Highly Adaptive Learning Systems: Research in Seven Redesigned High Schools in Alberta
Final Report

Sharon Friesen
Michele Jacobsen
Barb Brown
Gabriela Alonso Yanez

WERKLUND SCHOOL OF EDUCATION

GALILEO EDUCATIONAL NETWORK

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Part I: Executive Summary

Overview

Moving Forward with High School Redesign in Alberta provides a strategic framework for a theory of action for change. This strategic framework focuses on school culture, school leadership, school pedagogy and school structures. The foundational principles guiding this theory of action for change are: mastery learning, rigorous and relevant curriculum, personalization, flexible learning environments, educator roles and professional development, meaningful relationships, home and community involvement, assessment, and welcoming, caring, respectful and safe (Alberta Education, Redesigning High School).

In 2008 - 2009, Alberta Education initiated the *High School Flexibility Enhancement Pilot Project.* In 2013, this pilot wrapped up and *Moving Forward with High School Redesign* was initiated. Many high schools across Alberta are now involved in Moving Forward with High School Redesign. While research was an essential component of the initial *High School Flexibility Enhancement Pilot Project* and many key features of the initiative were highlighted, it remained unclear what features might be transferrable to other high schools across the province. As such, the present study was initiated. Using a mixed methods convergent parallel design, we (research team) examined what conditions existed within seven high schools and across all schools (i.e., culture, leadership, pedagogy and structure), the ways in which principals supported teacher professional learning within each school and across schools, and the ways district leaders supported principals' learning across the schools in order to determine whether the initiatives undertaken built system adaptive capacity; that is, learning throughout the various layers within the system.

Research Approach

Drawing upon Creswell's (2014) approach for a convergent parallel mixed methods design, we gathered quantitative and qualitative data through interviews, an online survey and documentation. The quantitative and qualitative data were collected using the same constructs. In other words, questions asked in the survey were parallel to the semi-structured interview questions and documentation collected from participants. We analyzed patterned interactions and collaborations through social network analysis. This mixed methods approach allowed the research team to achieve contextual richness and helped us to improve internal

validity and interpretation of findings through triangulation (Creswell, 2014). No single source of information had an advantage over others and both qualitative and quantitative data were gathered and analyzed concurrently.

The research team gathered data from various sources over a one-year period (2015). Data collection methods included: an online survey, on-site and online interviews and focus groups, and document analysis. Participants were surveyed, including teachers, vice principals and principals, in seven highly successful schools in Alberta that were involved in high school redesign. Participants responded to an online survey (developed with the host software Question Pro to protect the privacy and confidentiality of respondents). The survey comprised six sections: a) demographic information, b) teaching practices, c) student work and assessment, d) engagement, e) teacher collaboration and f) social networks. The overall design of the survey included a combination of select-response questions using a five-point rating scale and open-ended questions.

The research team analyzed the data separately and then compared and contrasted the quantitative and qualitative data sets. The different types of data collected converged to yield findings generalizable to the population along with in-depth perspectives.

Results

The intent of this report is to inform future High School Redesign initiatives and identify elements of leadership and professional learning that are required for high schools across the province to actualize the goals of the redesign process. Using a social network analysis (Borgatti, Everett & Johnson, 2013), results from this study provide a conceptualization of highly adaptive learning systems with permeable or blurry boundaries (Clarke, 2005) and varied levels of connection strength between school and system level influences. Conditions impacting change include a variety of high impact conditions and interconnections (school, district, system) bound by a culture of trust and a shared vision for high expectations for all learners working collectively in partnership (students, staff and parents). These conditions include: (a) removing the Carnegie unit (25 hour-per credit requirement); (b) developing a highly connected and trusting learning community; (c) engaging in collaborative Inquiry; (c) making teaching visible; (e) developing a comprehensive understanding of the curriculum [1]and assessment; and (f) seeking input from school and system level influences, including students.

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[1] Many models of curriculum design seem to produce knowledge and skills that are disconnected rather than organized into coherent wholes. An alternative to this conceptualization of curriculum is one of "learning the landscape". Traditional curricula often fail to help students 'learn their way around' a discipline. A comprehensive understanding of

Continuous professional learning for teachers and for principals was supported through external and internal supports in the learning system. Enacting collective leadership and collective responsibility in iteratively making data-informed, research-based changes using cycles of inquiry is found to support teacher-led and teacher-driven professional learning. Multiple indicators (qualitative and quantitative) of success enabled principals to lead a learning system to engage in a dynamic and iterative process of inquiry and professional learning for high school redesign. Overall, participants in this study described key redesigns in their schools associated with school culture, school leadership, school pedagogy and school structure, and the positive impacts of these changes in student experience, increase or maintenance of student achievement, student and teacher engagement, student and staff well-being, student attendance, student retention, and involvement and satisfaction of parents.

Findings and Recommendations

The findings from this study provide a deeper understanding of the conditions that impact iterative change and the leadership and pedagogy required to create adaptive learning systems in high schools. Moreover, the findings identify actions required to scale up and sustain the high impact aspects of high school reform. Recommendations for increasing adaptive learning capacity may interest practitioners and leaders in school jurisdictions, policy makers, and scholars in the field interested in high school redesign at the school and system level. Table 1 provides a summary of the findings and recommendations.

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the curriculum refers to expertise in knowing where one is in the larger learning landscape. "Traditional curricula often fail to help students 'learn their way around' a discipline. The curricula include the familiar scope and sequence charts that specify procedural objectives to be mastered by students at each grade: though an individual objective might be reasonable, it is not seen as part of a larger network. Yet it is the network, the connections among objectives, that is important. This is the kind of knowledge that characterizes expertise" (Bransford, Brown & Cocking, p. 138-139). When we use the term curriculum in this study, it is this definition to which we are referring.

