs



Conclusion

In this and the previous chapter I have chronicled the design process and practical outputs of this study. Following the completion and delivery of the School Playbook and System Response Model the study transitioned into an Evaluation and Reflection microcycle. In Chapter 6 I present a theoretical model that was generated in the microcycle and represents an attempt to conceptualize the what we learned about designing for a school system that learns through the design work and practical outputs of Mesocycles 1 and 2.

Chapter 6: Theoretical Output

In this chapter I present the theoretical output of this study. The theoretical output is an attempt to advance theory grounded in naturalistic contexts to combine “know-how” with “know-why” (Bereiter, 2014, p. 5). The theoretical output was generated in the Evaluation and Reflection microcycle through an iterative interpretive process drawing on the process artifacts and products from the study; the researcher field journal; system leader interviews; and research literature from the theoretical framework. I present the theoretical output featuring four design principles. For each design principle I provide an overview of why and how the principle was explored in the study, present findings, discuss the findings, and present recommendations for system leaders and researchers. It is important to note that the theoretical output presented represents one way to conceptualize the experiences from this study and like all models it falls short of representing the real world fully. My intention in this chapter is to lay open the design work in a way that honors the complexity of the experience in the local context while at the same time lending itself to global relevance. To present the design principles and findings I have included system leader quotations drawn from interviews of participants in this study. Following the findings for each principle I include a discussion of the research literature. Finally, for each design principle I have generated recommendations from the findings and discussion. The recommendations are framed as insights toward the research question of this study: My doctoral research was underpinned by the question: How can school district leaders design for a system that learns?

In the framing of the recommendations I have aimed to open up possibilities for the practice of system leaders as designers and to inspire future research.

Overview of Design Principles, Findings, and Recommendations

The theoretical output is comprised of four design principles: (a) divergence and convergence, (b) feedback cycles, (c) network connectivity, and (d) design culture. Figure 33 presents these principles in a visual model.

Figure 33

Theoretical Model

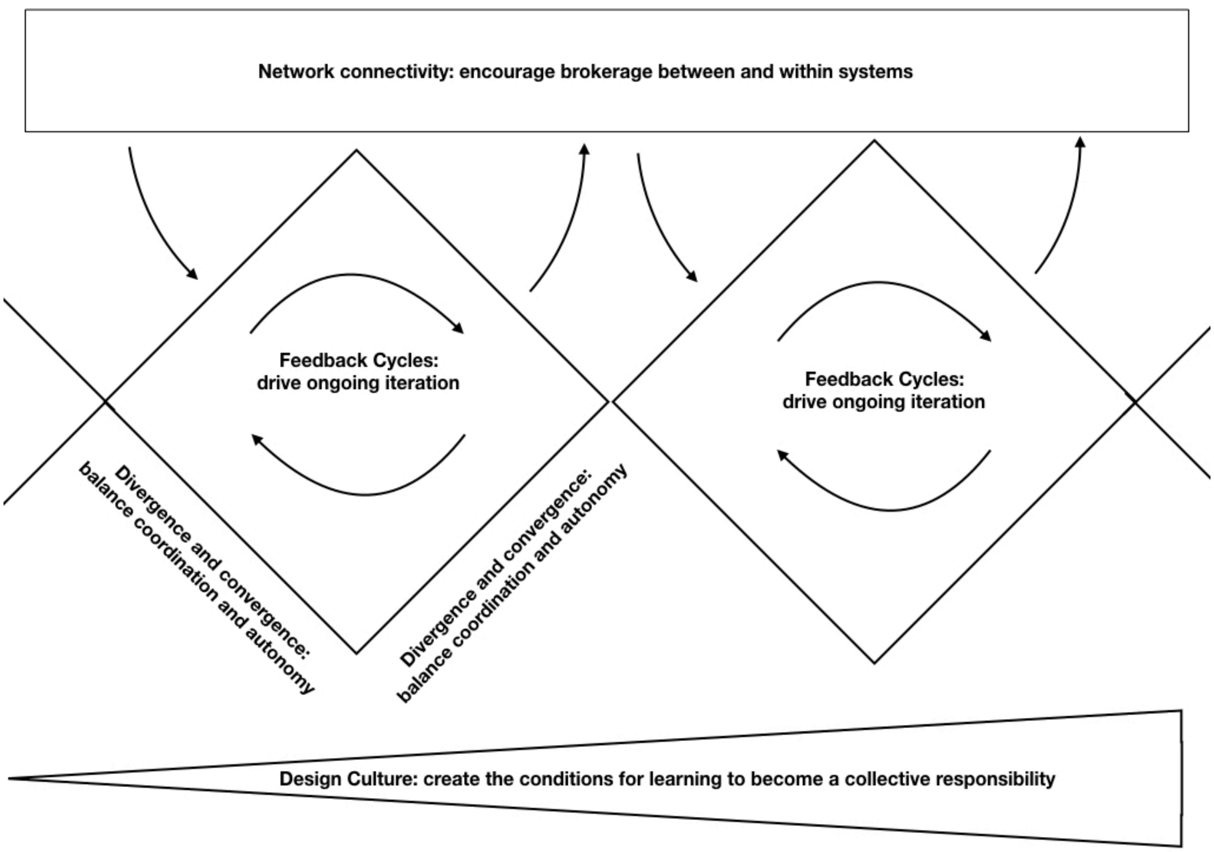


Table 10 offers an overview of the findings and recommendations presented in this chapter organized by the four design principles.

Table 10

Evaluation and Reflection Microcycle Findings and Recommendations

Design principle	Findings	Recommendations
Divergence and convergence	F1.1 The Double Diamond model of Design provided a mechanism to support the system to remain dynamic, responsive, and iterative. F1.2 Divergent stakeholder perspective was solicited using design thinking protocols focused on student learning. F1.3 Designing for divergence involved various engagement strategies including face-to-face engagements; crowd sourcing software; survey; and decentralized engagements. F1.4 Convergence needed to be deftly balanced. F1.5 Convergence involved co-creating common goals and language. F1.6 Stakeholders participated in making convergence decisions. F1.7 Student need statements provided common ground for convergence. F1.8 Data analysis and visualization supported convergence. F1.9 Storytelling supported convergence.	R1.1 Design for divergence and convergence to balance diverse context specific solutions and centralized coordination, support and system coherence. R1.2 Design a dynamic and iterative design process towards a shared purpose. R1.3 Employ a design-based research partnership to investigate and iterate the balance of divergence and convergence.
Feedback cycles	F2.1 Determining what data to collect and analyze was an important consideration in the design of feedback cycles. F2.2 Feedback cycles were designed into the design process to foster responsiveness and iteration throughout the system. F2.3 Empirical research methods were embedded in feedback cycles to enhance the results, credibility, and trustworthiness of the design process. F2.4 System feedback cycles were made explicit to enhance stakeholder ownership and model responsiveness. F2.5 Feedback cycles represented a shift within school and district planning from	R2.1 Design for stakeholders to design and enact feedback cycles throughout the system. R2.2 Design for feedback between systems. R2.3 Design for research capacity to support feedback cycles. R2.4 Design feedback cycles that take into account a broad and dynamic range of evidence.

Design principle	Findings	Recommendations
	analyzing data primarily to evaluate, to the ongoing analysis of data as a driver of reflection and action.	
Network connectivity	F3.1 A distributed leadership design was employed to increase connectivity between systems. F3.2 Collaboration protocols were designed into existing face-to-face meeting structures to increase connectivity within and between systems. F3.3 District supports were reorganized into multidisciplinary approach to increase connectivity between system leaders. F3.4 Storytelling via media tools was embedded in the design process. F3.5 A design process was employed in a fractal-like pattern to increase connectivity within and between systems.	R3.1 Design to encourage the flow of ideas within and between systems. R3.2 Employ social network analysis within a design-based research partnership to visualize and iterate the emergence of network connectivity.
Design culture	F4.1 Videos were produced to communicate the shift of culture. F4.2 Design culture was fostered through professional learning. F4.4 System leaders championed storytelling as a key practice in encouraging a design culture. F4.5 A need existed to navigate the expectations of the Board of Trustees and the Ministry of Education.	R4.1 Design to communicate a narrative. R4.2 Design to build design capacity through professional learning. R4.3 Design for design-based leadership capacity. R4.4 Design for stakeholders to make learning visible. R4.5 Research the potential influence of storytelling in designing for a learning system. R4.6 Design beyond the boundaries of the system.

The design principles are interconnected, co-dependent, and in places overlapping however for explanatory purposes I take them up individually in the sections below.

Design Principle 1: Divergence and Convergence

"When designing at a system level we need to be attentive to balance giving people opportunity to make it their own but then pick our spots on when and how to provide coordination" (System leader).

Central to the theoretical output of this study is a double diamond model of design that draws on Norman (2013; see Figure 33). In the School Playbook and System Response Model the double diamond model was conceptualized and employed as recursive with the conclusion of the second diamond providing input into a new double diamond cycle. This cyclical design provided a mechanism to support the system to remain dynamic, responsive, and iterative.

The divergence phases in the model were designed to encourage diverse stakeholder voice and unique solutions that address context specific needs. Some examples of how divergence was designed for in this study included: face-to-face engagements featuring diverse stakeholder groups; the Big Idea Quest where staff generated and shared local needs and promising solutions; a system wide learning walk process where parents, staff, and students used an observation protocol to gather evidence of learning and identify needs in local contexts; and a shift from action planning to prototyping where promising solutions were developed and tested in context.

The convergence modes of the model were designed to support the coordination necessary for collaboration, allocation of resources and supports, and system coherence. Examples of how convergence was designed for included: bringing together a heterogeneous stakeholder group to analyze and interpret previous stakeholder engagement data; developing, administering, and analyzing a survey to identify common system needs; developing a common design process; developing a common language through the 4YP goals, outcomes, and design principles; and creating a variety of storytelling mediums to facilitate the sharing of learning stories. In the forthcoming sections I present findings connected to this design principle.

Findings

F1.1 The Double Diamond of design provided a mechanism to support the system to remain dynamic, responsive, and iterative.

> We've created a promise that when you put your school's priority areas forward we will listen to it, we will be responsive to the needs of schools. If we can follow through on that promise, that's going to be a big change because previous plans weren't dynamic in that way…Previously everything was lag so this is really putting it in reverse order and flipping it on its head….a lot of that thinking will be proactive instead of retroactive and the voice of the community will help guide the decisions that are being made. (System leader)

The Double Diamond Model of Design shifted school and system planning into a space of design. At the school level this shifted education planning from a once annual forecasting and once annual reporting to a dynamic process of ongoing action and reflection. The divergence phases of the model provided for staff to explore the needs of students and test unique solutions. The convergence phases provided for the sharing of insights, reflection on evidence, and coordination between teams. The alternating phases of divergence and convergence allowed for a ongoing, dynamic, and responsive planning process.

At the district level phases of divergence and convergence provided a process for system leaders "to be more supportive of school aims rather than making sure that your boxes are checked and that you are doing your job properly" (System Leader). Previously system level action planning occurred quarterly and was largely focused on implementing the 4YP directives. The double diamond model provided a process by which system leaders collected and reflected on the evidence from the School Playbooks. This provided system leaders with opportunities to learn from the needs and solutions being explored in school contexts to inform the design of policy, professional learning, and supports at the system level. The relationship between the School Playbook process and the System Response model can be conceptualized as an ongoing call and response establishing a mechanism for iteration and responsiveness.

F1.2 Divergent stakeholder perspectives were solicited using design thinking protocols focused on student learning.

> We have always tried to do large scale community engagement and we've used a variety of processes to do that and I think one of the things that is different is that we've been able to use the human-centred design principles and protocols to get really good, deep, engaging, community engagement. (System leader)

System leaders identified that there was an important relationship between the facilitation design of stakeholder engagements to the type of data yielded. They found that human-centred design protocols that encouraged empathy, divergent thinking, and prototyping were particularly helpful in garnering a wide range of possibilities. They also repeatedly identified the importance of positioning student voice and learning as input to the design protocols. This was accomplished through school learning walks, watching videos of student learning experiences, and developing and testing ideas in schools with students.

Human-centred design protocols were built into the School Playbook and System Response Model to support an ongoing focus on divergent exploration of student need.

F1.3 Designing for divergence involved various engagement strategies including face-to-face engagements, crowd sourcing software, survey, and decentralized engagements.

In addition to face-to-face engagements, system leaders recognized that other engagement strategies were necessary to reach diverse stakeholder perspectives. The meetings featured representatives from diverse stakeholder groups (students, parents, staff, community). However system leaders identified that the attendees at meetings represented a small percentage of total stakeholders. Furthermore, while all of the stakeholder categories were represented, the particular individuals who attended were not representative of the diversity in the school system. For example, most of the parents involved were school council members and the students involved were members of high school leadership bodies. In the following subsections I present additional engagement strategies explored in this study that were successful in soliciting a greater diversity of stakeholder perspective.

> Having a crowd sourcing tool to allow perspectives from so many different stakeholders and having a centralized place to gather that and then some structured crowd sourced organized facilitation. I think it’s the voice, there was more contribution, more insights into what’s really happening at the ground level, by creating an environment where people could put forward their thoughts, interests, and concerns using organized structures and to reflect on what was being said by other groups. (System leader)

In the Big Idea Quest crowd sourcing software was used to solicit diverse stakeholder perspective. The crowd sourcing software provided a medium for stakeholders to post and interact with one another's ideas. The crowd sourcing software yielded 1,128 contributions. System leaders repeatedly spoke of the importance of this engagement. They identified the value being in both the breadth of the ideas shared, and in the momentum and good will engendered by the scale of the engagement.

A survey tool was used to solicit feedback from staff and parents via email. The data from these surveys was analyzed into themes and used to drive revisions to the plan. System leaders believed that it was important to provide an engagement opportunity that required very little investment on behalf of participants but still allowed them a chance to have voice in the system. To this end the surveys were designed to take less than five minutes to complete.

System leaders designed for engagements to be led at the school and business department level. An important feature of this strategy was designing for data to be generated in these engagements and aggregated centrally. This design allowed for many more engagements then could be facilitated centrally. It also allowed for engagements to be built into regular meetings. This design resulted in the involvement of many more stakeholders than centralized meetings. Engagements included education centre staff meetings organized in their business groups (HR, Finance, Grounds, Maintenance, Transportation, etc.) led by directors; school council engagements led by trustees at all 53 school sites; school staff meeting engagements led by principals at all 53 school; community and business partner engagements held in local communities; and student input facilitated by teachers at the classroom level. This practice was also designed into the School Playbook. Each school designed and led engagements to enlist diverse perspectives. School based action teams planned for learning walks, student engagements, staff engagements, and parent engagements inspired by protocols and tools developed centrally. This design supported decentralization as it empowered local sites to customize their engagement processes, analyze the data locally to be used within their design process. Through the School Playbook submission, the data from these engagements were aggregated centrally and fed into the System Response Model to inform system coordination.

F1.4 Convergence needed to be deftly balanced.

> Coordination needs to be deftly balanced. How much system direction do you provide and how much school-based autonomy do you provide? How do you set it up for them to do what we want them to do but to do it within the context of their own situation? I think that is always a deftly balanced situation. (System leader)

A challenge encountered in our study emerged in designing for convergence. System leaders identified the need for convergence to support: collaboration; coordination of resources and supports; system coherence; and system reporting and accountability requirements. Designing for convergence was explored in the design of engagements, the design of the Mesocycle 1engagement process as a whole, and in the design of the School Playbook, and System Response Model. Specific challenges related to designing for convergence included that (a) system leaders identified that it was at times difficult to synthesize diverse ideas, (b) system leaders identified that some stakeholders may find it challenging to recognize how their specific idea was generalized into a more global solution/concept, and (c) system leaders wrestled with how to design for divergent exploration so that it could lead back to convergence rather than resulting in a fracturing of the system. System leaders identified that navigating this balance will need to be attended to moving forward in the implementation of the School Playbook and System Response Model. The following system leader quote describes the challenge of designing for convergence.