Table 1

Research Findings and Recommendations

Research Questions	Findings	Recommendations
1. What conditions exist within the school that allow for the scalability of the high school success undertaken by the school?	1.1 Changing structures, such as removing a strict adherence to time required by the Carnegie Unit is a catalyst for creating flexible, learner-focused approaches that develop a trusting learning system that supports student learning, growth and student success.	1. Learning systems need to remove structures such as a 25-hour per credit requirement for all learners.
	1.2 A relentless focus, growth-orientation, risk-taking attitudes and actions, and value for trusting, cohesive and collaborative relations (i.e. student success grouping) built upon a theory of action for change fostered a highly connected and trusting learning community.	2. Learning systems need to embrace a theory of action for change in which the attitudes and actions that foster highly collaborative, connected and trusting learning communities are expected and supported.
	1.3 A collaborative inquiry approach focused on student learning (achievement, engagement and well-being) is required at all levels of the learning system to develop new conceptions of teaching, learning, assessment and leadership in high schools.	3. Learning systems need a collaborative inquiry approach to redesign.
	1.4 Visible teaching, that included peer mentoring, planning and teaching contributed to teachers' effectiveness and also allowed teachers to actively	4. Learning systems need visible teaching.

	seek and receive feedback from their peers in their own and other disciplines.	
	1.5 A comprehensive understanding among teachers of the curriculum across, within and between grade levels and subjects and employing formative assessment strategies are becoming a part of day-to-day practice; making learning criteria visible and explicit to students is an area for growth.	5. Learning systems require a comprehensive understanding of curriculum and assessment.
	1.6 Students provide input and and are regularly consulted in developing ideas for high school redesign.	6. Learning systems need to regularly seek input from students and other school and system level influences.
2. In what ways do principals support teachers' professional learning?	2.1 Continuous professional learning for teachers and for principals guided by a theory of action for change focused on improving, strengthening and deepening student learning (achievement, engagement and well-being) was supported through external and internal supports in the learning system.	7. Ongoing, continuous professional learning focused on student learning is required throughout the learning system for leaders and teachers; learning systems need to have high expectations for all learners.
	2.2 Principals enacted a conception of collective leadership and collective responsibility in iteratively making data-informed, research-based changes through teacher-led, teacher-driven professional learning using cycles of inquiry.	8. Learning systems require a collective, design-based orientation to leadership guided by a theory of action for change.

	2.3 Multiple indicators of success (qualitative and quantitative) based on a theory of action for change enabled principals to lead a learning system to engage in a dynamic and iterative process of inquiry and professional learning for high school redesign.	9. School leaders need to continually use data-informed, research-based, multiple indicators of success as evidence to inform iterative changes during cycles of inquiry.
3. In what ways do district leaders support the principals' professional learning?	3.1 Results from this study provide a conceptualization of highly adaptive learning systems with permeable or blurry boundaries and different levels of connection strength between school and system level influences. 3.2 Levels of connection and supports for principals' learning provided by district level leaders varied.	10. All levels within learning systems need highly adaptive networks of school and system level influences guided by a theory of action for change.

Participants

In 2008, a group of 16 pilot schools in the province explored how removing the Carnegie Unit (i.e. 25 hours of face-to-face instruction for every high school credit earned) requirement could increase flexibility at the high school level. This pilot project grew to include 27 pilots school by 2012. Each had the initial condition of removing the Carnegie Unit and employing a flexible timetable. With the implementation of *Moving Forward with High School Redesign* in 2013 all high schools in the province are presently invited to submit a plan to the ministry to signal their readiness to begin the redesign process (Alberta Education, 2015). At the time of our study there were 209 schools in 51 school authorities in Alberta involved in *Moving Forward with High School Redesign* and rethinking how to create student-centered learning environments (Alberta Education, 2014).

Schools were purposefully selected for this study based on previous participation in high school redesign initiatives. Participants from eight of these Alberta high schools were invited to participate in this study. One high school declined to participate. Three of the sites that met the criteria for inclusion in the study were part of the initial pilot group of 16 schools involved in the high school flexibility enhancement project and have been working on redesigning high school for the past seven to eight years. The seven sites involved in the study included two urban schools and five rural schools with a focus on high school redesign. Student populations in the schools ranged from 250-1200 students.

The sites and participants at the site (teachers and school based administrators) were selected to inform high school redesign and identify essential elements of leadership and teacher professional development. The teachers and school administrators at each site were asked to individually and voluntarily complete an online survey. Furthermore, teachers and school leaders were asked to provide consent to be audio recorded during a semi-structured interview individually or in a focus group at the school site or using an electronic format.

Data Collections and Analysis

Data collection methods included: (i) interviews/focus groups, (ii) online survey and (iii) qualitative and quantitative documentation. Data were collected over a one-year period (2015) and involved 43 participants in seven high schools in Alberta. Table 2 summarizes the number of participants involved in the study from each of the seven sites and the data collected.

Table 2
Data Collection

Data Collection Method	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Total
Interviews/Focus Groups (No. of participants)	3	4	10	5	5	7	9	43
Online survey	3	4	9	4	1	6	6	33
Qualitative and Quantitative Documents *	2	1	1	3	0	1	2	10

Overall Total	86

*Documents included printed copies and pdf, ppt, jpeg, doc digital formats.

Organization of the Report

The report informs future High School Redesign initiatives and identifies elements of leadership and professional learning that are required for high schools across the province to actualize the goals of the redesign process. The findings are discussed based on an integrated analysis of the various data sources used in studying seven highly adaptive high schools in Alberta and organized according to the following three research questions:

1. What conditions exist within the school that allow for the scalability of the high school success undertaken by the school?
2. In what ways do principals support teachers' professional learning?
3. In what ways do district leaders support principals' professional learning?

Details about the project background, rationale, theoretical framework, research methods, data collection, analysis, findings, overall impact and recommendations for sustainability and scalability are included in the second part of this report.