> School based autonomy is what they crave, so they want to be able to have those choices which the playbook is allowing them to look at their current structures and see what they've been doing and how it aligns with the protocols that have been suggested as ways of meeting the outcomes. But it will be interesting when people go down and take their own stance and where that will bring us at a divisional level. How do we converge and provide supports that are consistent and so that our performance measures can make sense to the work that is happening at the schools. There is going to need to be a lot of trust and conversations. The action teams will be important to help the various departments understand where the schools are coming from and how the workflows need to support the nuances that are happening at the site level. It is going to be a challenge. (System leader)

F1.5 Convergence involved co-creating common goals and language.

Shared goals and common language were created to frame learning and enable collaboration in the system. The 4YP deliverable that was the output of Mesocycle 1 represented a common purpose that system leaders endeavoured to co-create rather than impose on the system. System leaders spoke of the 4YP as a "declaration" of the system purpose to provide a frame to direct and coordinate local autonomy:

> It is very important for the system to go out and push the narrative, what is it going to look like for us, it's going to look like this. This is the direction the system provides and the schools provide what does it actually look like. Like if we say, this is the

> concept around more inclusive environments. The schools job is, what's that solution in the context of our building. (System leader)

In addition to providing a shared purpose the 4YP narrative, goals, design principles, and priority areas served to establish a common vocabulary. System leaders identified the importance of co-creating this vocabulary and endeavouring to engender common understanding of the terms. Practices that supported this included: bringing forward vocabulary between engagements (for example having SWC group work with the vocabulary terms generated in previous engagements); using in vivo coding and the creation of word clouds from the big idea quest data to position the most commonly used words by participants at the forefront; creating a draft and requesting feedback; and fleshing out the meaning of the design principles with input from various stakeholders through the creation of the Conditions for Innovation survey and continuums.

F1.6 Stakeholders participated in making convergence decisions.

System leaders designed for stakeholders to directly participate in making convergence decisions in order to decentre this process. Within face-to-face engagements this involved facilitating protocols that led participants to engage in synthesis. For example, in the SWC participants coded and themed data from previous engagements to develop the draft design principles and priority areas. In the School Playbook and System Response Model collaborative convergence processes were built into the design model. At the school and business unit level this included the creation of bulletin boards for teams to share emergent insights and generalize their prototyping experiences back to the design principles. In the System Response Model superintendent design teams (made up of school and system staff) were given the role of analyzing the data generated from School Playbooks to identify needs and make convergence decisions in the form of supports, resources, and policy development. System leaders identified four reasons for designing for stakeholders to make convergence decisions: (a) the results would better represent the perspectives of stakeholders; (b) stakeholders would feel more ownership for the process; (c) it would reduce the amount of data that system leaders would need to manage; and (d) stakeholders would be empowered to practice design and build capacity as design thinkers.

F1.7 Student need statements provided common ground for convergence. Convergence was framed towards identifying underlying user needs. This was explored in the 4YP engagements by designing protocols for stakeholders to frame insights as student need statements. In the School Playbook process protocols, the school bulletin boards, and the school submissions facilitated the development of student need statements. The focus on student needs provided common ground to launch into divergent phases where stakeholders explored many possible context specific solutions to address and learn more about the needs.

F1.8 Data analysis and visualization supported convergence.

> Because of the volume you receive when you receive information back from 52 sites. How do you rake the leaves? How do you take what's important from all of that information and feedback that you got? …. And so combing through that, categorizing it, finding some structure to work within to present that back or to make sense of it is critical. (System leader)

Qualitative and quantitative data analysis processes were used to analyze data from divergence phases. This occurred in Mesocycle 1 with the Big Idea Quest data and in Mesocycle 2 with the Conditions for Innovation survey data. Steps were taken to make the data analysis processes transparent by communicating the methods, findings, and supporting data back to stakeholders. Data visualizations were developed in the form of infographics. The infographics made the analysis process transparent to stakeholders and moved the findings forward into next steps in the process. Protocols were used to support stakeholders to interpret the data visualizations and develop insights for input to divergence protocols. System leaders believed that data analysis and visualization methods were essential to managing the flow of feedback and information and were important in building stakeholder confidence and acceptance of convergence decisions.

F1.9 Storytelling supported convergence. "Storytelling provides a way for us to look at, and to reflect upon, and to think about the iterations, the experiences, the failures, and the successes that are happening" (System leader).

Opportunities for stakeholders to share learning stories were designed as a form of convergence. System leaders identified that storytelling provides a unique frame for stakeholders to synthesize and share key aspects of their experience. They believed that this offered a different form for crafting and communicating insights than the student need statements described earlier. They also believed that by creating collections of stories from throughout the division they would be encouraging the co-creation of a system story.

A first iteration of supporting stakeholders to share stories occurred in the face-to-face engagements. Video panel discussions were recorded featuring participants discussing insights from the engagement. These videos were shared with stakeholders on the School District's YouTube channel. Later a blog platform was created and a variety of stakeholders were invited to compose blog stories chronicling their experience related to the development of the 4YP.

In the School Playbook and System Response Model storytelling was built into the double diamond design model in the document phase. The design encouraged stakeholders to document and share stories of testing of prototypes. System leaders developed storytelling mediums and offered scaffolding supports for stakeholders to create and share stories. Storytelling mediums included a Twitter hash tag, a blog platform, TED-style presentation "RockyTalk" events, study exhibition of learning events, and video learning story creation workshops. System leaders provided professional learning sessions focused on creating and sharing stories using these mediums. System leaders also promoted the stories on divisional communication platforms including the divisional website, email newsletters, Facebook, YouTube, and Twitter. System leaders positioned both the quantity of stories collected and the themes and insights represented in the stories as key evidence of learning in the system.

Discussion

Divergence and convergence considered in relation to network theory. A decentralized network is the fingergprint of a learning system as it combines efficient communication with a robust structure; enabling considerable flexibility and high adaptability (Davis et al., 2012). The modes of divergence in this study can be conceptualized as supporting the diversity of possibilities that enable flexibility in a decentralized network. The modes of convergence, as seeking the coordination necessary for adaptability in a decentralized network. Complexity thinking provides that proliferations of diversity are critical to the sustainability of a system (Davis et al., 2015). In a decentralized network diversity is supported through enough subsystem autonomy "to keep all subsystems flourishing, functioning, and self organizing" (Meadows & Wright, 2008, p. 85). Subsystem autonomy is balanced with "enough centralized control to achieve coordination toward the large-system goal" (Meadows & Wright, 2008, p. 85).

Too much diversity and not enough coordination, deemed suboptimization, can result in a subsystem's goals dominating at the expense of the total system's goals (Meadows & Wright, 2008). System leaders in this study were wary of designing for too much school based autonomy because of recognizing a need to maintain system coherence. System leaders believed that stakeholders, particularly parents and governance, needed to have confidence that each school in the system provided high quality student learning. In network terms a school district featuring too much local autonomy might be described as a fragmented network (Davis et al., 2012). The lack of centralized coordination in a fragmented network means that the system as a whole cannot pivot and adapt to changing conditions. This means that even though within the school district diverse and promising solutions may exist, because they are fragmented in isolated subsystems, the system as a whole cannot recognize and move to adopting the promising solution. System leaders also recognized that autonomous subsystem based planning would not allow for the efficiencies of scale made possible by central coordination. In the context of our study the coordination and pooling of support and resources centrally allowed for specialists who are shared throughout the system in areas that individual schools could not provide otherwise. System leaders recognized a shared purpose and coherence was necessary to providing integrated centralized supports.

Too much centralized coordination is also problematic as it will stifle diversity (Uhl-Bien et al., 2007). A network that is dominated by the top-down flow of information and resources is called a centralized network (Davis et al., 2012). While highly coordinated, it is only as innovative as its central decision maker and lacks the variability necessary for sustainability in times of change (Davis et al., 2012). In addition, a centralized decision maker it is not able to be responsive to the dynamics of local contexts (Uhl-Bien et al., 2007). In the context of our study system leaders identified that many educational change initiatives of the past feature a centralized network like implementation model. In this study they sought to disrupt this design while maintaining enough centralized structure to enable coordination.

A central theme of this study was designing for a balance between divergence and convergence.Uhl-Bien et al. (2007) frame the role of leaders in seeking this balance in this way: "to manage the coordination rhythms, or oscillations, between relative importance of top-down, hierarchical dynamics and emergent complex adaptive systems" (p. 306).

System leaders in this study designed modes of divergence and convergence into the School Playbook and System Response Model. These processes provided what might be deemed by complexity thinkers as rules for self-organization. Meadows and Wright (2008) deem the ability to self-organize as "the strongest form of system resilience" because it is a system that can change itself. Uhl-Bien et al. (2007) call rules for self organization "enabling constraints." They suggest leaders should design constraints that: promote interdependency; foster the acceptance of diversity; apply pressure to coordinate; encourage mission consistency; and create inter-agent accountability. This list helps theorize the design of the School Playbook and System Response Model. Norman (2013) provides further help, in the context of coordinating and synchronizing creative design processes across multiple teams, he suggests a "gated" method of design. It features management reviews at the transition points of the model (gates) to provide coordination. He identifies that this places limits on the circular process of design but he deems the limits as necessary for coordination in a large organization. Norman (2013) also underscores this gated method of design is preferable over the more linear “waterfall” model of design often found in organizational structures.

While the School Playbook and System Response model were designed with the intent to create the conditions for the system to engage in divergence and convergence, it is important to acknowledge that it was outside the scope of this study to study the ways in which the system responded to these rules. It is also important to identify that in this study (and in other contexts) many other structures, policies, and rules exist that influence the system and may not cohere with the logic of the new policy (Penuel & Spillane, 2014). In the context of this study HR policies, governance structures and programs of study are just a few examples of preexisting influences on the balance of autonomy and coordination at work in the system. To sum this section of discussion, the balance of divergence and convergence should not be thought of something that leaders simply design for and get right. Rather in seeking to practice design at the system scale leaders should design for, keep an eye on, and adjust constantly for the balance between divergence and convergence characteristic of a decentralized network.

Design as strategic planning. Over the last decade design-based processes have been applied in education to support student learning, teacher practice, and school redesign (Friesen, 2009; Friesen & Jacobsen, 2015; Friesen et al., 2015; Koh et al., 2015; Scardamalia, & Bereiter, 2018). In our study the Double Diamond Model of Design was employed to replace the previous school district and school planning processes. Consistent with the tradition of strategic planning, previous planning practices in our study involved: forecasting (determining what goals the district and schools should pursue and how the outcomes of these goals would be measured, determining an action plan); implementation (putting into practice the action plan); and evaluation (demonstrating the success of the implementation based on the pre determined measures) (Mintzberg, 1994). Drawing on the discipline of design, system leaders sought to avoid the implementation mindset characteristic of planning (Penuel & Spillane, 2014). Norman (2013) describes that planning operates on the assumption that “all that is necessary is to determine the requirements, then build to those requirements” (p. 229). In contrast, in design thinking, “the problems and associated solutions coevolve in a symbiotic manner with new task goals, constraints, and insights being generated as the creative problem-solving processes emerge” (Koh et al., 2015, p. 3). The Double Diamond Model of Design features repeated phases of divergence and convergence to facilitate an ongoing process of seeking to understand the problem and to develop and test context specific ways to solve it. This ongoing process of iteration driven by feedback is a defining characteristic of design (Friesen, 2009).

In this study the School Playbook and System Response Model employed the Double Diamond Model of Design to support recursive cycles of identifying user needs, taking action, collecting and reflecting on evidence, reframing need, and redesigning action at a system level. Feedback cycles provide a non-linear alternative to strategic planning that are better suited to the lack of predictable order inherent in a complex system (Alonso- Yáñez et al., 2018). Friesen et al. (2015) highlight the importance of iterative cycles to adaptive capacity. Participants in highly adaptive learning systems draw on a range of indicators and engage in a “common practice to design, implement, redesign, throughout the school year” (Friesen et al., 2015, p. 49) rather than waiting for formal yearly planning.

Although forecasting and implementation as practiced in previous planning practice was deemed inappropriate, system leaders believed there was still a need to establish shared goals for the system. Differently put, system leaders believed it was necessary to aim cycles of iteration toward shared goals. They believed this was necessary to allow for coordination and to ensure a focus on the purpose of the system (in this case student learning). Uhl-Bien et al. (2007) help here:

> On the one hand, emergence is the product of informal adaptive behaviors that would be hampered by top down restrictions. On the other hand, the need to focus creative behaviors is legitimate; indeed unrestrained adaptive behaviour would be expensive to support and could compromise rather than enhance the organization's strategic mission. (p. 312)

Meadows and Wright (2008) identify the critical influence of goals in systems as "everything further down the list, physical stocks and flows, feedback loops, information flows, even self-organizing behaviour, will be twisted to conform to that goal" (p. 161). Furthermore, they identify the "high leverage of articulating, meaning, repeating, standing up for, insisting upon, new system goals" (Meadows & Wright, 2008, p. 162). In our study the narrative, goals, design principles, and priority areas of the 4YP were positioned as a frame to direct iteration within the School Playbook and System Response Model.

Complexity leadership theory offers a caution for goal setting, as goals should not be "so specific that they restrict the creative process" and "they should be sufficiently flexible to change with changing conditions" (Uhl-Bien et al., 2007, p. 313). In the context of this study it was out of the scope of this research to study whether the 4YP will provide the system with the right balance of direction and flexibility. In addition to this caution, Meadows and Wright (2008) remind us that goals are subject to a system's paradigm, (or the shared ideas and taken for granted assumptions and beliefs of the system). That is, the 4YP, the School Playbook, and System Response Model will be interpreted through the system's paradigm. In Design Principle Four, I present an exploration of attempts to influence the system paradigm.

Recommendations

R1.1 Design for divergence and convergence to balance diverse context-specific solutions and centralized coordination, support, and system coherence. To design for a system that learns system leaders should consider how they might design for the autonomy necessary for local systems to generate local solutions in response to context specific needs. They should also consider how they might design for system level coordination necessary for adaptability and coherence. A key consideration is doing both and trying to maintain balance. Keeping an eye on and adjusting for a balance of divergence and convergence should be an ongoing focus for leaders. One promising solution to explore is designing a process or set of rules for self-organization to activate the system itself to oscillate between divergence and convergence.

R1.2 Design a dynamic and iterative design process towards a shared purpose. Designing for a system that learns might involve replacing command and control strategic planning with a dynamic process that supports the ongoing analysis of needs and adjustment of course. System leaders should consider how to create and position system goals to frame the creative process towards a shared vision of student learning.

R1.3 Employ a design-based research partnership to investigate and iterate the balance of divergence and convergence. A future research opportunity exists to study how system design decisions influence the balance between autonomy and coordination. A DBR partnership might offer a vehicle to track the influence of design decisions on the network structure and inform cycles of iteration.

Contributions

This study contributes to the scholarship that explores design thinking in education (Friesen, 2009; Friesen & Jacobsen, 2015; Friesen et al., 2015; Koh et al., 2015; Scardamalia, & Bereiter, 2018) and puts forward a novel model for practicing design at a school system scale. Furthermore, this study opens up possibilities for how design might be employed at a system scale to create the conditions for the diverse needs, perspectives, and ideas of stakeholders throughout the system to drive system evolution. In other words this study puts forward a conceptualization of school system leadership as designing for a system that learns.

Design Principle 2: Feedback Cycles

> It is the exact same thing that we would do as educators in the classroom. We want to look at our kids formatively over time, and see where they're at, and see how we might help support their growth as learners. The system needs to the exact same thing. (System leader)

Feedback cycles are represented in Figure 33 by the arrows located within each of the diamonds. Feedback cycles involved collecting feedback, interpreting feedback, responding to feedback, and sharing the feedback cycle story with stakeholders. Feedback cycles were designed to position the ongoing collection and analysis of data as a driver of iterative cycles. In Mesocycle 1 feedback cycles were designed in various forms including through stakeholder engagements, through email survey feedback opportunities, and through the Big Idea Quest. In Mesocycle 2 feedback cycles were build into the School Playbook and System Response Model within the discover and develop phases through protocols such as: learning walks; student engagements; parent engagements; Accountability Pillar results analysis; Conditions for Innovation survey analysis; and through the testing of prototypes. The feedback data drawn on within feedback cycles has some overlap with mechanisms for convergence presented in the previous design principle. In this section I focus more specifically on the design of feedback cycles and the role feedback cycles played in reframing how data was collected, analyzed, and used within School and School District planning.

Findings

F2.1 Determining what data to collect and analyze was an important consideration in the design of feedback cycles.

> I don't think you ever want to not include the traditional lag measures, like diploma exams and provincial achievement results, and anything the Province is producing….but I think the shift for us is going to be doing things like learning walks in the system, using the learning continuum to help people be reflective on where they are and to move them forward, and having discussion with administrators and staff about their own learning and growth in those areas. (System leader)

Throughout the study system leaders wrestled with what evidence to collect to drive feedback cycles. Many different types of evidence were collected and analyzed. System leaders sought to collect "lead" measures, or predictive evidence, that would help them understand how the specific action they were taking was working in a timely manner. They also sought to collect data that would provide evidence of student experience and learning. A system leader framed the imperative this way:

> If we identify the needs of students, the underlying, fundamental basic needs. Then that should inform how we design learning opportunities for kids and how we design our systems on the school scale. And then at the system level if we are doing things to

> support that, to evoke that, to initiate that, right at the kid level, then I think the upper level is doing its job. (System leader)

System leaders also identified that ongoing attention would need to be paid to determining what kind of evidence to collect and shifts in the types of evidence collected would need to be made over time.

F2.2 Feedback cycles were designed into the design process to foster responsiveness and iteration throughout the system. Within the School Playbook and System Response model feedback cycles were built into the design process. This included protocols to analyze evidence from: Big Idea Quest; Conditions for Innovation survey; Accountability Pillar data; learning walks; and student and parent engagements. In the design students and teachers also engage in feedback cycles comprised of collecting evidence of learning, analyzing it, creating prototypes, testing them, reflecting on evidence, and making their learning visible. Outputs from student and teacher feedback cycles are aggregated and provide additional sources of inputs to schools and system feedback cycles. System leaders believed that this decentralized model would empower iteration and learning throughout the system.

F2.3 Empirical research methods were embedded in feedback cycles to enhance the results, credibility, and trustworthiness of the design process.

> Because of the volume you receive when you receive information back from 52 sites. How do you rake the leaves? How do you take what's important from all of that information and feedback that you got and know that if this is said 15 times it is something that we want to be sure we want to make sure is on our radar going

> forward. And so combing through that, categorizing it, finding some structure to work within to present that back and to make sense of it. (System leader)

Research methods for data collection, data analysis and data visualization were utilized within the study. Examples from the study included: the analysis and visualization of the Big Idea Quest data; the creation, analysis, and visualization of the Conditions for innovation survey; the analysis of email survey feedback; the development of learning walks protocol; and the development of the Accountability Pillar data analysis protocol. System leaders identified that the research methods used within the study supported a better representation of stakeholder perspectives and needs; and enhanced system leader and stakeholder confidence in the process. Research capacity was needed to support the application of research methods. In this study the research partnership supported the application of research methods through: identifying opportunities to utilize research methods; engaging in the labour necessary to carry out the research method; building capacity of stakeholders to understand the purpose of the method; and where appropriate support stakeholders to directly contribute to the implementation of the method.

F2.4 System feedback cycles were made explicit to enhance stakeholder ownership and model responsiveness.

> Having the very visible sequencing of what it was going to look at so when the next iteration came out there was an attempt and ways to show changes that their voice had made. It was tracked and obvious that people were respecting the feedback and making adjustments along the way. And the whole process was very visual. Showing that if I contribute here, this is where I get to see where my contributions may have impacted decision making.

Within the stakeholder engagements in Mesocycle 1 visual representations were used to communicate how the data collected from stakeholders would be used to advance the plan. Following engagements, communiqués were sent to all staff and parents that chronicled the analysis of feedback and the corresponding revisions. System leaders believed that these practices enhanced stakeholders' sense of ownership and contribution to the 4YP. Furthermore, system leaders identified that these practices modeled the use of feedback cycles and created the conditions for feedback cycles to be carried out at local levels in the School Playbook and System Response Model.

F2.5 Feedback cycles represented a shift within school and district planning from analyzing data primarily to evaluate, to the ongoing analysis of data as a driver of reflection and action.

> We've operated in what I call a lag data world for some time. PAT's diplomas, they come after the year's over and say how was your year. I think that building in the system design and having the divergence and convergence continue as a process throughout the school year in an iterative way is going to be really important. (System leader)

Feedback cycles were designed to position the ongoing analysis of data as a driver of reflection and action through the School Playbook and System Response Model. System leaders identified that this represented a significant shift from past School Education and School District Planning processes where data was collected and analyzed on a yearly basis primarily to inform evaluation. System leaders believed that this would result in more responsive support at the school level and at the system level.

Discussion

Feedback in a system that learns. Designers of learning systematically collect and analyze formative assessment evidence both to determine next steps and to reframe ends in view (Friesen, 2009). This scanning of feedback and adjusting accordingly needs to be woven into the sequence of teaching and learning (Friesen, 2009). The conceptualization of teacher as designer of learning and the role formative assessment plays in learning provided a key frame of reference for system leaders in the design of feedback cycles at a system level.

Friesen, Jacobsen et al. (2015) found that schools and school districts as learning systems “need to regularly seek and act on input from students” (p. 37). This finding resonates with the experience in our study and connects to the importance system leaders identified to design for input from subsystems within the learning system (Friesen et al., 2015). In this study many forms of collecting feedback from subsystems were explored. This aligns with Friesen et al.’s (2015) finding of designing feedback cycles based on multiple quantitative and qualitative indicators of success.

Feedback cycles between systems. At a system level feedback must flow between subsystems (Meadows & Wright, 2008). System leaders designed the School Playbook and the System Response model to facilitate the flow of feedback from “adaptive structures into administrative structures” (Uhl-Bien et al. 2007, p. 305). The System Response Model design uses the stages of Norman’s (2013) interpretation of the Double Diamond Model of Design to facilitate the flow of feedback between School Playbooks and the System Response Model.

A challenge lies in ensuring no level is overwhelmed with information (Meadows & Wright, 2008). In the context of this study system leaders employed empirical research methods to collect and manage feedback from 53 schools and thousands of stakeholders. The experience in this study accords with Penuel and Spillane's (2014) finding of the value of DBR to support policy and system redesign. System leaders wrestled with knowing what feedback to position as lead measures to inform system action. The complexity of the system played a role in this challenge. Meadows and Wright (2008) identify that many relationships in systems are nonlinear and that this nonlinearity produces complexities in system behaviour. Alonso-Yáñez et al. (2018) speak directly about the education context and identify that "school systems are complex landscapes determined by highly coupled components, which contribute in different ways to the functioning of the system" (p. 4). They provide that system leaders must take this complexity into account and recognize that the successes in systems are often facilitated by the interconnectedness of system elements. System leaders then must avoid adopting too linear or rigid a view of inputs and outputs into feedback cycles. In this study a broad and dynamic range of evidence was designed for to take into account the complexity of the system. An ongoing need will exist for system leaders to not only manage and make sense of the complexity of feedback cycles in the system but also to communicate the design of feedback cycles to stakeholders who are more accustomed to linear planning and evaluation.

Decentralized feedback cycles. Feedback cycles were designed for self organizing feedback cycles to occur in nested systems. In this way the design sought to foster the collective engagement and responsibility for knowledge building throughout the system (Scardamalia & Bereiter, 2018). This design may serve to minimize feedback delays that make a system likely to oscillate (Meadows & Wright, 2008). The decentralized nature of this model provided autonomy at the local level for the design and carrying out of feedback cycles. This autonomy inherently will produce variability of the goals of feedback cycles given that actors throughout the system are empowered to create and enact feedback cycles. Meadows and Wright (2008) present a potential concern within this design: “if the goals—the indicators of satisfaction of the rules—are defined inaccurately or incompletely, the system may obediently work to produce a result that is not really intended or wanted” (p. 140). System leaders created a mechanism to potentially respond to this issue discussed in the following section.

Feedback cycles that learn. System leaders designed feedback cycles for feedback cycles. Put differently, they designed to collect evidence of how feedback cycles were working to inform the ongoing redesign of feedback cycles at the system level. Meadows and Wright (2008) provide that feedback cycles of this type create meta-resilience because they are feedback cycles “that can learn, create, design, and evolve ever more complex restorative structures” (p. 76). This mechanism will be critical given the complexity of feedback cycles in a complex system as discussed in the preceding and forthcoming sections.

Limits to designing feedback cycles. It is critical to stay aware of the limits to designing for feedback cycles. Meadows and Wright (2008) put it this way: “We can’t control systems or figure them out. But we can dance with them!” (p. 70).

Recommendations

R2.1 Design for stakeholders to design and enact feedback cycles throughout the system. System leaders should consider how to design for feedback cycles to drive learning throughout the system by empowering stakeholders to engage in cycles of iteration driven by the ongoing collection and analysis of evidence. To this end, leaders might design scaffolding supports, build capacity, design scalable data collection and analysis methods, create accountability structures for engaging in feedback cycles, model feedback cycles, and create opportunities for stakeholders to make feedback cycles visible. Leaders might also design a meta-feedback cycle that involves collecting, analyzing, and responding to evidence of how feedback cycles are working in the system.

R2.2 Design for feedback cycles between systems. To practice design at a system level, leaders need feedback to inform the allocation of resources and supports and the development of procedures and policies. System leaders should design to collect, aggregate, and analyze evidence from subsystems on an ongoing basis. They should develop leadership practices and protocols focused on using feedback to inform responsive decision making. They should also consider how to design for flexibility in their planning, workflows, and allocation structures to allow for responsiveness.

R2.3 Design for research capacity to support feedback cycles. To design for a system that learns, system leaders should consider how to fulfill the need for research capacity in the organization. Specifically, needs may exist in: identifying opportunities for data collection; selecting, designing and employing quantitative and qualitative data collection methods; analysis methods; and visualizing data analysis. A DBR partnership is one way to support research activities and build research capacity.

R2.4 Design feedback cycles that take into account a broad and dynamic range of evidence. System leaders should design to collect and analyze a broad range of quantitative and qualitative evidence to drive feedback cycles. Empirical research methods should be considered to enhance the results, credibility, and trustworthiness of feedback cycles. System leaders should seek to collect lead evidence with minimal feedback delays to provide timely information about how an intervention is working. System leaders should consider how to collect feedback that is focused on the core goal(s) of the system. In recognizing the complexity of the system and the important role that evidence plays in driving feedback cycles, system leaders should create a dynamic process that features a continuous reevaluation and redesign of evidence collection and analysis.

Contributions

This study takes what is known about designing feedback cycles at a classroom (Friesen, 2009) and school level (Friesen et al., 2015) to open up possibilities for designing learning at a school system scale. This study demonstrates how design thinking, systems thinking, and empirical research methods can be drawn on to increase the flow of information, in the forms of both knowledge and needs, throughout the system. Moreover, this study reframes the responsibility of collecting and responding to feedback from a top-down or leader directed process to a collective phenomenon in which cycles of feedback are embedded in the ways of working of actors throughout the system.

Design Principle 3: Network Connectivity

> There is something to be said about everyone in our district, this district that is growing very quickly and is geographically quite large, to have everyone do the same thing and get the same message at the same time. And the fact that what came out of that became the heart of the plan. I think that was powerful and it created more of a network in our school district. Everyone that participated had the chance to read through anyone's submission that day and see what is happening at other schools. (System leader)

Network connectivity is illustrated in Figure 33 by the black arrows that flow into and out of the design model. These arrows represent how the design process interacts between and within systems. In our study the Double Diamond Model of Design was employed at both the district level and in 53 individual school contexts. Within both the district and school context individuals and small teams employed the design process in their work. Communication linkages were created to connect individuals throughout the system, to connect individuals and teams within schools, to connect between schools, to connect between schools and system leaders, and to connect between system leaders. Network connectivity was further fostered by establishing collaboration protocols and storytelling into the design process. It was also encouraged by introducing media tools and building the capacity of stakeholders to use them.

Findings

F3.1 Brokers were identified and supported to encourage connectivity within and between schools.

> Bringing school action teams together, what I’ve found to be really interesting is when you bring multiple school action teams together into one space and you give them protocols like gallery walk or critical friends protocol. The feedback we’ve had is that its been very valuable. Principals talking together or teachers talking together. The real power they're seeing is in mentorship and collaboration opportunities. (System leader)

The School Playbook design required schools to form a “School Action Team” to lead the school-based design process. Schools were encouraged to include teachers, administration, and support staff and consider including representation of a range of perspectives, grades, and departments. School principals were encouraged to select individuals who had high levels of influence with their peers. The School Playbook facilitated a decentralized design whereby School Action Team members led small teams in protocols to collect, analyze, and consolidate evidence. The data generated in this decentralized model was brought centrally to the School Action Team Level to inform convergence decisions for the school as a whole. Connected to this, School Action Teams were responsible for, and provided with professional learning to, support the sharing of learning stories within and beyond the school. The intention of this design was to have School Action Team members act like hubs to connect staff members. Importantly the design of School Action Teams supported two-way flow of communication and information; School Action Teams both gathered ideas from throughout the network and funneled them centrally and represented a communication channel to disseminate ideas out into the network.

The School Action Team design also provided for connections between schools. School Action Teams from multiple schools participated in professional learning throughout the school year led by system leaders. These events featured opportunities to collaborate and co-construct knowledge across schools. Also built into these centralized meetings was opportunities to share promising ideas and learning stories between schools. System leaders used these meetings as a data collection opportunity to help understand the needs and experiences at the local level. In this way the School Action Team design created connectivity between system leaders and schools.

F3.2 Brokerage was encouraged throughout the system by designing collaboration protocols into existing face-to-face meeting structures.

> Collaboration is very, very important. Principals need to collaborate with other principals, teachers with teachers, the system needs to do that, the jurisdiction leaders need to do that. The superintendents need to be collaborative in that work….As an organization there can never be enough capacity to support collaboration. Time- how

> do I in our already busy schedules, how do we create space to make sure that we are productively critical of one another, getting feedback, giving feedback? What protocols are in place to support that? That is always an area of growth. (System leader)

In the School Playbook collaborative protocols were designed to be incorporated into preexisting meeting opportunities at the local school level. This design took advantage of collaborative opportunities such as grade or department team meetings, staff meetings, professional learning days, school council meetings, and student leadership body meetings. In the System Response Model business departments, director teams, and the executive team embedded 4YP design protocols into their preexisting meetings. System leaders believed that in designing constraints, structure, and a common focus to meetings throughout the system they would leverage the power of collaboration and amplify learning. The School Playbook and System Response Model design also provided for the knowledge created in subsystem level collaboration to flow centrally.

Connected to this, and because of the system wide shared design model, system leaders were able to embed 4YP protocols into cross school and cross department meetings that occur in the system. Examples of these meetings include: system-wide principals and assistant principal meetings; family of school and school area meetings; system-wide literacy and numeracy meetings; and Education Centre staff meetings. These opportunities were designed to create connectivity between teams from diverse contexts to share how they were moving forward the shared design principles and priority areas of the system.

F3.3 District supports were reorganized into a multidisciplinary approach.

> We are changing the structure of school planning reviews. So there are deliverables that schools need to turn into the system and the system is going to use all of the Directors of Learning and all of the Directors of Schools to review them, where as previously it was kind of siloed.
>
> As a group of learning specialists who support innovation and change in the system we are going to need to look at those plans, we are going to need to have access to them. If I'm the learning specialist in design or Indigenous studies, What is this plan that CW Perry is telling me and is there an entry point for me to get in and support the school with the big bucket items that they have picked as local solutions in their building? (System leader)

The System Response Model design produced greater connectivity between the system leaders and schools. It also created greater connectivity between the various teams of system leaders. The School Playbook data provided an organizing structure for district supports where as previously each team and department provided support based on their mandate within the system. Collaborative structures were designed to support this new multidisciplinary model including the collaborative review of School Playbooks. System leaders also designed to use a shared app to document and make visible to one another the support they were providing at schools. This app was designed to support System Leaders to document their work in each school organized by the School Playbook data. This would allow system leaders to reference the app prior to working with teachers or leaders to align their support or professional learning to the school need and to the supports being provided from other teams and departments. System leaders identified that this design addressed two previous problems in regard to flow of information. Firstly, being better coordinated at the system level and better aligned to school need would reduce the overload of information and initiatives being pushed to school and increase the effectiveness of support. Secondly, they believed this addressed a problematic lack of information flow between system leader department and teams and would result in more complementary messaging and support from the district level to schools.