Part II: Research Report

Project Background

In 2008, a group of 16 high schools in Alberta were involved in an initial pilot phase exploring how removing the Carnegie Unit (established in 1906), that is removing the requirement for 25 hours of face-to-face instruction per credit, could increase flexibility at the high school level. In other words, a five-credit course using the Carnegie Unit requires 125 hours of instruction. The High School Flexibility Enhancement Pilot Project continued for a five-year period and, by its end, included twenty-seven schools; each had the initial condition of removing the Carnegie Unit and employing a flexible timetable.

The pilot project was followed by Moving Forward with High School Redesign. Schools involved in high school redesign use key strategies such as flexible blocks of time for learning, credit recovery options, teacher advisory groupings and interdisciplinary and project-based coursework. This work resulted in redesigns of parent conferences, assessment practices, teaching approaches and student advisory. Currently, all high schools in the province are invited to submit a plan to the ministry to signal their readiness to begin the redesign process. As of 2015-16 there were 209 schools in 51 school authorities in Alberta Moving Forward with High School Redesign and rethinking how to create student-centered learning environments.

In collaboration with Alberta Education, seven high school sites in urban and rural locations were identified as places where informed transformations were underway; these high schools were selected for inclusion in this focused research study. These informed transformations or disciplined innovation requires drawing on "what is known to develop something new that is consistent with sound theory and evidence" (Timperley & Earl, 2012, p. 31). Through the processes of development, these sites have become coherent, adaptive learning systems (Timperley, 2011) that are in alignment with the vision of Inspiring Education (Alberta Education, 2010) and that look beyond 'what is' to 'what could be.' The conditions supporting the innovations across seven high schools in Alberta were examined through this research study. The purpose of this research was twofold: (1) to inform future High School redesign in Alberta, and (2) to identify the essential elements of leadership and teacher professional learning that might allow for scalability. A number of elements were identified from a number of the key leadership initiatives currently underway in Alberta, particularly those that are

proving to be successful in bringing high schools in alignment with the Ministerial Order on Student Learning (Alberta Education, 2013a).

Rationale

Many high schools across Alberta have been involved in various High School Success initiatives sponsored by Alberta Education. Research is an essential component of many of these initiatives; however, it remained unclear, in the sites that have undergone significant innovation, growth and change, what features might be transferrable to other sites across the province to assist school leaders and teachers in creating coherent and adaptive learning systems. Building on the work of Robinson (2011) and Timperley (2011), the present research was initiated to sharply focus on identifying and studying adaptive capacity in seven high schools. For example, Timperley (2011) notes, "in schools with high adaptive capacity attention is given to how the school becomes a coherent learning system" (p. 182). As such, we (research team) sought to determine whether the initiatives undertaken were building adaptive capacity across the system.

Theoretical Framework

As we were interested in determining both adaptive capacity at the school level and at the system level, complex adaptive systems formed the conceptual framework for this research. Complex Adaptive Systems are knowledge-oriented learning systems bound together in dynamic interaction through the processes of knowledge building (Davis, Sumara, & D'Amour, 2012; Newell, 2008). A complex adaptive systems-thinking lens was used to describe the seven high schools according to three parts: elements, interconnections, and purposes of the system (Meadows, 2008). Interconnections were further analyzed using a social world arenas framework (Clarke, 2005) and social network analysis (Borgatti et al., 2013) to understand the dynamic flow between internal and external influences on teachers, principals and school district leaders. This fluid context of interconnection is considered an arena organized around the purpose of improving student learning through high school redesign. The school was the unit of analysis in this study. Guided by a complex adaptive systems-thinking lens, social world arenas framework, and social network analysis, this study examined the elements (school culture, school leadership, school pedagogy and school structures), interconnections and purposes of dynamic system levels with the aim of determining the conditions for adaptive capacity at the school level and at the system level.

Research Approach

A convergent parallel mixed methods design (Creswell, 2014) was used to study high school redesign initiatives undertaken by seven high schools in Alberta. A convergent parallel design was selected as it was necessary (i) to examine both quantitative and qualitative strands during the same phase of the research process, (ii) to prioritize the methods equally, (iii) to keep the strands independent during analysis, and then (iv) to mix the results in the overall interpretation to discern scalable key elements across high schools (Creswell, 2014; Creswell & Plano Clark, 2011). In this way, we were able to obtain different but complementary data on the same topic to best and more deeply understand the topic.

Drawing on the strategic framework for a theory of action for change, the researchers examined conditions and learning environments that existed within each school, the ways in which principals supported teacher professional learning, and the ways district leaders supported principals' learning. According to Alberta Education, redesigning high school requires changes to:

- School culture (made up of the values, beliefs and shared meaning of all stakeholders);
- School leadership (has a key role in improving classroom practice, informing school policies and making connections beyond the walls of the school building);
- School pedagogy (the art and science of teaching); and
- School structure (include organizational structures that allow learning to occur under a variety of circumstances and conditions).

The following research questions guided this study:

1. What conditions exist within the school that allow for the scalability of the high school success undertaken by the school?
2. In what ways do principals support teachers' professional learning?
3. In what ways do district leaders support principals' professional learning?

Data Collection and Analysis

Three data collection methods were used in this study: (i) interviews/focus groups, (ii) online survey and (iii) qualitative and quantitative documentation. Data were collected over a one-year period (2015) and involved 43 participants in seven high schools in Alberta.

(i) Interviews/Focus Groups
Researchers used an interview protocol with semi-structured questions for the individual interviews and for the focus groups. Principals were interviewed individually and teachers participated in focus groups. Seven principals were interviewed individually. All teacher focus

group interviews were conducted on-site and in-person. Overall, n=43 participants were involved in interviews and focus groups.

(ii) Online Survey

Principals and teachers participating in the study were invited to complete an online survey. The survey included six parts as shown in Table 3. The first part included five demographic questions. The second section used a five-point rating school with seven questions about what teaching practices are implemented in the school. The third section included six questions about learning designs. The fourth section comprised four questions about student learning. In the fifth section respondents completed two questions about teachers work with students and colleagues. In the sixth section, two open-ended questions were used to analyze social network connections. Participants were asked to identify three individuals who have been most influential in their learning and practice over the last three years. The response rate for the online survey was 77% (n=33).