F3.4 Storytelling via media tools was embedded in the design process. “People’s perspectives matter, there’s a forum for it. There’s a movement for people’s experiences to instruct and inspire others” (System leader).

Network connectivity was encouraged between individuals throughout the system through the support of storytelling via media tools. This included: the crowd sourcing software in the Big Idea Quest; a shared hashtag used on Social Media sites such as Twitter and Facebook; a school district blog featuring bloggers from throughout the district; and video storytelling shared through YouTube in the form of panel interviews, video learning stories, and “RockyTalk” TED-style talks. System leaders embedded the use of these tools into the design of the 4YP development process, the School Playbook, and the System Response Model. The use of these tools was modelled in the practice of system leaders at meetings and professional learning; the tools were promoted through divisional communication channels such as the district’s website and email newsletter; and school leaders offered professional learning sessions for staff to learn how to use the tools, to learn how to use the tools with their students, and/or to create and share a story in a workshop design. System leaders believed that in encouraging the sharing of stories throughout the district ideas would flow more readily throughout the system. They also believed that this design would offer inspiration to others and create momentum. The role of storytelling in encouraging design culture is presented in the forthcoming design principle four.

F3.5 A design process was employed in a fractal-like pattern to increase connectivity within and between Systems. The Double Diamond Model of Design was employed throughout the system through the School Playbook and System Response Model.

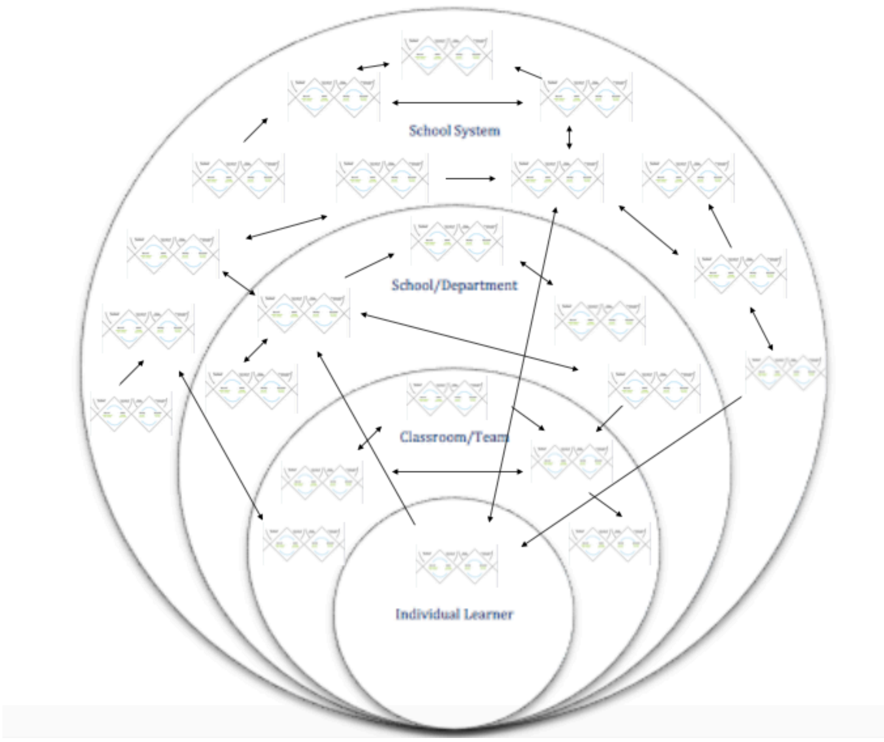
Figure 34 features a nested visual metaphor with the arrows gesturing towards the complex network intended to be fostered through this fractal like implementation of the design model.

This design was intended to enable collaboration and the flow of ideas between individuals, between classrooms and teams, and between schools. The design model was envisioned to be practiced by students, by teams of students, by teachers, by teams of teachers, by entire schools, and by system leaders. As presented earlier, convergence mechanisms, feedback cycles, collaboration protocols, and storytelling using media tools were embedded in the model to encourage linkages and the flow of ideas between systems.

Figure 34 attempts to represent these communication linkages with black arrows. Of note, is that the fractal like model encourages and supports collaboration both within systems and between systems. It allows for an individual in one system to share an idea that might then have influence on an individual or an entire subsystem located somewhere else in the network. System leaders articulated the importance of this design to breaking down siloes that exist within schools and between schools. They hoped to enable inspiring practice to be spread and collaboration to be enabled in a network effect. System leaders believed that the fractal implementation of the model itself would provide a common language, story archetype, and communication imperative to increase the impact of network connectivity. Furthermore, system leaders believed that in enacting design at scale in this way, they were shifting how they were practicing design in a way that was “less directive and more participatory.” The ultimate intention was to empower the collective networked learning capacity of the system through design.

Figure 34

Network Connectivity Between Systems



Discussion

Designing for network connectivity. The design of network connectivity in this study drew on a conceptualization of the school system as a network including many subsystems amongst and between students, staff, parents, community, government, etc. (Davis et al., 2012). A complex adaptive system depends on the flows of information between stakeholders, and missing information flows is one of the most common causes of system malfunction (Meadows & Wright, 2008, p. 157). Complexity research suggests that Leaders should attend to both how people are connected to one another and how ideas circulate in the system (Davis et al., 2012; Uhl-Bien et al., 2007).

One-way connections between people was encouraged in this study was through creating opportunities for collaboration. Collaboration has been repeatedly found to be an important component of improving learning whether it be for students, teachers, or leaders (Brandon et al., 2018; Friesen, 2009; Kennedy et., 2011; Robinson et al., 2008). Friesen et al. (2015) point to the importance of designing for collaboration that is frequent and embedded. To this end collaboration protocols were designed to be led in a decentralized model and built into the preexisting structures within subsystems of the school district network.

Designing for network closure and brokerage. Designing for collaboration within preexisting teams took advantage of the closure or social trust that existed within these subsystems of the network. Closure is an important feature of decentralized networks because it creates the conditions for coordination and adaptability (Crossley, 2010). Uhl-Bien et al. (2007) offer that in addition to designing collaboration between individuals, leaders should create pressure for individuals to act on the new information they receive. In this study accountability was encouraged through the design of School Action Teams.

School Action Teams were also created to act as brokers between subsystems. A decentralized network features many brokers who act like hubs throughout the system (Crossley, 2010; Davis et al., 2012). School Action Team members served as hubs to facilitate a flow of ideas within the school, and also strengthened brokerage between schools and between each school and system leaders.

Designing for the flow of ideas. Uhl-Bien et al. (2007) attest that formal organizational systems are often not structured to foster internal dissemination of innovation. They contend that leaders should “facilitate, orchestrate, and share innovative ideas and outcomes throughout the organization" (p. 313). Scardamalia and Bereiter (2014) move this idea into a space of collective responsibility. They provide that a designer of learning should create the conditions for learning to advance community knowledge through "out-in-the-world production of designs, theories, problem solutions, hypotheses, proofs, and the like" (Scardamalia & Bereiter, 2014, p. 397). Friesen et al. (2015) recommend designing to make teaching visible, including sharing practices in online environments. In this study system leaders designed and supported media tools and storytelling with the intent of creating the conditions for ideas to "emerge, combine, diverge, become extinct, conflict with one another, adapt and change, and increase in complexity" (Uhl-Bien et al., 2007, p. 307). Uhl-Bien et al. (2007) posit that the primary output of this complex dynamic are "adaptability, creativity, and learning" (p. 307).

Limitations in designing for network connectivity. It is important to note that leaders "cannot create the sophisticated dynamic linkages that characterize complex networks, nor can they accurately pre-calculate what constitutes the right amount of coupling. Rather, such networks are self-organizing" (Uhl-Bien et al., 2007, p. 309). Leaders can, however, encourage the conditions in which sophisticated networks can evolve (Uhl-Bien et al., 2007). In this study system leaders designed network connections as a means to shift power in ways that enhance a system's ability to adapt (Kershner & McQuillan, 2016). They did not however collect data to help understand what connections exist or in what ways the network shifted in response to the interventions. Alonso-Yanez et al. (2016) demonstrated that Social Network Analysis (SNA) can be used for this purpose as it provides a way to make visible and analyze the knowledge activities and information flows between people in a system (Alonso-Yanez et al., 2016). SNA offers a possible tool to be employed in follow up research to support system leaders to conceptualize the flows of information in the system.

Recommendations

R3.1 Design to encourage the flow of ideas within and between systems. System leaders should seek to encourage communication linkages to support the flow of ideas in the system. This might involve conceptualizing the system as a network and designing for trust within subsystems and connectivity between subsystems. System leaders might design for brokers who can act as hubs throughout the network. System leaders might also create a shared design process and associated collaboration protocols to provide a common framework and impetus for connectivity. System leaders should also consider facilitating the use of storytelling via media tools to encourage the dissemination of ideas throughout the system.

R3.2 Employ social network analysis within a design-based research partnership to visualize and iterate the emergence of network connectivity. A research partnership opportunity exists in exploring how system leaders can influence the shape of the school system network through designing for network connectivity. Social Network Analysis could be used to visualize the network as it exists and track changes in the flow of information in response to interventions. Through the partnership researchers could learn more about how to influence the emergence of a learning system and system leaders could make iterative improvements to the flow of information in the system.

Contributions

Davis et al., (2012) put forward a conceptualization of the school system as a learner and called for school system leaders to draw on what is known in network theory about occasion the emergence of a decentralized learning network. This study builds on this foundation and offers practical examples of how system leaders in one context endeavoured to do this. Most significantly this study explores how network theory can be used to design for collaboration. The fractal like implementation of design protocols throughout the school district presented in this study provides an example of how the well researched importance of collaboration to effective learning environments (Brandon et al., 2018; Friesen, 2009; Kennedy et al., 2011; Robinson et al., 2008) might be leveraged at a school system scale.

Design Principle 4: Design Culture

> Perhaps brave is not the right word, but for an organization to do something like this it tells a lot about the organization. Even if it's a struggle at some points, it's happening. Everyone's on board now and I think that speaks to the leadership and the culture, and I think that people feel that. They feel that innovation is encouraged. The challenge will be continuing to maintain support for risk taking. (System leader)

Design culture refers to creating the conditions for learning and knowledge production to become a collective responsibility. It is represented in Figure 34 by the crescendo like illustration at the bottom of the model intended to gesture towards an increase over time. The shift from hierarchal structures of command and control to design required not only new ways of working, but new ways of thinking, and new attitudes for stakeholders throughout the system. In the forthcoming sections I chronicle findings in the form of tensions, needs, and promising strategies uncovered through attempts to engender a design culture.

Findings

F4.1 Videos were produced to communicate a shift in culture.

> It's a real shift for people to come up with content as opposed to being told. I think that's a hurdle. Is how do you communicate to people that this is about them, it's not about the district, or the curriculum? It's about supporting people to learn, to be learners, to think like they want their students to think. I think a lot of people don't know, and it's a tough thing to communicate, that it is different….the toughest thing is sharing with people that engaging in a design process is in some ways the opposite of a corporate strategic plan. (System leader)

Throughout the study system leaders used video to communicate the shifts in planning and leadership practice. The video communication strategy involved both explaining the nature of the shift and seeking to demonstrate the shift. Video messages from the superintendent were produced to introduce the Big Idea Quest, to introduce the draft 4YP for feedback, and to introduce the School Playbook process.

> The video facilitations created a workshop environment. It wasn't the superintendent saying here's what our goals were for next year, it was the superintendent introducing a process and then inviting people, and giving them permission, I think that was big. Having his face and his voice there as the leader of this process but then the subsequent slides in the video was a process to engage all staff. This was quite different as you typically get a keynote from somebody with the biggest office telling you what the mission is. (System leader)

Videos featured the superintendent speaking directly to stakeholders using a personal and colloquial voice. The videos were positioned to invite stakeholders into the process and were preamble to opportunities for stakeholders to engage. The videos were produced with an upbeat tone intended to convey energy and enthusiasm. The scripts were written with attention to describing the upcoming process and explaining the rationale with specific focus on articulating the shift to stakeholder agency, conveying trust, and inspiring action.

Videos were also produced featuring stakeholders who participated in the engagement processes. A series of panel format videos were produced during the initial face-to-face engagements. The videos were intended to make the ideas shared at the face-to-face engagement visible to a broader group of stakeholders. The panels were also intended to demonstrate the voice of diverse stakeholders in the plan and featured students, teachers, administrators, parents, and community partners. A video was also produced launching the design principles featuring participants from the Superintendent Working Committee. As a part of the SWC process participants drafted the scripts and were filmed pitching the design principles to the learning community. This was intended to communicate that it was members of the learning community who had made convergence decisions and were the authors of the common language of the 4YP.

F4.2 Design culture was fostered through professional learning. "On the whole there's momentum. People are feeling, I can try, my ideas matter, it is expected to fail, it is expected to go forth into the unknown, I think that's a new thing" (System leader).

In both the 4YP development process and the School Playbook and System Response model, protocols were designed to support stakeholders to practice design. Engagements were used both as an opportunity to yield data and to build stakeholder capacity with the design process. To this end, facilitations were designed to include: explicit reference to the common design model; explanation of the purpose of each protocol in relation to the design model;

collaborative knowledge building within protocols; and post protocol reflections designed to support stakeholders to be metacognitive about their learning experience.

System leaders believed it was important to integrate the design model into as many processes and workflows in the system as possible.

> What we have found is that design is everything. This concept of system design, using design principles for improving all aspects of what we do. For example we put on sessions for administrators for how to use design to build your school education plan, how to engage staff to co-construct what a learning commons should be in your building, it has so many varied uses. (System leader)

The design model was built into professional learning and meetings occurring throughout the district beyond the direct scope of the 4YP. This included professional learning to support Teachers to use the design model to design instruction for students. In also involved support for students to use the model as a heuristic for inquiry. System leaders aimed to move away from piece meal professional learning towards a sustained system wide use of the common design model as a vehicle for learning together.

Professional learning design also included opportunities for stakeholders to share stories of their learning with the networked learning community. This is explored further in the subsequent finding.

F4.3 Leaders needed support to shift how they practiced leadership.

> What's going to be critical is that we all walk the talk as well. It's one thing to download a change to the schools and have them participating but need to see us being responsive and working in the same format. We need to have a very similar format in

> our process and structures to show that we are using design thinking and that we are being responsive and reflective. (System leader)

The School Playbook and System Response Model shifted the role of leaders and required them to lead and engage in collaborative knowledge building protocols as opposed to delivering mandates and checking for accountability. This shift required leaders to change both how they worked and how they conceptualized their role as a leader. This following system leader quote speaks to the challenge of this shift for leaders:

> I think it's a tricky piece because people are in positions where they think they know what people need, they know what staff need and then we are going to get all of these how might we questions and we need to respond to them. We can't ask people all these questions and then not really listen to them. (System leader)

The changes made to the work of leadership in the district created challenges for both system leaders and school leaders. Some system leaders expressed frustration at the changes as referenced by this quote from a system leader interview: "in our initial roll out of this hackles came up right away from the folks who were receiving that information and were responsible for learning the work." In response to the push back from system leaders the design team recognized the need to seek to understand and respond to the needs of this stakeholder group:

> The reality is we do need to have empathy for what people need and spend the extra time to find out what that is and help move them forward at a pace that is manageable. If we are causing a tremendous amount of stress or asking for leaps that are unmanageable we won't move anywhere at all. (System leader)

The School Playbook also created challenges for school-based leaders. One challenge identified by system leaders was the workload School Leaders perceived the Playbook to add:

"It is tricky that it is a new process, some principals are feeling like it is all brand new, and are overwhelmed by it." A second challenge was the framing by which principals viewed this initiative. In previous SEP and School Annual Results Report processes school leaders felt pressure by the evaluative nature of the process. System leaders identified that many school leaders viewed the new process in this same way. System leaders identified the need to create a culture where school-based leaders felt trusted to take risks, to be honest about the needs of their school, and to share stories of learning from failure. One system leader characterized it this way:

> If we don't honour that work, and allow that time with trust to be messy and then we start imposing structures or consequences on people that got a little messier than maybe other schools don't support them through that time, that's the biggest risk. We've got to be able to support them through this time of change and allow them to make mistakes along the way.