Table 3
Survey Questions

Survey Section	Survey Questions (number of items in each section)	Response Options
Section I: Demographic Information	Q1-5 - School Jurisdiction, position, teaching assignment	open-text responses
Section II: Teaching Practices	Q6 - Q12 - Perceptions of teachers understanding of how students learn, core concepts, outcomes and design	Scale to rate % of teachers in department or school demonstrating criteria: five=75-100%; four=50-75%; three=less than 50%; two=none; one=not enough evidence to say.
Section III: Student Work & Assessment	Q13-Q18 - Perceptions of the work students undertake and assessment criteria	Scale to rate % of learning designs of the teachers in the school: five=75-100%; four=50-75%; three=less than 50%; two=none; one=not enough evidence to say.

Section IV: Engagement	Q19-22 - Perceptions of student engagement and collaboration	Scale to rate % students in the school: five=75-100%; four=50-75%; three=less than 50%; two=none; one=not enough evidence to say.
Section V: Teacher Collaboration	Q23-24 - Perceptions of teachers sharing thinking processes with students and collaborating with colleagues and mentors	Scale to rate % teachers in the school: five=75-100%; four=50-75%; three=less than 50%; two=none; one=not enough evidence to say.
Section VI: Social Network	Q25-26 – List three individuals who have been most influential in your learning and practice over the last three years and describe the influence.	Open text responses

(iii) Qualitative and Quantitative Documentation - Participants provided researchers with documentation related to the school initiatives and leadership practices. These included school plans, stakeholder presentations, brochures and links to school achievement data, accountability pillar reports and Tell Them From Me survey [2]reports.

Both quantitative and qualitative data were collected during the same phase of the research process, the methods were prioritized equally and the data sets were analyzed independently during the analysis phase. Survey responses (n=33) were analyzed using descriptive statistics and the interview and focus group data (n=43) were analyzed using a thorough open coding process and code aggregation matrices. The analysis frame embraces a number of distinct categories (teachers, school leaders, district leaders). The frame was organized by the categories into separate "strata." Each stratum was then analyzed as an independent sub-population. Dividing the population into distinct, independent strata enabled the researchers to draw inferences about specific subgroups that may be lost in a more generalized random approach to sampling.

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[2] Student web-based surveys providing information about student engagement and well being. Measures are provided for social-emotional outcomes, physical health outcomes, academic outcomes, drivers of student outcomes and demographic factors.
http://www.thelearningbar.com/solutions/school-improvement/survey-instruments/

Analysis also included interpreting qualitative and quantitative documents provided by participating schools, including school accountability reports, diploma exam results and Tell Them from Me Survey reports (Alberta Education, 2013b). The quantitative and qualitative results were then compared using a side-by-side comparison for a joint display of data. The merged data provided an overall interpretation to discern key elements, interconnections and purposes across seven highly adaptive high schools generalizable to the population along with in-depth perspectives.

Findings & Discussion

Research Question 1: What conditions exist within the school that allow for the scalability of the high school success undertaken by the school?

Findings suggest there are identifiable and similar conditions across schools that allowed for the sustainability and scalability of success initiatives undertaken by the seven high schools participating in the study. Conditions impacting change include a variety of high impact aspects and interconnections in the learning system bound by a culture of trust and a shared vision for high expectations for all learners working collectively in partnership (students, staff and parents). These conditions include: (a) removing the Carnegie unit (25 hour-per credit requirement) creating flexible, learner-focused approaches to timetabling and other uses of time; (b) developing a highly connected and trusting learning community (partnership among students, teachers and administrative staff); (c) engaging in collaborative inquiry (teachers with teachers, school leaders with teachers, and in some instances district leaders with school leaders); (c) making teaching visible; (e) developing a comprehensive understanding of the curriculum[3] and assessment (across and within subjects and grades); and (f) seeking input from school and system level influences, including students.

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[3] Many models of curriculum design seem to produce knowledge and skills that are disconnected rather than organized into coherent wholes. An alternative to this conceptualization of curriculum is one of "learning the landscape". Traditional curricula often fail to help students 'learn their way around' a discipline. A comprehensive understanding of the curriculum refers to expertise in knowing where one is in the larger learning landscape. "Traditional curricula often fail to help students 'learn their way around' a discipline. The curricula include the familiar scope and sequence charts that specify procedural objectives to be mastered by students at each grade: though an individual objective might be reasonable, it is not seen as part of a larger network. Yet it is the network, the connections among objectives, that is important. This is the kind of knowledge that characterizes expertise" (Bransford, Brown & Cocking, p. 138-139). When we use the term curriculum in this study, it is this definition to which we are referring.

In this section six findings are discussed. First, removing the Carnegie Unit is a catalyst for creating flexible, learner-focused approaches. Second, a relentless focus, growth-orientation, risk-taking attitude and value for trusting, cohesive and collaborative relations fostered a highly connected and trusting learning community. Third, a collaborative inquiry approach is required at all levels of the learning system to develop new conceptions of teaching, learning, assessment and leadership in high schools. Fourth, visible teaching contributed to teachers' effectiveness (Friesen, 2009) and also allowed teachers to actively seek feedback from their peers in other disciplines. Fifth, a comprehensive understanding of the curriculum and employing formative assessment strategies are becoming a part of day-to-day practice; making learning criteria visible and explicit to students is an area for growth. Sixth, students are valued as partners in learning and are regularly consulted in developing ideas for high school redesign.

A. Removing the Carnegie Unit

Finding 1.1. Changing structures, such as removing a strict adherence to time required by the Carnegie Unit is a catalyst for creating flexible, learner-focused approaches that develop a trusting learning system that supports student learning, growth and student success.

As participants discussed involvement in the high school success initiative, it was clear the removal of the Carnegie Unit (hours used to determine credits per course) was a catalyst for developing a trusting learning system that supports growth and student success. Participants noted that they were surprised and mostly unaware that so many programmatic structures, practices, and decisions and so many organizational structures, practices and decisions within a high school were connected to the Carnegie unit.

> "It's not just changing the Carnegie unit but, it changed everything."

Participants in this study found that unlocking one piece of the high school fabric started to unravel many other threads such as assessment, attendance and completion. Schwartz, Bransford and Sears (2005) discuss how a sense of disequilibrium is needed to prompt changes in a learning system. Removing the Carnegie unit provided the right amount of instability or disequilibrium needed for high schools to begin questioning taken-for-granted processes and structures and redesigning schools for the learners.

In assessing whether the changes being implemented were working, teachers and administrators focused their attention on the students in their respective schools and looked to each other and others in the high school redesign initiative for guidance. Administrators and

teachers in these seven schools looked to the students--what they were saying and data from outcomes-based formative assessments--to guide decision making and determine next steps. All decisions were guided by student learning instead of expected time in a classroom. As one principal noted, "the real energies have to be in the classroom personalizing and adapting for kids."

The first finding in this section suggests learning systems need to remove structures such as a 25-hour per credit requirement for all learners; however, the data in this study indicate the removal of a time structure, such as the Carnegie Unit is necessary, it is not sufficient. Schools within this study used the removal of the 25-hour per credit requirement as an opportunity to revisit and change everything: structures, pedagogies and relationships.

B. Developing a highly connected and trusting learning community

> Finding 1.2: A relentless focus, growth-orientation, risk-taking attitudes and actions, and value for trusting, cohesive and collaborative relations (i.e., student success grouping) built upon a theory of action for change fostered a highly connected and trusting learning community.

A condition that allows for sustainability and scalability of success initiatives in high schools is the community. When the community as a learning system is persistent in building a strength-based culture of growth with high expectations and with a sharp focus on emotional, social and academic growth for all students, all learners benefit. This collective disposition, or in complexity terms, ethos, was noted by principals and teachers in all seven high schools (D'Amour, Davis & Sumara, 2012). Participants shared examples of a relentless focus on student engagement, achievement, and well-being.   Students are viewed as fully capable learners who can achieve high standards and all changes are in support of student learning. For example, participants in our study described changes directed to building a positive, highly connected collaborative learning environment where student voice is present, changes to assessment strategies with a relentless focus on gathering evidence of student learning and an emphasis on building school communities in which students experience a strong sense of belonging. In this section, examples of these highly connected and trusting communities are described according to trusting relations, growth-oriented attitude and risk-taking. Three elements of highly connected and trusting communities are summarized in Table 4 and described in the sections that follow.

Table 4

Highly Connected and Trusting Communities

Trusting Relations	Teacher-student connections and relationships (student success groupings) throughout a student's high-school experience are critical.
Growth-oriented Attitude	The learning community is a place of growth and learning for everyone.
Risk-Taking	There is an openness and tolerance to taking risks.

Trusting Relations.

Participants emphasized the significance of having teacher-student connections and relationships throughout a student's high-school experience. These connections created a context for interactions with the learning community, parents and strong lasting relationships with students. Moreover, these bonds between teachers and students allowed the teachers to be alert to the emotional, social, intellectual and academic needs of each student as demonstrated by the following comments by teachers:

> "I try to make it personal in the sense that I make those personal connections with the students."

> "We identify things year-by-year or even semester-by-semester based on where the kids are struggling and we modify and change based on that. It's all about the relationships with the kids. If we don't have that, you can't understand their needs."

> "I think the biggest success for us is the relationships that we built so the kids feel safe, even the high risk kids."

> "We started by also asking our students in our school if they felt they had a significant relationship with at least one significant adult in our building. I cannot think of the numbers right now, but it was not good."

Likewise, researchers argue little change will occur in the absence of trust (Bryk & Schneider, 2003). Trust is associated with shared leadership (Seashore Louis, Leithwood, Wahlstrom &

Anderson, 2010). In a longitudinal study, Bryk and Schneider (2003) found that schools with low levels of trust have one-in-seven chances of academic improvement.

In our study, the schools placed an emphasis on creating trusting environments not only for teachers, but also for students as shown in this quote from the interview transcripts:

> "So some of that is the structure of having the learning communities, and a key part of that is the looping. If we can see students more than once, or we really try to do that. So working with student for more than one semester is so powerful for them. So I think that's really important. The other aspect is that we use the flexible time that we've built in with the whole redesign project. We've motivated our students to use that flex time for their own good. And that is the number one comment that I get from visitors to the school, is they can't believe how much the students embrace that."

One common strategy described by the schools was the configuration of smaller student success groupings to ensure no student would go unnoticed each day. The schools involved in the study provided a variety of names for smaller student groupings (Teacher Advisory, TA, AIM, communities, etc.); however, the intent in grouping students for building relationships was common across all the schools. As one participant noted, "before I think they [students] would remain unnoticed and in the background until a test comes around." This common observation in the schools prompted redesign around student groupings aimed to strengthen relationships. One school refers to the teacher advisory program as a fundamental pillar of change to work on personalization, relationships between staff and students and also build enhanced student supports. In this school, each student is placed in a teacher advisory class consisting of approximately 16-19 students from grades 9-12. This required all personnel in the school to take part in the smaller grouping, including administrators, librarians and school counselors. Students remain with their teacher advisor for their entire high school career. The teacher advisor serves as a mentor or facilitator to provide academic guidance, personal supports and to help meet the unique needs of every student for success. Similarly, the following narrative from one of the participants describes how a school arranged cross-graded student groupings:

> This year we started a new group program where we divided up the grades. We separated grades 9-12 between all the teachers into teams. The teachers focus on creating individual relationships with those students inside of the particular group. Those students are with that one teacher throughout their high school career. The teachers review and reflect upon their marks but they also do activities within the groups to help build team spirit. Not only has it contributed to building a group or team mentality, but it's also contributed to growing our high school.