To address these learning needs professional learning was designed specifically towards leadership with focuses on: supporting Leaders to understand the system and school as a learner; to activate Leaders' understanding of the role of teacher as designer; and to collaboratively build knowledge and share practices for creating the conditions for design culture. System leaders identified a continued need to support leadership capacity moving forward.

F4.4 System leaders championed storytelling as a key practice in encouraging a design culture.

> For me storytelling is almost like an Indigenous way of knowing, using story to embed wisdom, or to archive experience, chronicle it, and then pass it down to the

> next generation. People look at it and say, “oh” that’s what they want learning to look like, then I can aspire to that. (System leader)

Storytelling via media tools was embedded into the design of the 4YP development process, the School Playbook, and the System Response Model. System leaders designed storytelling opportunities focused on stakeholders sharing their design story complete with challenges, failures, and lessons learned. As presented more thoroughly in Design Principle 3 Network Connectivity, the support for storytelling included: professional learning for stakeholders; the modelling and support of video storytelling; and the introduction, modelling, and embedding of social media tools.

System leaders spoke about storytelling as an Indigenous practice. They pointed to unique affordances of storytelling for teaching and learning. System leaders believed that a culture of making learning visible would engender collective knowledge building and inspire momentum. System leaders considered the potential role storytelling could play in the design of all other design considerations in this study. Ultimately, system leaders identified storytelling as a key mechanism in their effort to creating systemic change.

F4.5 A need existed to navigate the expectations of the Board of Trustees and the Ministry of Education.

> Pleased and impressed with our own School Board for showing the confidence in our team to lead us down this direction. I think it was pretty innovative of us to come up with this direction and process. Kudos to the board and the superintendent for taking the chance and the risk to allow the staff to lead them down this road…Having said that, the conversations I’ve had with our local zone 5 Alberta Ed people have been extremely

> positive. One of the things that was smart on our part was to invite them to a couple of different sessions along the process and they were very impressed with what they were seeing. I think this might be a direction that they see some value in. I think there might be some negotiation around the evidence piece again, when we get into the results reports. But they see that. Every year, we have these Annual Education Results Reports, and every year I finish off with a video of student voice. And this year the three people who came from Alberta Ed had all seen the video before I showed it to them. Which means they are on our YouTube site, and winding back a couple years, they didn't know we had a YouTube site. (System leader)

Throughout the development of the 4YP, the School Playbook, and System Response model system leaders needed to negotiate the expectations of the Board of Trustees and the Ministry of Education. This included navigating requirements as outlined in policy and legislation. It also involved seeking to ensure that the board members and key Ministry contacts understood and supported the new 4YP and Implementation Process.

The superintendent and executive team used design thinking to redesign preexisting practices and develop innovative solutions within constraints. System leaders also identified the importance of communicating and building trust with governance stakeholders. To this end, trustees and Ministry staff were included in the design process to engender co-ownership and attempt to include these stakeholders in the design culture. In the coming sections I chronicle specific points where design was required to navigate tension with governance expectations.

Timeframes. "Previously everything was lag so this is really putting it in reverse order and flipping it on its head" (System leader).

Alberta Education requires school districts to submit a Budget Report (BR) at the end of May forecasting budget assumptions for the subsequent school year. It also requires a Fall submission of an Annual Education Results Report authored in response to the Accountability Pillar data (APORI). In previous 4YP models these timelines were carried through to the school level. SEP occurred in the spring and School Annual Results Reports were made in the fall. This meant planning occurred prior to reviewing progress which conflicted with the design principle of having ongoing data analysis drive action. To navigate this tension, system leaders de-coupled school planning from the Ministry timelines. Within the School Playbook, system leaders designed for schools to engage in ongoing data analysis. APORI data was repositioned in this process as one data source to inform ongoing understanding of the conditions for learning in the school. To maintain alignment to Ministry processes the System Response model featured an aggregation of school data to inform the submission of the Annual Education Results Report.

Annual Education Results Reports. In addition to the timelines of the Annual Education Results Reports, the performance measures within the report were also important considerations for system leaders to design for. Alberta Education requires districts to report on APORI data. To this requirement, system leaders felt it was important to include this data as one form of formative evidence in the School Playbook.

System leaders also designed to include local measures in the form of digital evidence in their submission of the Annual Education Results Reports to Alberta Education. Shifting what counts as evidence of success for the system required trust and communication with both the Board of Trustees and the Ministry. System leaders believed that in including a broader range of evidence of success in their Annual Education Results Reports they could provide a model to Alberta Education and potentially encourage change at the Ministerial level.

Expectations of what "good planning" should be. System leaders identified the importance of supporting Governance stakeholders to understand why and how planning ideals of forecasting, accountability, and implementation were being reframed in the district. To this end, the superintendent and executive team needed to clearly and persuasively communicate the vision of the project; governance stakeholders were included in face-to-face engagements; and a plan was made to document and share quick wins early in the process to illustrate the model in action and build confidence in its ability to result in positive student outcomes. System leaders again believed that they might have influence on the broader system by communicating and making visible their practice.

Discussion

Design culture. Friesen et al. (2015) found that in order to sustain and scale success learning systems needed to develop trusting relations, growth oriented attitude and risk taking. Uhl-Bien, Marion, and McKelvey (2007) speak of a similar characteristic which they deem a "pro-innovation" environment. Meadows and Wright (2008) point to paradigms: "shared social agreements about the nature of reality" from which come "goals, and information flows, feedbacks, stocks, flows and everything else about systems" (p. 163). For Meadows and Wright, switching paradigms is the second highest leverage point for system change. The research presented above speaks to the importance for system leaders to consider how to design to influence the culture of the system.

Influencing culture. Culture was identified as of high importance in our study and much focus was placed on trying to support a shift. Meadows and Wright (2008) provide that while individuals can experience paradigm change “in a millisecond,” systems resist challenges to their paradigms harder than they resist anything else (p. 164). This is in part because a complex system responds to change in a manner that enables it to maintain its historicized coherence (Davis et al., 2012). Davis et al. (2012) suggest that leaders should not think about creating change in a linear, predictive sense, but rather to seek “occasions or triggers for transformation” (p. 396). With the importance (and challenge) of shifting culture as a frame Meadows and Wright (2008) describe an important role a leader can play in communicating a shared purpose or goals for the system. In our study the 4YP and the video communication strategy were both attempts at this aim. Meadows and Wright also provide that building a model of the system can enable a change of paradigm in that it takes stakeholders outside of the system and offers a view of the whole. The double-diamond model of design in this study provided a heuristic to support reflection in this study. In presentations, system leaders contrasted the double-diamond design model with a linear model of planning in order to help stakeholders conceptualize the shift. System leaders recognized that these efforts were only a beginning of uniting stakeholders. Moving forward system leaders designed for the double-diamond design model and the 4YP system goals to be embedded in all communication, professional learning and supports offered by system leaders. More than what was created centrally, system leaders believed that in order to shift the culture they needed to empower the community to enact the shift. Kershner and McQuillan (2016) suggest that for change to emerge a shift in power dynamics must disrupt the status quo. They point to network generation as an adaptive mechanism towards this end. This points back to design principle three and the efforts to design for the flow of ideas and collaboration in the system. Scardamalia and Bereiter (2018) help here as they refer to a "knowledge building culture." They describe a community in which contributing ideas towards shared goals becomes what you have to do in order to be part of the community. That is the motivation to engage in learning is driven by "the simple and virtually universal desire to belong" (Scardamalia & Bereiter, 2010, p. 8). Scardamalia and Bereiter (2018) identify that fostering the conditions for a knowledge building culture to arise involves, idea diversity, treating all ideas as improvable, democratizing knowledge, embedded assessment, and practicing knowledge building discourse. These ideas point to the ideas explored in the three previous design principles and reinforce the interconnectedness of this study's theoretical model.

Design-based leadership. Connected to the previous discussion regarding efforts to influence culture, Davis et al., (2012) suggest that system leaders might consider how they can embody the "character/culture/ethos" (p. 399) that they wish to see enacted in the system. This idea is supported by Friesen et al. (2015) who found that learning systems require a collective "design-based orientation" to leadership. Design-based leadership involves avoiding an "implementation mindset" (Penuel & Spillane, 2014, p. 658) and engaging in iterative cycles as feedback loops, or mechanisms of change and adaptation (Alonso-Yáñez et al., 2018). Uhl-Bien et al. (2007) describe the tension that exists between what they deem as adaptive leadership (emergent leadership in a complexity frame) and the managerial expectations traditionally associated with administrative leadership. They call for enabling leadership which attempts to balance emergence and administration and involves managing the organizational conditions in which adaptive leadership exists, and helping disseminate innovative products of adaptive leadership.

In our study system leaders aimed to reframe the role of leadership from being directive to being responsive. Meadows and Wright (2008) support this reframing from a systems perspective as they attest that "the purpose of the upper layers of the hierarchy is to serve the purposes of the lower layers" (p. 85).

In our study we found that in shifting the role of leaders a need existed to build capacity to support this shift. Norman (2013) identifies that it is common for designers to be so focused on meeting the needs of users that they can overlook the needs of the other groups involved in the process. He cautions that if designers don't design for the needs of groups responsible for carry the design forward those groups will change it. This was a risk identified by system leaders in this study who recognized the critical need to build leadership capacity.

Design-based professional learning. Friesen et al. (2015) identified that to create and sustain a highly adaptive system a design based learning approach was required at all levels of the learning system. This underscores the finding in this study emphasizing the importance of supporting stakeholders to build capacity to work in design mode. System leaders in our study focused their efforts primarily on designing learning for staff. The design however explicitly involved empowering staff to build the design capacity of students and parents. Research supports this focus on professional learning. Bransford et al. (2005) demonstrate that investments in learning for teachers results in improved student learning. Chu et al. (2020) provide a conceptualization of professional learning that aligns well with this study deemed "design-based professional learning" (DBPL). DBPL involves designing a learning environment that is consistent with the principles of learning, with complexity theory, and with the design process (Chu et al., 2020). This provides a theoretical underpinning for the practices articulated in the professional learning finding of this study. Chu et al. (2020) also present that DBPL should involve opportunities to continually revisit previous learning to create next learning steps. System leaders might consider how to empower School Action Teams to have and create agency over the design of professional learning moving forward.

System leaders in this study designed for professional learning to include opportunities for learners to make their learning visible. This is supported by Friesen et al. (2015) who found that making teaching visible, including in online spaces, was a feature of adaptive learning systems. A connection exists here to the work of Scardamalia and Bereiter (2014) who advocate for advancing community knowledge through “out-in-the-world production of designs, theories, problem solutions, hypotheses, proofs, and the like” (p. 397).

Storytelling. Storytelling has been identified as a key method in human centred design (IDEO, 2012; Parkinson & Warwick, 2017; Quinn et al., 2018). Stories can be used in the design process to:

> Encourage collaboration, share ideas, create a sense of shared purpose, persuade others of the value of our contributions, help us understand the world and give us insight into people who are not like us, put a human face on analytic ideas, and help us gather and share information about users, tasks and goals. (Quesenbery & Brooks, 2010, p. 2)

The use of storytelling in this study provides an example for how storytelling might be leveraged at a system scale. This is supported by Denning (2011), who identifies that the communicative strengths of storytelling can be used to support organizational change. He explains that storytelling can engender enthusiasm for large scale change initiatives in part by influencing the culture of the organization.

System leaders drew a connection between storytelling as explored in this study and storytelling as an Indigenous way of knowing. L. T. Smith (2012) speaks of the importance of story in bringing people together and sharing cultural values and beliefs: stories "contribute to a collective story in which every Indigenous person has a place" (p. 145). L. T. Smith (2012) also underscores that stories and storytelling are inseparable from Indigenous culture. Louie et al. (2017) offer that storytelling can be used as an Indigenizing principle within educational practice. They describe how embedding storytelling in learning environments can shift power dynamics away from instructors and towards a collective responsibility for knowledge creation. Connected to this, they provide that learning from stories involves understanding how knowledge and validity are embedded in experience as well as how experience is contextual (Louie et al., 2017). An opportunity exists to explore how system leaders can learn from Indigenous People and Indigenous storytelling practices and how this knowledge might contribute to a learning system.

School districts as open systems. Penuel and Spillane (2014) provide that school districts are open systems, meaning: "people and processes from outside strongly influence dynamics and outcomes within them" (p. 654). Meadows and Wright (2008) push us further to recognize that there are no separate systems and that "where to draw a boundary around a system depends on the purpose of the discussion" (p. 97). This creates a frame for the practice explored in this study of seeking to include community and business partners and governance stakeholders in the design culture. It also raises a limitation. System leaders need to recognize that while they are trying to make shifts in culture within the district (as defined organizationally) they are operating within a much broader societal context that is largely beyond their influence. That said, Uhl-Bien et al. (2007) posit that leaders need to recognize and protect the creative process from forces "(e.g., boards or directors, other administrators, environmental pressures)" that would limit the capacity of the organization or its subsystems to engage in adaptive functions. This was recognized in our study, and represents a unique role that system leaders hold in the system. Friesen et al. (2015) offer a helpful conceptualization of “permeable or blurry boundaries” between systems and subsystems. The role of system leader as designer then involves seeking to understand, respond to, and navigate the larger societal context in relationship to the needs of the system.

Recommendations

R4.1 Design to communicate a narrative. System leaders have an important role to play in communicating a shared purpose for the system. A communication strategy should consider not only what will be said but how the message will be shared and by whom. System leaders might focus the narrative on the culture and creative process they are trying to engender. Differently put, system leaders might focus on engendering a design culture by communicating why and how the system will learn rather than dictating what it should learn.

R4.2 Design to build design capacity through professional learning. Creating a culture of design should involve building capacity for stakeholders throughout the system to engage in the practice of design. Professional learning should be designed with principles of learning and feature a shared design model. System leaders should consider how to empower a practice of design across all facets of the organization including at the level of study learning. Leaders might also consider how to design for stakeholders to have agency in the design of their learning. A promising practice to explore is providing opportunities for stakeholders to share their learning in online spaces with the aim of engendering a culture of collaborative knowledge building.

R4.3 Design for design-based leadership capacity. In a system that learns leaders are designers of learning. Leaders throughout the system need to transform how they practice leadership and shift the mindsets they bring to their practice. The needs of leaders should be a key consideration from the beginning of the design process. Professional learning for design-based leadership and engaging leaders as co-designers are strategies to pursue.

R4.5 Design beyond the boundaries of the system. System leaders should be flexible in the boundaries they conceptualize when designing for a system that learns. School board trustees, government, and community members have influence on the system. Leaders should design to include these stakeholders in the design culture. System leaders should also keep in mind that policies and events beyond their control have influence on the learning system. System leaders have a role to play in protecting the creative process in the system from external threats. This might involve seeking to reinforce boundaries between the district and outside forces and at other times blurring boundaries and creating information flows and connectivity beyond the school district. Developing a design practice of their own is a promising way to navigate this challenge. Leaders can practice design to identify constraints and develop creative and evolving solutions in dynamic interplay with the context.

R4.6 Research the potential influence of storytelling in designing for a learning system. How might the combined power of storytelling and design be leveraged to trigger transformation in a system? How might Indigenous storytelling practices as a way of knowing and a way of coming to know offer a frame for learning at a system level? These questions might provide starting points for research to explore the role of storytelling in system design and leadership.

Contributions

An emerging body of research maps the terrain for the application of design and complexity thinking to educational leadership and school reform (Friesen, 2015; Davis et al., 2012; Chu et al., 2020; Bien et al., 2007; Alonso-Yanez et al., 2018). This study contributes to this cannon by providing an example of how school system leaders have applied complexity and design thinking to redesign the mechanisms of leadership practice and reframe school system leadership. Specifically, this study puts forward a design that shifts hierarchal leadership power structures to school system leadership as a collective responsibility. It identifies the need for a shift in the role and mindset of leaders and posits storytelling, design-based professional learning, and systems thinking as promising practices to this end.