Another school had a teacher advisory program prior to their involvement in high school redesign initiatives. In this school, the principal described the old teacher advisory program in the school and how a shift to a newly redesigned program focuses on strengthening relationships:

> Prior to getting involved in the high school flexibility program, we had a teacher advisory program. Our TA model did not include all the teachers on our staff at one time. We had it once per week and it was for 40 minutes. It was single graded and teachers stayed with the same kids by grade. So the kids cycled every year. The teachers had a new group of kids and the same grade every year…We wanted to redesign our teacher advisory program and we wanted to bring relationships into our teacher advisory program. So, that is where we started.

One of the common features among the schools when organizing student groupings was to build strong relationships with a significant adult checking in on students every single day. As one teacher noted, "It's very difficult for a student to fall in the cracks in the school because there is such a collaborative atmosphere and the TA teacher has knowledge of that student."

Another common feature is maintaining the same groupings for the duration of high school, also referred to as "looping" by some schools. Looping allows students to work with the same teacher for more than one year. One school principal contends that looping fosters better teacher-student relationships and has led to improved results. In one larger high school, students are organized into smaller communities of approximately 150 cross-graded students aligned with four core teachers along with other teachers from fine arts, athletics and CTS. This smaller community within a community provides students and teachers an opportunity to connect and build trusting relationships even within a larger population.

A smaller rural school configures students in small cross-grade grouping that meet with one teacher advisor for 20 minutes, two times per week. Another school organizes similar grouping and they meet for a brief period on a daily basis. Regardless of the amount of time or occurrences of these cross-graded groupings, the teachers expressed similar ideas about the value in having consistent groupings to build relationships with the students:

> "It's the strongest relationship you might have in this school even though you may never teach those students and you may only see them for 20 seconds every single day for 186 days."

> "Now they're a cohesive group and they don't mind working with the other grades."

> "I think certainly one of the biggest things that we have seen here at our school has been our Teacher Advisory Program.

> "It is mentoring. It is advocating. It is getting to know those kids."

The student success groupings have evolved from configurations and time periods of unplanned uncertainty to interactions that are student focused, student driven and built around student needs and learning. Developing these tight trust groups ensures no student goes unnoticed and at least one adult knows each student well and helps guide their learning. This was a common feature among all the schools.

Growth-oriented attitude.

Principals and teachers discussed how the learning community is a place of growth and learning for everyone:

> "We're open to change all the time…. We are on that ever searching quest of how can we make it better…we want to be able to reflective and then reactive enough to make it better."

> "I'm certainly growing as a leader."

> "I don't think we are ever going to get there. We are always going to be on the journey and I don't think that is a bad thing because that was the problem in the past. We got stuck in a system implementation of learning that didn't change."

> "We use the word "iteration" in this school a lot...there are very few things in here that are finished documents. Some are a little bit further along than others, but for the most part everything we are willing to look at again."

> "Everything in the world is evolving around us, we need to do the same. Sometimes you get it right. Something that you try works and you tweak it and other times it doesn't."

> "It's giving me freedom to do things and experiment and be wrong and try things. That's what I really enjoy about uncertainty and not knowing."

> "We learn to be open-minded about everything we can do."

> "It's about understanding the bigger picture of what it means to be a lifelong learner

and engaging in context."

In the following narrative, a math teacher describes how student's fear of failure can limit growth, and the importance in fostering a learning-oriented attitude in the classroom:

"In Math, anyway they are terrified of being wrong. They think that every time they share, they have to be right all the time. And so one of the biggest obstacles that I've had to encourage the kids to overcome is that it's okay to be wrong, because when we fix mistakes, that's actually when we learn. If we did everything perfect the first time, we wouldn't learn anything. And so if I can get that kind of professional learning community built in my classroom over the first few weeks and the kids get comfortable enough to share even if they are wrong. We can laugh at our mistakes and we can be a big think tank together. That's when I really start learning from them, because I learn how they think. If they can show me something on the board, I'll go, I never thought of it that way and I get insight into where they are coming from."

Researchers noted a growth-oriented attitude was consistent in discussions about adult and student learning. Adult learners embrace learning as an ongoing and iterative change process. Likewise, teachers aim to foster a culture of growth and learning within the classroom context.

Risk-taking.

One element of a highly connected and trusting community is risk taking. Teachers discussed an openness and tolerance to taking risks:

"They have encouraged me to step outside my comfort zone and try things that may be risky in the classroom. They have been able to give me feedback on my ideas and provide me with opportunities to grow and change. [Principal] has encouraged me to think differently about the way I teach and why I teach that way."

Principals discussed how they support staff in safely being adventurous and taking risks.

"I think that's what appealed to the teachers too, learning with us. They are bringing their experience and expertise, but at the same time, they didn't have all the answers."

"The awareness as a leader as you grow as a leader that you're not always going to necessarily get it right every time and you're certainly not going to please everybody…there's going to be some bumps along the road and we're all okay with that. We're just going to take a deep breath and reflect and re-visit."

"We needed to go in there saying that this may not work and let's give it a try any way… think it is just fine tuning it all the time."

"I also like to invite them [teachers] to think outside the box. I do not like to harness my teachers at all so I give them that invitation all the time. I like them to be creative and I like them to be those kinds of thinkers so I let them come to me with the ideas. I like to think about how I am going to empower them to bring those ideas to fruition."

For example, one principal shared how discomfort and risk-taking can promote learning:

"I ask teachers and kids to take risks all the time…Last week I did a Ted Talk and that's not my comfort zone. I prefer not to and I like to have a podium. I like to be planned and not shoot from the hip. And so I try and put myself in those kinds of areas of discomfort too."

In another example, a principal described how a teacher was supported in bringing in dogs during testing periods:

"He brought in dogs during testing periods just for stress release. One of the things that he noticed was that the dogs would circulate. They [dogs] would go to students that were experiencing the greatest concerns at that time. They would stick their head near their hand or foot and then the students would reach down to pet them. We don't know the data or anything behind it but it was amazing that he was able to tie that together. He knows those students because they were his students for the whole year. He knew the students that were struggling and the dogs went that way."