Conclusion

In the design principles, findings, discussions, and recommendations presented in this chapter I have attempted to chronicle, explore, critique, explicate, and ultimately lay open our experience of practicing design at a school system scale. I want to underscore that in the framing of findings and recommendations I have endeavoured to draw on what we tried in the practical context, the insights and experience of the system leader participants, and research literature to share our experience and open up possibilities for readers. In the concluding chapter I reflect on my experience as a researcher in this project and explore what I have learned about the problem that was framed in Chapter 1.

Chapter 7: Conclusion

In this final chapter I endeavour to reflect on the project as a whole to open up possibilities for the future. I return to the use of a personal voice and storytelling to present reflection in a way that is situated in place and identity. This chapter features a spiral style that begins in reflection on the project, proceeds in reflection on research, and concludes with reflection on self.

Behind the Scenes

The following is an excerpt from the script of the video that featured the superintendent introducing the Big Idea Quest. It provides the setting to the forthcoming reflections on the project.

> Welcome to the RVS Big Idea Quest! Today is about innovation and improving learning. It is an opportunity to create new ideas, it is a chance to share the incredible things in your school with others in the division, and it is designed to unleash the innovative potential of our learning network. Today we are crowdsourcing ideas for our 2019-2023 4-year plan. Our plan is going to be fuelled by the ideas of students, staff and parents. We all want all learners to become innovators and it will be through our collective ideas that we will get there. I am excited to get started and I recognize that I am asking you to take a risk in sharing your ideas. I want you to know that your ideas are important and valued. In fact, we need everyone in our network learning together to become the jurisdiction we envision. The learning department team has designed a process for us to be creative together. So, let's get started. (RVS, 2018b)

The mood in an executive meeting room at the RVS district office on October 5 was one of excitement. The 4YP team was gathered reviewing the ideas as they flooded in to the crowd sourcing software as they were posted by teams of staff all across the district. We were feverishly typing out replies with the aim of starting dialogue connecting ideas, and being visible. Throughout the morning we were collectively holding our breath, terrified each time the software hiccupped at the thought of losing momentum and good will if the portal crashed. The system leaders around the table were genuinely inspired by both the quantity and quality of the ideas put forward by staff. Energized as the number of engagements rocketed higher, this felt like a moment of success; a tangible realization of our long-discussed ideal of "unleashing the innovative potential of our learning network." Later that afternoon, as the flow of posts tapered to a trickle, the number of engagements sat north of 10,000. A new realization set in around the table and was voiced by a system leader: "Now what?" At this moment, and many others throughout the project, system leaders looked to me. With this story as context I want to welcome you inside the mind of the researcher.

A Sidebar on a New Flock of Ideas

In this moment, and many others in the study, I reached for a frame to help generate possible solutions. The frames I drew on emanate from the new flock of ideas I explored in Chapter 2 and connect to the theoretical frameworks used to create the design solutions. Dorst (2015) speaks to the importance of establishing shared frames to harmonize members of a design team. Throughout the project I explored different frames to support our 4YP team to engage in design work. At different times, different frames were helpful. Each of the frames I explored also had limitations. I chronicle my experience exploring three different metaphors in the sections below.

School District as Ecosystem

In the early stages of the project I drew on ecological metaphors. This frame resonated with the big picture of the project. Specifically it helped our team recognize and conceptualize the need for diversity and to recognize the inappropriateness of linear cause and effect planning. It was not very effective however in supporting productive ideation towards action/solutions. I believe this may have been because we did not have deep enough knowledge about ecology. Connected to this, the ecological frame created a sense that the system was too complex for us to know how to take action.

School District as Decentralized Network

A second prevalent metaphor construed the system as a decentralized network. This metaphor was particularly useful in working with hierarchal organizational metaphors brought forward by others. In response I was able to draw on the characteristics of a decentralized network, to promote the idea of designing for both top-down (coordination) and bottom-up (autonomy). To support this frame and build greater background understanding, system leaders read Davis et al. (2012). In contrast to the ecological metaphors this frame opened up many possible actions and precipitated many of the design ideas implemented in this study. Because of the effectiveness and prominence of its use in our study I drew on this metaphor heavily to present the theoretical output. The limitation of this frame was that it at times appeared to encourage system leaders to view the system as more complicated than complex. That is, at times system leaders worked with this frame as if it offered a roadmap that could lead to predictability and control. It was difficult in working with this frame to convey the critical caveat that “dynamic learning systems cannot be forced or legislated into existence" (Davis et al., 2012, p. 398). For this reason the ecological frame explored in the preceding section played a key complimentary role.

School District as Learner

As a third frame I drew on the metaphor of the system as a learner. An advantage of this lied in the fact that system leaders had the most background knowledge as compared to the previously chronicled metaphors. System leaders were able to draw on their understanding of teacher as designer. Specifically, they had a strong understanding of: the role of formative assessment in learning; the role of community knowledge building in learning; and the role of student voice in learning. Additionally, system leaders had an understanding of the principles of human centred design and experience applying design-thinking processes in their work with leaders and teachers. This experience and knowledge precipitated both generative brainstorming and greater sophistication and nuance of ideas. The Double Diamond Model of Design worked well within this metaphor for a frame to guide design practice. A limitation of this frame emerged in trying to transfer what we knew about teaching to the scale of the school district. Teaching effectiveness principles such as building relationships or providing timely and individual feedback, while still relevant at a system scale, demanded different practices than in a classroom setting. When this limitation was encountered it was at times helpful to jump to the system as network frame. Moving back and forth between frames became a key feature of our design work. In the next section I return to the story to further illustrate how framing was employed in our study.

Back to the Story

In my response to the question "now what?" I drew on the frame of system as learner. I replied "what would we do in our classroom after facilitating a brainstorm of divergent ideas?" From this frame we were able to identify important design considerations such as how to: ensure that individuals who had taken a risk to share an idea felt that their idea was honoured; give individuals encouragement and opportunity to explore their ideas in ways that mattered to them in their own context; give individuals formative feedback on their ideas that may include introducing them to new ways of looking at their ideas and to give them support to their ideas out into relation with other ideas; provide opportunities for individuals to collaborate with others both with those who have similar and those who have divergent ideas; get a sense of the ideas as a whole to determine what the next learning steps should be for the class (in this case the whole district); and keep in mind the timelines and expectations of our professional responsibility and curriculum (in this case the Ministry of Education and the Board of Trustees). Following this brainstorm we were able to draw on both our experience as designing learning at the classroom scale and elements of network theory to design next step action steps. (I won't reiterate them all here as they have been thoroughly documented and explicated in the preceding chapters).

Frame Creation Summary

Framing and reframing played a pivotal role in this research project. Frame creation helped disrupt the status quo and reveal the taken for granted. It also created a shared language and harmonized the creative process that supported the application of theoretical frameworks to inspire ideation. In alignment with the pragmatic underpinnings of this study, frames were employed based on their effectiveness. Different frames proved effective for different purposes. Frame effectiveness involved: harmonizing the design team; disrupting the status quo; and inspiring productive ideation. We remained flexible with framing and shifted between frames throughout the study and even within design sessions. Finally, as the research partner my role involved introducing frames, building background knowledge within frames, and documenting and monitoring the effectiveness of frames.

The Big Picture Revisited

At the outset of this study I sought to disrupt the metanarratives of scarcity, standardization, fragmentation, and control by framing the system as a learner, and drawing on a conceptualization of learning as maintaining viability and teaching and leadership as designing learning. In this section I reflect on what I have learned about the problem and new flock of ideas through developing the outputs of this study.

Scarcity, Standardization, Fragmentation, and Control

Throughout the project I used my research journal to document and reflect on the metanarratives of scarcity, standardization, fragmentation, and control. Practices and metaphors that connected to these metanarratives were ever-present. Importantly however, they lived alongside practices that harkened to different ideas.

Hierarchal structures and instrumental ideas of the purpose of education were particularly evident. Embedded in the preexisting planning and accountability processes was a flow of power and influence from the Ministry, through to system leaders, to school leaders, to teachers, and finally to students. Completely taken for granted was the idea that in any discussion of the purpose of education or in any process to design learning the starting point should be determining outcomes. Education and learning in this frame are about shaping/manipulating learners to bring about that which is predetermined. Connected to this was a hierarchy in which each layer “up the chain of command” was responsible for determining how best to manipulate the group below them to bring about the outcomes. Ideas of accountability, assurances, measurement, and best practice all come along with this thinking. Central critical curriculum questions that this hierarchal instrumentalism raised was who is deciding the outcomes? Whose stories/ whose knowledge/ whose ways of coming to know/ whose ways of being are being privileged? Who is deciding which image this system is shaping students into? And connecting back to the big problem as framed in this study: how in this system (which is designed to produce a predetermined outcome) is their hope for the emergence of something new?

It is important to note that I encountered these ideas in the processes, the metaphors and the ideas put forward by stakeholders (and even in my own thinking). Much like in the practice in my classroom that Carter interrupted, these metanarratives were playing themselves beyond the explicit wanting and knowing of those tied up in them.

Alongside, even mixed up with the practices described above were practices that trace to a different flock of ideas. Most notably, the district had a strong focus on sharing stories of learning and design thinking. Video storytelling featuring student and teacher voice had influence on the narrative the district presented and was used to help the Ministry of Education, the Board of Trustees, and the Executive to stay connected to the experiences of students and teachers. Design thinking was used in by leaders at the school and district level, by teachers, and by students. Design thinking supported stakeholders to identify local needs and develop solutions. Design of learning was also used to prevalently in the district to support teachers to develop project-based, inquiry, and other experience based pedagogical practices. I noted that system leaders were explicitly aware of the ways in which these new practices were playing themselves out. These were the practices they were most excited about and were seeking ways to advance. Furthermore, in the Big Idea Quest these practices were prominently represented in the ideas put forward with high frequency by staff members from throughout the district.

Interruption

I set out to occasion an interruption to the metanarratives of scarcity, standardization, fragmentation, and control. If this occurred in any way it certainly was not in the dramatic fashion that Carter interrupted my classroom (or least how he did in the way I tell the story). As chronicled in Chapters 4, 5, and 6 six there were many ways in which I sought to embed a new flock of ideas in the leadership practices of the district. Much of this work was finding opportunities to shift practices. It involved trying to negotiate within the constraints of the context. One strategy that worked well was identifying the new flock of ideas in practices that had already taken root (in this case storytelling and design thinking) and seeking to leverage and amplify them. Embedded in these practices (and from my perspective perhaps the most significant disruption brought about by this study) was enhancing the profile of the needs, ideas, and perspectives of students and teachers. Without a doubt this was the most prevalent conceptualization of the project I would hear from stakeholders who participated in the face to face engagements. The metaphors they used pointed to a shift of power: “oh, I get it, this isn’t top down anymore, it’s bottom up;” or, “your flipping the chandelier;” or “grassroots.” This harkens to an anti-oppression pedagogy, a pedagogy of empowerment if you will. I think of Donna Haraway’s (1998) words here “the vision is better from below the brilliant space platforms of the powerful” (p. 583). The interventions in this study included the voices of more stakeholders in defining and enacting the goals of the district. Furthermore, the design provided mechanisms for the needs and ideas of stakeholders to be identified, shared, and have influence. In these ways I believe the outputs of this study embedded a shift from the preexisting hierarchal instrumentalism.

While the interruption was not as abrupt as the one in my classroom it was not without strife. In our attempts to shift ways of working and ways of thinking in the school district we encountered significant resistance. Some of this resistance was encountered at the school level. By way of illustration, in the days that followed the Big Idea Quest engagement system leaders informally collected perspectives from contacts in the division (of course this represented a limited sample). Much of the feedback revealed positive momentum and enthusiasm. But certainly not all. Some staff members felt that because of the public nature of the design of the engagement they were unable to share honest feedback. They felt strong armed into contributing to a corporate narrative of innovation. This was one of several times in the project we heard that "central office" was better known by some as "central obstacle." In other school contexts we learned that the protocols and processes were led in a way that served to marginalize the engagement and the 4YP process as a whole.

The School Playbook and System Response Model precipitated strong reactions from some of the system leaders whose ways of working were challenged and changed in the new design. Resistance was expressed in anger, defensiveness, and avoidance. In some cases, individuals actively worked to undermine confidence in the new practices. Following the development and launch of the School Playbook two leaders retired from their roles in the district.

Resistance can be interpreted as one sign that change took place. As explored in Chapter 2, learners seek to maintain viability in accordance with a historicized narrative, we avoid learning where possible, and learning is a transformation of self. And while this resistance is not sufficient to ensure transformative change, it is necessary. Of note here is that in addition to policy, structures, and processes, it was also individuals (in their language, thinking, actions, and perhaps even self-identity) that upheld the status quo in a school district.

A System that Learns

Ultimately, I sought to design for a System that Learns. In this section I reflect on how in seeking to design for a system that learns it became evident that in conceptualizing the district as a learner it meant we were seeking to shift not only what the district would be doing but *who* the district was becoming. To provide a context for this reflection I begin by quoting the superintendent's video message that was sent to all stakeholders following the Big Idea Quest.

> Wow, Rocky View, we had over 10,000 ideas submitted to our Big Idea Quest! This is a celebration of the inspiring and innovative teaching and learning happening in our division, and evidence of a vibrant education community dedicated to growing and learning. If you haven't already, you have to go to the 2023 by design site and check it out. While you're there, post comments, get inspired by innovative ideas from all over our district or share in the rich discussions in the Community Cafe. Now you might be asking, what's going to happen with all of these ideas? For starters, we've been busy reviewing the feedback you provided and hearing from school councils and community partners. We will be revising the narrative, goals and outcomes and sharing them with you in early November. But that's just the beginning. The truly amazing part of the Idea Quest is how it makes visible the innovation in our schools. 2023 by design isn't about compiling everyone's ideas and squeezing them

into a plan. It's about designing a four-year plan that supports everyone in the learning system to co-create ideas and actualize them. In short, it's about fostering the conditions for innovation.(RVS, 2018a)

This quote illustrates the design principles presented in the theoretical output. It points to designing to engage a divergence and convergence of ideas, it speaks to feedback cycles, and network connectivity. It provides that designing for a system that learns involves creating processes that position the needs and ideas of students, teachers, parents, staff, and community members *as* the curriculum. More than this I think, it points to the fourth principle: design culture. It suggests that the ideas of stakeholders represent more than a sum total. It suggests that a system that learns is about more than doing. In the context of this project it became evident that we were dealing with something more than designing new processes, new ways of working. In treating the system as a learner, it became evident that to do something, one has to be somebody. It became evident that what we were trying to do was not just design for new ideas to be generated but also to design new ways of being.

Aoki et al. (2012) asserts the togetherness of doing and being enfolded in "becoming." Biesta (2006) speaks about a "coming into presence." To further conceptualize what this might mean at a school district scale it is helpful to revisit the fractal conceptualization of the district. In this frame the system is made up of nested systems comprised of individuals, classrooms, and schools. Each layer in this conceptualization must be simultaneously thought of as a whole, a part of a whole, and a network of wholes. In a system that learns then, one might attempt to imagine ongoing interconnected processes of becoming between and within each of these systems and subsystems. Arendt (1961) helps me make sense of this reconceptualization of individuality. She posits that anytime an individual acts, they are never the sole author of their actions because ones actions are always contaminated by the actions of others. Like the nested systems metaphor, this frames subjectivity as always in relationship. Arendt also provides that while an individual is never the sole author of their actions (because every action one makes is completely unique), when one acts one shows oneself in their unique distinctness. Therefore, for Arendt, one's identity is in a constant state of emergence in relation to the other. Osberg and Biesta (2008) build on Arendt to conceive of the reasonability of education to create a "space of emergence"

A system that learns then, might be conceptualized as curriculum. Conceptualized as an ongoing process of coming into presence; a space were individuals, classrooms, schools, and the system not only generate and share ideas but in doing so engage in a process of becoming something new, becoming something unique in relation to others.

From here, designing for a school system that learns means creating the conditions for emergence. I believe that the theoretical model presented and discussed in Chapter 6 offers places to begin to think about how to go about this. I build from this section in the final spirals of this paper. Specifically, I revisit the ideas of emergence, of coming-into-presence, of doing and being-with-others enfolded into becoming to help me reflect on this project and myself.

A Closing Reflection on Being a Research Partner

I would be remiss if I presented this project in a way that left the impression that I simply jumped from frame to frame, design model to design model, pulling strings behind the scenes. I often wrestled with what to do, I often made decisions and tried things that weren't received in the ways I intended. I at times approached being overwhelmed with the responsibility. In the subsequent sections I reflect on the challenges I encountered being a research partner. I used my research journal to document and reflect on not only on what I encountered in the context but also on my own actions and the influence I was having. I recognized that I was positioned as holding expertise and being looked upon to chart the course. In some ways this was not new for me. In various past roles I have been looked upon to lead. Over time I have come to greater recognition of the responsibility of holding influence and power. I have come to see the need to reflect on my biases, to reflect on what shapes my perspective, on whose needs and interests I should seek to represent, and on what disciplines and traditions I should root in.

While I was familiar with the responsibility of leadership, the role of researcher was new to me. In this context I had significant influence and a sense of ownership, yet was at the same time an outsider. I was not in a role to make decisions, rather I provided consultation on decisions. Added to this, I at times was not privy to all of the information that system leaders had to take into account. Nor did they always share with me all of the rationale behind their decisions. Furthermore, as a researcher partner I did not have a mandate to see the work through beyond the scope of our partnership.

Frequently in this study I reflected on my responsibility and influence. These important questions emerged and persisted:

- Am I imposing my agenda and perspective too greatly on the context? Whose interests am I advancing?
- What biases that I hold might I identify in my thinking? What privilege contributed to my position of power and how might seeking to recognize my privilege help me identify my blind spots?

- Am I doing enough to voice concerns when I have them? How do I handle the situations when my advice is not headed? Am I objecting enough? Am I pushing too hard?
- Am I creating a design that they do not have the capacity to carry out? In what ways can I build the capacity of stakeholders to carry it out before our partnership comes to a close? How can I design it so that it is sustainable?
- Can I think different? Can I "see" beyond the paradigm I am a product of and am immersed in? Can I conceptualize the complexity within which I am implicated? (More to come on this line of reflection upcoming).

My research journal features many pages of self-reflection. I raised and discussed many of these questions with my school district partners. I don't have singular or clear answers to these questions. At the time of writing them in the journal, and now in hindsight, I feel that the best I could do was to keep asking these kinds of questions, to keep reflecting in my journal, and to keep walking as practice of deep reflection.

Paired with this practice of reflection was a dedication to amelioration. That is, I endeavoured to balance the need to critique and question my own thinking well all the while seeking to make things better in the messiness of the context, one action at a time. Stated from a design perspective, DBR allows me to continuously seek to explore and reframe the root problem and underlying human needs through cycles of testing and reflection. I have learned that DBR is well suited for me as it allows me to combine what I think of as the work of curriculum theory (seeking to understand what is going on, to reflect on how things came to be, and to imagine things being otherwise) and that of a learning scientist (creating innovation in real-world contexts through systematic inquiry).

(Not) a Hero's Journey

Carter's essential question that interrupted my classroom and practice echoed in my mind and reverberated through my research journal throughout this project: "Why are we doing this?" I felt as if the metanarratives of standardization, scarcity, fragmentation, and control were screaming back at me. I would hear them in the metaphors people used, recognize them in the barriers put up, see them in my own ideas. Most vexing perhaps was the taken-for-granted-ness of it all pointed to in the oft-heard and dismissive turn-of phrase "it is what it is." I struggled at times to help others see that things could be otherwise. Often I was treated as if I was complicating things, I was met with the attitude that things just needed to get done. But for me standardization, scarcity, fragmentation, and control were, as Jardine (2012) so hauntingly puts it, "*Every- where*" (p. 2). I wondered if I was necessary going through the "afflictions" of interpretive work, if this was all part of getting a glimpse into "what the hell is going on" (Jardine, 2012, p. 2).

I tried to deal with this by seeking to find perspective, to let go a little of the self-importance. To let go of the self-aggrandizing tied up in the story of researcher as change agent up against the meta-narratives only he can see. Differently framed, I was (and am now) seeking to recognize that I was casting myself in a hero's journey. Reading and rereading this text (even this very section) I recognize that I haven't been able to get too far away from authoring a hero's journey. But nonetheless there was (and continues to be) some relief to be had in attempting to let go, relief in the recognition that I am in at least in part the author of the challenges I am up against. With the aforementioned self-awareness in mind, if this is to have the elements of a hero's journey it requires a revelation; a transformation of perspective that gives birth to a transformed self.

A Closing Reflection on Complexity

This morning I marveled at the arrival of Spring as pronounced by hundreds of newly opened crocuses interrupting the seemingly lifeless and bare winter pallet to which we have become so accustomed. My walk on Nose Hill, as it has served throughout this project, provided me with an opportunity to reflect on a bigger view.

I have composed these final sections in self-isolation and have not been able to help thinking about the global pandemic alongside the ideas I have explored in this dissertation. In the opening chapter I wrote about interruption. The magnitude of the one our global community is currently immersed in by far the most far reaching of my life experience. I have been paying keen attention to the reactions; seeking myself to get a glimpse of how things might be otherwise, watching to see if others might be given such a chance. Wondering, by way of apropos example, if our “pivot” to home learning might reveal some things about learning, about schooling, for me, for students, for teachers, for parents, for us as a collective.

Alas, I have seen a lot of folks construing this situation within their preexisting frames. For some, the pandemic has revealed the risks of authoritarianism, for others it is illuminating inequality. For some more, it affirms the risks of globalization, or of climate change, or capitalism. Some recognize the importance of science, others the over reach of experts. In education, some see the value of teachers in society. Others the dispensability of educational assistants. Some see a highlighting of inequities, others reaffirm the prominence of “the basics.” Not to be outdone, I of course, can’t help but see the inappropriateness of standardization, scarcity, fragmentation, and control.

This line of reflection is necessarily humbling, particularly as I chronicle my efforts to provoke an interruption. This line of reflection helps me recognize the challenge of encouraging a new flock of ideas, of precipitating an interruption, of shifting paradigms, of unseating the dominant frames underpinning school and society. From this view it is hard to imagine what one could do of significance within systems so complex and so vast.

As I continue on my usual route I pass many folks in the awkward physical distancing way we have come accustomed. In a strange inverse, Nose Hill is crowded; John Laurie Blvd. and the skyscrapers near Mohkínstsis, nearly deserted. Undoubtedly, the routines of Calgarians have changed. Perhaps I am not the only one to be interrupted by the crocus. Perhaps the wisdom that sits in this place is at work (Basso, 1996). Perhaps "*aoksisowaato'p*" is at work connecting us to this place and our relations (Blood et al., 2012). Perhaps having our children in our midst, seeing them play, learn, and grow, is at work. Perhaps their energy, their voices, their viability is at work. Perhaps shifting to a new flock of ideas is incremental, accretive, is dynamic and unfolding. Perhaps the crocus, the rock, our children, even the coronavirus itself is an opportunity to awaken us to our relationships, to our responsibilities, to each other and all of our relations.

I wonder what it might take for this interruption to occasion the emergence of something new. Perhaps the seemingly ideological renderings of COVID-19 might instead be recast as a plurality of frames helping us move away from the danger of a single story (Adichie, 2009). Perhaps our common experience of disruption, coupled with the networked reflections of our global community is shifting power and enlivening relationships. Perhaps in this disruption there is emergence.

In this project I have oft traversed these bipolar reflections on my experience. The following quote seems to help me explain myself here: "Love says I am everything. Wisdom says I am nothing. Between the two, my life flows" (Nisargadatta et al., 2012). In this project

I have endeavoured to navigate the tension of being both empowered and humbled by an awareness of complexity. I have endeavoured to navigate the seeming paradox of seeking to visualize complexity and act on it as if I can conceptualize it, all the while holding onto the necessary partiality of my understanding. Perhaps more clearly put, Meadows and Wright (2008) suggest that to transcend paradigms is “to realize that no paradigm is “true,” that every one, including the one that sweetly shapes your own worldview, is a tremendously limited understanding of an immense and amazing universe that is far beyond human comprehension” (p. 164). In my experience this is tricky, to say the least. I have often approached a paralysis as a product of the recognition of complexity.

Berlow (2010) talks about finding simplicity on the other side of complexity. He calls for us to use an awareness of complexity to “zoom out” to attempt to identify the complex web of relationships with in which our project is entangled (Berlow, 2010). He contents that in visualizing complexity we can seek to identify simple actions that will matter most. In the theoretical output of this paper I have attempted to do that.

On another plane, in Chapters 1 and 2 I attempted to explore an entangled web of interrelationships to frame the problem and project. In doing so I endeavoured to render a glimpse of complexity. Throughout the project I have continued to seek to periodically zoom out. I believe that reading curriculum theorists, writing in my research journal, and taking reflective walks at Nose Hill have been important methods to seek a view of the bigger picture. Paired with this I have used DBR to allow me to zoom back in and take pragmatic action while trying to hold tentatively my partial awareness of a bigger picture. I feel the need to further qualify the above. Well I am not sure of much, I am sure that I have not come anywhere near succeeding at the aim of letting go of not knowing, of transcending paradigms, of taking pragmatic action with an understanding of the complexity within which I am entangled. I don't even believe these ideals can ever be met. I do believe however that we can, in fact that I have, worked rigorously towards them. And I have come to believe that this is the only appropriate response to an awareness of complexity.

Coming Into Presence

This project and the learning I have engaged in alongside it, can be interpreted as another interruption. Carter helped to interrupt some of what I was becoming in my teaching practice, to interrupt some of what we were becoming in our classroom. This interruption has been to my actions and perspectives on my life more broadly, an interruption to who I am, and am becoming in the world. Like the one I have sought to occasion in RVS this interruption has been more incremental and accretive; it is not definite but perpetual. It has doing and being enfolded in becoming. It is been occasioned through my experiences on the land and through engaging with Indigenous Knowledge. I believe that I am coming into a greater presence of myself in the world. I have come to see questions of relationship and responsibility to be central, ongoing, and preeminent in my life. I am engaged in an ongoing process of seeking to recognize the relationships that I have in the world and endeavouring to become more responsible within those relationships. Differently put, I am seeking reciprocity. Connected to my previous reflections on complexity this is daunting and humbling. Writing it, I feel I run the risk it being interpreted as narcissism. I find relief from this worry through taking action. I have partnered with system leaders to try to make things better for students. I have shared the ideas I have been exploring in my research in many professional presentations. I have mentored school principals. I have taken my students to learn on the land. I have made tree medicine with my children. I have learned from the Starlight Family of the Tsuut'ina Nation. I have reclaimed family stories. I have come to know many names and uses of the plants of Nose Hill. I have volunteered for the Métis Nation of Alberta Askîy Advisory Committee. I have spent time on the land from my learning from my Father. I have tried to do, be, and become in the development and writing of this dissertation. This work is ongoing and I feel gratitude for privilege that I have had to engage in it. I also want to thank-you for extending me grace in your interpretation of this reflection.

Epilogue

On Tuesdays I walk my daughter Mika to school, on Thursdays I take my son Joe. Their school is nestled in a bluff shaped by the flood plain of the Bow River. The climax of our journey provides us with a chance to take in the big Alberta sunrise to the east and the dramatic Rocky Mountains to the west. My children and their peers spend their day making fires, using tools, playing in the forest, exploring, learning about plants, observing animals, taking risks, and building relationships. As all parents do, I marvel at how they change. Wonder in who they are becoming. In an age of the politicization, even weaponization of identity, the polarization of society, and a losing of sense of self in our technology, I am seeking something different. I am seeking something different for my children and all of our children. I am seeking to contribute to the creation of a public education that offers spaces of emergence. This requires a shift away from a system designed to promote compliance and a shift away from an instrumental education that necessarily represents an enculturation and an attempt to reduce difference. I am seeking spaces that enable people to become more unique, more irreplaceable, in and through their interconnectedness in the world. In this journey I have learned some things about how to try to do this, I have learned some things about the nature of the problem, and I have come to practice some new ways of becoming. It is my hope that this paper has opened up some possibilities for you.

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Appendix A: Recruitment Letter System Leader Interview

We are inviting you to participate in a research study called Designing for a School System That Learns. You were selected to be part of this study because you are a system leader involved in the development of the 2019-2023 strategic plan.

The purpose of this design-based research study is to design a system strategic plan for Rocky View School District that sponsors the conditions for the emergence of sustainable system innovation. The research question guiding this study is: How can school System Leaders practice design to occasion the emergence and nurture the development of a robust and productive learning system?

As a participant in this study you will be asked to participate in an audio-recorded interview lasting approximately 1 hour.

This study has been approved by the University of Calgary Conjoint Faculties Research Ethics Board.

Attached to this letter is a consent form that fully explains the intended research and the role that you might play in providing information to inform the study. Please read the consent form carefully. If you give your consent to participate in the study, please sign the form and return to the researchers within two (2) weeks of receipt of this letter.

Questions/Concerns

If you have any further questions or want clarification regarding this research and/or your participation, please contact:

Dr. Sharon Friesen 403.220.5625 sfriesen@ucalgary.ca

If you have any concerns about the way you have been treated as a participant, please contact the Research Ethics Analyst, Research Services, University of Calgary at (403) 220-6289/220-4283; e-mail cfreb@ucalgary.ca

Appendix B: System Leader Interview Consent

Research Project Title: Designing for A School System That Learns

Lead Investigator: Dr. Sharon Friesen

Research Approval: This study has been approved by the University of Calgary Conjoint Faculties Research Ethics Board.

Dear System Leader,

This consent form, a copy of which has been given to you, is only part of the process of informed consent. If you want more details about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information. Please also note that you may decline to answer any or all of the documents. Your decision to participate will have no bearing on your relationship with the University of Calgary or with Rocky View School Division.

Purpose of the Research Study:

The purpose of this design-based research study is to design a system strategic plan for Rocky View School District that sponsors the conditions for the emergence of sustainable system innovation.

The research question guiding this study is: How can school System Leaders practice design to occasion the emergence and nurture the development of a robust and productive learning system?

What Will I Be Doing?

As a participant in this study you will be asked to participate in an audio-recorded interview lasting approximately 1 hour.

Participation in this study is voluntary and any individual may refuse to participate entirely, refuse to participate in parts of the study, or may withdraw from the study at any time during the study without penalty.

The recording will be transcribed and researchers may use quotes to illustrate research themes but will not identify you in the reports.

If at any point in the interview you have the right to ask for the research to stop. The researcher will advise the research ethics board that the research has stopped.

Participation in any RVS activities will not be compromised or limited in any way by accepting or declining participation in this study. Should you choose to withdraw from the study you have the right to request the withdrawal of your data. However, all data collected up until the date of withdrawal may be used if it has already been aggregated for purposes of this study. The last point of possible withdrawal from the study is March 1, 2019 so reports can be completed.

Are there Risks or Benefits If I Participate?

There are no risks in participating in this study. Data will be reported as an aggregate and individuals will be referred to using pseudonyms. You may benefit from participating in this study by reflecting on your role, sharing your practice, and engaging in dialogue with a member of the research team.

What Type of Personal Information Will Be Collected?

Should you agree to participate in the study, you will be asked to provide your name and email so the researchers can communicate with you and make arrangements to conduct the research activities. Other research participants will not be aware of your participation. To ensure your anonymity in the research reports, you will be identified by pseudonym that the researchers will assign to you, unless you choose to provide the researchers with a pseudonym. You will not be identified in any research reports or articles, but rather you will be referred to by a pseudonym.

What Happens to the Information I Provide?

To ensure confidentiality of your data, all data will be stored in a locked cabinet and only the investigators will have the key. Any local electronic data will be stored on secured and encrypted computers at the University of Calgary where only the investigators can gain access to the data. All data will be held until Dec 5, 2023 and will be subsequently destroyed. Paper data will be shredded. Electronic data will be deleted and the hard drive erased.