This ongoing, relentless focus on students allowed principals, teachers and school communities to engage in extensive analysis of the supports today's students need for achievement, engagement and well-being. Moreover, participants described a genuine care and concern for the welfare of all members in the learning community. The finding in this section suggests learning systems need to embrace a theory of action for change in which the attitudes and actions that foster highly collaborative, connected and trusting learning communities are expected and supported.

C. Engaging in collaborative inquiry

Finding 1.3 A collaborative inquiry approach focused on student learning (achievement, engagement and well-being) is required at all levels of the learning system to develop new conceptions of teaching, learning, assessment and leadership in high schools.

An impetus for change, such as the removal of the Carnegie Unit, and changes in attitudes and mindsets, as discussed in the previous sections, is important for high school redesign. However, this work also requires collaboration and a team approach towards joint work. Collaborative inquiry requires the learning community to work as a team instead of working in isolation. It is evident that the seven schools we studied had found ways to work collaboratively within their sites and with other schools involved in high school redesign initiatives to improve learning. Together, teams questioned existing approaches, examined new conceptions of learning in high schools and provided mutual support. Changes required all members of the learning system to work together.

As shown in Figure 1, the majority of survey respondents (n=24, 80%) indicated that most teachers (75-100% of teachers) work in collaboration with others to design robust learning tasks and obtain feedback about instructional planning and day-to-day teaching from colleagues and mentors. Few respondents (n=6, 20%) indicated only less than 75% of the teachers in the school work in collaboration.
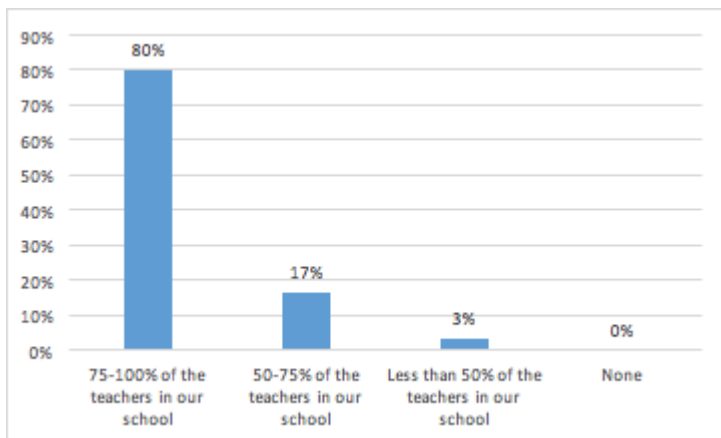

Figure 1. Perceptions of Teachers Designing in Collaboration

As discussed in the interviews, a focus on teacher collaboration allowed for flexible and innovative approaches to high school timetables, schedules and acquisition of resources. Lack of time is often cited as a barrier for change; in this study flexible use of time and collaboration was a stimulus for redesign and providing students with a range of learning options. Principals indicated that organizational structures, such as meeting times are driven by pedagogical changes and used for collaboration and connection among teaching colleagues within and across discipline areas. Timetables are designed in service of student learning instead of required hours/credits, bus schedules, or other factors not directly related to student success. Professional learning for teachers is ongoing, embedded in a collaborative environment of

learners and extending within the network of schools. Teachers noted that professional development and professional learning are part of the fabric of the way they do their daily work, rather than an event occurring at a specified time and date.

> "I'd say the professional development that we've had at this high school is unprecedented in terms of what opportunities other schools would have in terms of the last seven years I think that I I've been here anyways or eight years, like it's been phenomenal. I think that's been the core piece as to how changes have been initiated and implemented."

> "Because you hear it intentionally on so many levels, every need is the same message around using the TEF [Teaching Effectiveness Framework see Friesen, 2009]. It's around doing tasks designed together, it's around standard setting, it's around creating that common rubric around our assessments spectrum. And how it is that we are building exemplars, and I would say that we still got some gaps. But people know very clearly from me, that our work has to change. The planning a lot of the assessment we are doing together and differently, because the real energies have to be in the classroom personalizing and adapting for kids."

Data suggests there is a relentless focus on student learning in the seven high schools in Alberta who participated in the study. Interviews with principals and teachers suggested a strong focus on achievement, engagement and well-being using a collaborative inquiry approach. One participant stated:
> "I have the right mindset and beliefs that all students can learn. That it's better to do things by hands-on than multiple choice tasks and doing percentage marks and all those things are okay to kind of let go and put in the background and not covering every outcome of the program study."

Student collaboration is valued at the classroom level. Almost 75% (n=22) of respondents indicated most students (75-100% of students) have opportunities to collaborate with one another to build collective understanding of their work. However, fewer respondents (n=9, 30%) indicated the same numbers of students collaborate in an understanding that each member has a significant role in the knowledge advancement of the entire team. This finding suggests that learning designs provide students with opportunities to collaborate but an increased focus on understanding the connections of collaboration and learning needs to be enacted within pedagogy.

The findings in this section suggest that learning systems need a collaborative inquiry approach (developing ideas, questioning/negotiating, reflecting, decision-making) to redesign. As such, a

collaborative inquiry approach is required at all levels of the learning system to develop new conceptions of teaching, learning, assessment and leadership in high schools.

D. Making teaching visible

> Finding 1.4 Visible teaching, that included peer mentoring, planning and teaching contributed to teachers' effectiveness and also allowed teachers to actively seek and receive feedback from their peers in their own and other disciplines.