The study will begin in December 2018 and conclude April 1, 2019.

Dissemination of Findings

The findings will be used to inform the design of the 2019-2023 Rocky View Schools 4- Year Plan. Findings from the study will be published in a Doctoral Dissertation. Findings will be presented at stakeholder events within Alberta; and at local, provincial, national or international academic conferences for the purposes of furthering an understanding of designing for system innovation.

Signatures – Written Consent

I grant permission for researchers to audio record a one-hour interview with me: Yes: _____ No: _____

You may wish to select a pseudonym for yourself. This is not required and should you not select a pseudonym the researchers will assign a pseudonym to you to protect your identity.

I wish to provide the researchers with a pseudonym. Yes: _____ No: _____ The pseudonym I select is ____________________.

Your signature on this form indicates that you understand to your satisfaction the information provided to you about your participation in this research project.

In no way does this waive your legal rights nor release the investigators, sponsors, or involved institutions from their legal and professional responsibilities. You should feel free to ask for clarification or new information throughout your participation.

Participant's Name: (please print) ____
Participant's Signature: _______________________________ Date: ________________
Researcher's Name: (please print) _________________

Researcher's Signature: _____________________________ Date: ________________

Questions/Concerns

If you have any further questions or want clarification regarding this research and/or your participation, please contact:

Dr. Sharon Friesen 403.220.5625 sfriesen@ucalgary.ca

If you have any concerns about the way you have been treated as a participant, please contact the Research Ethics Analyst, Research Services, University of Calgary at (403) 220-6289/220-4283; e-mail cfreb@ucalgary.ca

A copy of this consent form has been given to you to keep for your records and reference.

Appendix C: System Leader Interview Questions

1. Describe your role and provide an overview of how you were involved in the development of the 4YP?
2. Explain how system leaders facilitate learning? In what ways do system leadership practices impact administrators', teachers' and students' learning?
3. Describe how learning is designed at the school system level?
4. Describe the ways in which authentic learning is supported at the system level?
5. Describe assessment practices at the system level?
6. Describe how collaboration is supported at the system level?
7. How do teachers' and leaders collaborate and build on each other's ideas? Provide examples of opportunities for collaboration in the district.
8. What evidence do you use to determine what you need to learn in order to improve student learning? What evidence is used to determine what teachers know and do well and what they need to learn? (i.e. what evidence demonstrates teachers have an exceptional understanding of the core concepts within the disciplines they teach)
9. In your role as a system leader how do you engage in professional learning?
10. In what ways was the development of the 2023 by design 4YP different as compared to other strategic planning processes you have been involved in?
11. In what ways is the 2023 by design 4YP different from other strategic plans?
12. What recommendations would you make to other system leaders for advancing innovation in the system?
13. Is there anything else you would like to share with me?

Appendix D: Principal and Assistant Principal Consent and Survey

We are inviting you to participate in a research study called **Designing for a School System That Learns**. You were selected to be part of this study because you are an assistant principal or principal in Rocky View Schools.

The purpose of this design-based research study is to design a system strategic plan for Rocky View School District that sponsors the conditions for the emergence of sustainable system innovation.

The research question guiding this study is: How can school System Leaders practice design to occasion the emergence and nurture the development of a robust and productive learning system?

You are invited to complete this online survey that will take approximately 10-15 minutes to complete.

Completing this survey is part of the process of informed consent. If you want more details about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information. Please also note that you may decline to answer any or all of the questions. Your decision to participate will have no bearing on your relationship with the University of Calgary or with Rocky View Schools.

Participation in this study is voluntary and any individual may refuse to participate entirely, refuse to participate in parts of the study, or may withdraw from the study at any time during the study without penalty. Should you choose to withdraw from the study you can close out of the online survey at any time and your responses will not be submitted.

Are there Risks or Benefits If I Participate? There are no risks in participating in this study. The survey is anonymous and data will be reported as an aggregate. You may benefit from participating in this phase of the study by reflecting on your perceptions about learning and leadership in your context.

What Type of Personal Information Will Be Collected? No personally identifying information will be collected.

Dissemination of Findings: The findings will be used to inform the design of the 2019-2023 Rocky View Schools 4-Year Plan. Findings from the study will be published in a Doctoral Dissertation. Findings will be presented at stakeholder events within Alberta; and at local, provincial, national or international academic conferences for the purposes of furthering an understanding of designing for system innovation.

Questions/Concerns: If you have any further questions or want clarification regarding this research and/or your participation, please contact: Dr. Sharon Friesen; 403.220.5625; sfriesen@ucalgary.ca If you have any concerns about the way you have been treated as a participant, please contact the Research Ethics Analyst, Research Services, University of Calgary at (403) 220-6289/220-4283; e-mail cfreb@ucalgary.ca

1. Do you agree to participate in this survey? Select yes to continue to the survey questions or close to exit. You may exit the survey at any time.
   Yes, I agree to complete the survey for the study.
   Yes, I agree to complete the survey but do not want my responses used for the study.
   No, I do not agree to complete the survey for the study and wish to exit the survey.

2. What is the grade configuration of your school?
   - High School
   - Middle School
   - Elementary School
   - Multi-level School

Leverage the competence of students and the community to make a positive impact on the life of students, staff, parents and our world

3. In this part we are interested in knowing more about how the competence of students and the community are leveraged in your school. Please select what best describes the situation in your school.

	Not Sure **I don't have enough evidence to say**	**Disagree** **Does not describe the conditions in my school.**	**Minimally Agree** **Describes less than 50% of the conditions in my school.**	**Somewhat Agree** **Describes 50-75% of the conditions in my school.**	**Strongly Agree** **Describes 76-100% of the conditions in my school.**
Students regularly collaborate with one another to build collective understanding.					
Student questions and voice drive learning.					

Student leadership drives school direction.					
Student learning makes positive contributions to the community.					
Teachers and staff regularly collaborate with one another to support learning.					
Teachers regularly collaborate with other teachers to co-design learning and assessment.					
Teachers regularly obtain and incorporate feedback about instructional planning and assessment from colleagues.					
Teachers collaborate with teachers from other schools.					
Teachers collaborate with school district staff to design learning.					
Community members/partners support learning.					
Opportunities exist for parents to meaningful contribute to support student learning.					
Teachers participate in online learning					

communities.					
Teachers use social media to make learning visible to the community.					
Protocols are used to support collaboration (in classrooms, staff meetings, school council meetings, etc.)					
Students, staff, parents and community members share a common vision for learning and teaching.					

Engage in purposeful work designed to build foundational skills and competencies through projects that foster deep understanding.

4. In this part we are interested in knowing more about the design of purposeful work in your school. Please select what best describes the situation in your school.

	Not Sure **I don't have enough evidence to say**	**Disagree** **Does not describe the conditions in my school.**	**Minimally Agree** **Describes less than 50% of the conditions in my school.**	**Somewhat Agree** **Describes 50-75% of the conditions in my school.**	**Strongly Agree** **Describes 76-100% of the conditions in my school.**
Students undertake work that is connected to their lives.					
Students undertake work that is connected to the world outside of the					

school.					
Students apply core concepts within the disciplines (i.e. big ideas, critical or key understandings)					
Students undertake work that requires disciplinary expertise (distinct ways of thinking and acting consistent with the ways in which experts in the disciplines work; e.g. mathematician, historian, author, scientist, engineer, etc.)					
Teachers continue to learn about and stay abreast of discipline knowledge as it evolves in real world contexts.					
Teachers continue to learn about and stay abreast of pedagogy and learning science.					
Teachers have an exceptional understanding of the core concepts within the disciplines they teach (i.e. big ideas, critical or key understandings)					

Teachers intentionally design strong robust, authentic tasks that focus on issues, questions or problems central to the discipline.					
Teachers design learning experiences that engage students in developing foundational literacy and numeracy skills.					
Teachers design learning experiences that engage students in applying foundational literacy and numeracy skills to purposeful work.					
Teachers design learning to ensure that all students continuously develop skills in literacy and numeracy across subject areas.					
Teachers design learning that fosters the development of competencies across subject areas.					

Appreciate and promote diversity in ideas, cultures and ways of knowing, being and learning.

5. Appreciate and promote diversity in ideas, cultures and ways of knowing, being and learning.

	Not Sure **I don't**	**Disagree** **Does not**	**Minimally Agree**	**Somewhat Agree**	**Strongly Agree**

	have enough evidence to say	describe the conditions in my school.	Describes less than 50% of the conditions in my school.	Describes 50-75% of the conditions in my school.	Describes 76-100% of the conditions in my school.
Students engage with a wide range of ideas and perspectives.					
Students undertake work that fosters innovation and creativity.					
Students engage in a wide range of cultural experiences.					
Students demonstrate empathy for diverse ways of being and learning.					
Teachers and staff have a strong understanding of the diversity profile of classrooms and school.					
Teachers design learning experiences that use universal strategies to address students' strengths, learning challenges and areas for growth.					
Teachers and staff recognize and respond to specific learning needs of individual students.					

Teachers and staff collaborate to problem solve and respond to specific learning needs of individual students.					
Teachers when needed, collaborate with service providers and other specialists to design and provide targeted and specialized supports.					
Teachers and staff foster a learning community of equality and respect.					
Teachers design learning that incorporates students' cultural strengths into teaching and learning.					
Teachers honour cultural diversity and promote intercultural understanding.					
Teachers design a learning environment where students develop empathy for multiple perspectives.					
Teachers design learning that uses the programs of study to provide opportunities for all students to develop knowledge , understanding of, and respect for, the histories, cultures, languages, contributions,					

perspectives, experiences and contemporary contexts of First Nations, Métis and Inuit.					
Teachers and students draw on resources that accurately reflect and demonstrate the strength and diversity of First Nations, Métis and Inuit.					

Reflect on learning through meaningful assessments to inform and showcase growth.

6. In this part we are interested in knowing more about reflection and assessment in your school. Please select what best describes the situation in your school.

	Not Sure I don't have enough evidence to say	Disagree Does not describe the conditions in my school.	Minimally Agree Describes less than 50% of the conditions in my school.	Somewhat Agree Describes 50-75% of the conditions in my school.	Strongly Agree Describes 76-100% of the conditions in my school.
Students collect and reflect on evidence of their learning journey.					
Students share learning stories with the broader school network.					

Students exhibit their learning to the community.					
Assessment criteria are collaboratively designed with students.					
Assessment tasks and criteria reflect real world standards for high quality work.					
Teachers engage in ongoing formative assessment to determine next steps in teaching and learning.					
Teachers provide formative assessment opportunities to scaffold student learning prior to summative assessment.					
Teachers design opportunities for parents to help students to reflect on growth over time and set learning goals.					
Teachers collect a range of observations, conversations and products as evidence of student learning.					

Teachers collect and organize assessment evidence by learner outcomes within the program(s) of study to determine and report the level of student learning.					
Teachers and leaders engage in design thinking characterized by ongoing and recursive process that involves defining needs, framing inquiry questions, taking action and collecting evidence.					
Teachers and leaders share learning stories with the broader school network.					

Nurture positive relationships built on trust, support and care for one another.

7. In this part we are interested in knowing more about relationships in your school. Please select what best describes the situation in your school.

	Not Sure **I don't have enough evidence to say**	**Disagree** **Does not describe the conditions in my school.**	**Minimally Agree** **Describes less than 50% of the conditions in my school.**	**Somewhat Agree** **Describes 50-75% of the conditions in my school.**	**Strongly Agree** **Describes 76-100% of the conditions in my school.**

Students feel safe and welcome at school.					
Students collaborate in an understanding that each member has a significant role in the knowledge advancement of the entire team (build on each other's ideas).					
Members of the school community demonstrate empathy and a genuine caring for others.					
Programs at the school are available to support the basic needs of students in need (sleep, food, clothing, school supplies)					
Learning environments support social and emotional health.					
Teachers and staff feel supported and trusted to take risks and innovate in their practice.					
Teachers are involved in learning communities (in-person and/or online) to access and extend continuous ongoing professional learning for self, to improve					

practice and to advance the learning of colleagues.					
Teachers design opportunities for parents to be involved in student learning.					
Teachers and leaders design opportunities for parents and community partners to be partners in education.					
First Nations, Métis and Inuit parents/ guardians, Elders/knowledge keepers, cultural advisors and local community members are invited and involved in the school and classrooms.					

Thank you for your participation your responses have been submitted.

Appendix E: 2019-2023 Rocky View Schools 4YP

NARRATIVE: INNOVATORS BY DESIGN

In Rocky View Schools, we believe...

Children are born innovators.

It's how they learn the tough stuff, like walking and talking, feeding themselves and tying shoes. They try a lot and fail a lot. Once they've learned to say the word why, they just won't stop – and at Rocky View Schools, we don't want them to.

Innovators ask a lot of questions and tackle problems that matter, to them, their families and their communities. They consult with expert sources and people, far beyond the classroom. They bounce possibilities off fellow students and teachers and spark ideas that just might work. They test their ideas in the real world. Trying, failing, asking more questions, redesigning, until they've earned success.

In the process, we work with families and communities to ensure students' basic needs are met and guide them to acquire and practice fundamental math, reading and science skills. They learn to value diversity, and build cultural understanding and the foundation for healthy relationships. They grow as critical thinkers, communicators and collaborators. And they develop self-reliance, empathy, resilience and perseverance.

In short, innovators accept the challenge of reaching their full potential. They are in demand in every

sector of society and most likely to succeed at any endeavour.

That's why at Rocky View Schools, the development of innovators happens by design.

- A design that engages students as co-designers of their learning, empowering them to follow their passions and challenging them to new heights.
- A design that moves beyond classroom walls to the natural world, building sites, farms, engineering firms, hospitals, zoos, museums and theatres.
- A design where students share what they learn, so when one learns, we all learn.
- A design that meets students where they are and supports them in the journey to where they need to and want to be.
- A design that supports and encourages teachers, administrators and support staff to be innovators themselves.

At Rocky View Schools, we know our students go on to change the world. As contributing adults, they'll bring their personal best to that important work.

GOALS- INNOVATORS CAN

In Rocky View Schools (RVS), we design learning so innovators...

Connect to passions, interests and people

RVS teachers understand students have an innate curiosity and eagerness to learn. By intentionally designing learning activities that connect students to what and who they care about, teachers expand learning beyond the classroom and support students in understanding why their learning matters and how it can make a difference. Along the way, students develop creative confidence, communication and social skills, and agency in their lives.

Achieve their potential

RVS teachers understand that not all students learn in the same way, at the same age, to the same performance level, in all areas of study. By designing classroom instruction to address students' personal learning styles and capabilities, students develop foundational skills and core competencies to acquire, create, connect, and communicate knowledge in a variety of contexts. In partnership with parents, teachers communicate high expectations, motivating students to expand their individual potential, pursue excellence and overcome challenges.

Navigate successfully as global citizens

RVS teachers understand students thrive in schools that care about the development of the whole child – physically, emotionally, socially and intellectually. Fostering learning environments that value student voice, opportunity, fairness, compassion, citizenship, choice and diversity, teachers instill a sense of belonging, building empathy, resilience and the desire in students to take an active role in their community, and work with others to make the planet more equal, fair, vibrant and sustainable.

DESIGN PRINCIPLES

As we approach our work, together, we will LEARN:

Leverage the capabilities of students and the community to make a
positive impact on the lives of students, staff, parents and the world.

Engage in purposeful work designed to build foundational skills and competencies through projects that foster deep understanding.

Appreciate and promote diversity in ideas, cultures and ways of knowing, being and learning.

Reflect on learning through meaningful assessments to inform and showcase growth.

Nurture positive relationships built on trust, support and care for one another.

STRATEGIES

To achieve our plan, we will focus on:

School Priority Areas

• Student Engagement – Enhance and measure student voice in the co-construction of their learning.

• Inclusion – Refine and implement an inclusive framework to ensure all students are equally valued, safe and have their diverse needs met.

• Instructional Practices – Align pedagogical approaches to ensure instruction is relevant and meaningful for all students.

• Make Learning Visible – Enhance the visibility of all students' learning journey and growth.

System Priority Area

• System Redesign – Redesign RVS' collaborative, organizational and planning structures to maximize resources, professional learning opportunities, teamwork, and innovation.