Participants reported ongoing interactions with colleagues and continuous network building across the school. One of the principles of teaching effectiveness (Friesen, 2009) is that teachers improve practice in the company of their peers. The continuous interaction contributed to teachers' effectiveness and also allowed teachers from different disciplines to actively seek feedback from their peers in other disciplines. Some teachers called these "fierce conversations" as they worked collectively to improve, strengthen and expand their teaching approaches and pedagogical strategies. Ongoing "fierce conversations" and collaborative teams improved interdisciplinary communication and helped build relational trust among teachers. The following quotes from interviews provide examples of how teaching can be made visible through interdisciplinary dialogue/debate, collaboration, sharing practice using online spaces and by team teaching:

Table 5
Making Teaching Visible

Interdisciplinary dialogue/debate	"Some critical work that we did was intense and intentional work with the team itself, relying on our [district] folks to do some work in fierce conversations." "Last year there were lots of heated outcomes-based assessment conversations between the math/science people and the humanities people. Well, we can't do that in English. Have you seen the number of outcomes we have? So then I was able to say, 'Well, I'm trying it in my English class.'"
Collaboration	"We are such a collaborative environment. The culture is

	collaborative. English teachers, we've been able to do a lot more standard setting and really looking at our own assessment a lot more than I have in the past. I think that's been beneficial for students because the other part of the culture that I've seen and I've always wanted to see in high school is not every teacher is within their own silo." "We listened and observed to what the other disciplines were doing, and we took and we adapted that to Math and tried some practices. So we actually learned from the other disciplines and then grew that way. We've worked as a group and we have a lot of collaborative opportunities to share. So that is very good. It's made us very strong. We have a chance to team teach and perfect our methodologies…Social Studies and English and Science, all three of them and option classes too. We just took notes down and we talked about what had worked for the other disciplines, and then we just decided how we could tweak it so that it could happen in the Math classroom as well."
Sharing practice in online spaces	"So when I was speaking to a new teacher at school this year, I asked him, what has helped you the most? …He said, if I couldn't see all your different lessons, your different assessments, your timelines, he said I don't know what I would have done. So that's been very useful for us. We all collaborate and we all put it out there. We just say, here is what I created, it may not be perfect, take it and use it as you want, change it whatever you need to do and then we put the revised stuff back in. So we have a whole ton of things we can pick from that kind of suits our own style, but it's collectively creative." "The major tasks are designed to be similar [across different sections of the same course] with lots of entry and exit points. The assessments, the resources…the more that we can plan jointly together, then the materials, the D2L shell is all there for resources, then you spend the time face to face with the kids adapting, and listening to what they say."
Team Teaching	"Having a chance to observe another professional at your side and what they are doing, it definitely will affect a teacher's behavior. And

	then thinking about what have I done, what can I do differently, could I be like the other person or is there anything else that we can contribute together to better this course or these classes. So in that way I think [co-teaching] is a great professional development and growth opportunity." "I have been team teaching with another teacher [Social and Physical Education]. I find even being in the classroom at the same time is great PD because we can learn from each other and talk about what we need to do or new ideas that we have come up with." "They're finally figuring out which teacher to go to that would be the best help for them." "Once we got into the flex project, one of the biggest impacts, especially early on was team teaching. It was a huge impact for a few reasons. We learnt how to work together, which for several different styles of teaching all come together to form one blended option. Took a lot of ups and downs, an incredible learning curve…[principal] was able to give us common planning time where we were asked to not just plan lessons together but plan units together, dissect curriculum together, plan projects together, so everything became a lesson in collaboration."

The finding in this section suggests learning systems need visible teaching. Data from this study show visible teaching contributed to teachers' effectiveness (Friesen, 2009) and also allowed teachers to actively seek feedback from their peers in other disciplines. In other words, teachers improved their practice in the company of their peers.

E. Developing comprehensive understanding of the curriculum and assessment

Finding 1.5 A comprehensive understanding among teachers of the curriculum across, within and between grade levels and subjects and employing formative assessment strategies are becoming a part of day-to-day practice; making learning criteria visible and explicit to students is an area for growth.

Teachers reported that collaborative planning and co-teaching resulted in a comprehensive understanding of the Programs of Study in all subject and disciplinary areas. Teachers'

comprehensive understanding, of not only the courses they were teaching, but also of the other courses and other grades, guided the selection of resources and creation of activities that teachers expected the students to master.

> "Another important piece to that, so it's connecting to the kids, but then also I think knowing the curriculum and knowing what you can focus on that will engage the kids in that, and what you can kind of skim over and glaze over. I definitely made more hands on projects and more activities and I create more discussion and I moved away from lecture-based because that's what the kids want and that's what they engage in."

> "One of the first things that came out is the curriculums are just too flipping big. We can't figure out how they could connect. So we really started the idea of prioritizing curriculum...what are your goals, why would you do this?"

Survey respondents were asked questions to determine the pervasiveness of design principles enacted across the school. There were six survey questions that attempted to surface the pervasiveness of design to inform the creation of learning environments (Bransford, Brown & Cocking, 2000; Friesen, 2009). Elements of a learning design include: i) understanding of how students learn, ii) the concepts in the disciplines they teach, iii) understanding the outcomes in the Programs of Study, iv) robust, authentic task design (Friesen, 2009; Herrington & Oliver, 2000; Newmann, et al., 2001), v) the extent to which the designs include tasks that are meaningful to the students (Friesen, 2009; Perkins, 2009, 2014), and vi) the extent to which the tasks that were designed connected students to the world outside of school (Friesen, 2009; Newmann, et al., 2001; Perkins, 2009, 2014). Most respondents (83%, n=25) perceived 75-100% teachers to have exceptional understanding of the core concepts within the disciplines they teach. Similarly, respondents (77%, n=23) perceived 75-100% teachers have an exceptional understanding of the outcomes as articulated within the Programs of Study. It is clearly evident that the teachers who participated in this study perceived that teaching colleagues in their respective schools had exceptional understanding of both core disciplinary concepts and the outcomes articulated in the Programs of Study. Participants (53%, n=16) perceived that 75-100% of the teachers within their school had an exceptional understanding of how students learn. In terms of task design participants (57%, n=17) perceived that 75-100% of the teachers: designed robust, authentic tasks; (60%, n=18) perceived that 75-100% of the teachers designed tasks that were meaningful to the students; and (43%, n=13) perceived that 75-100% of the teachers designed tasks that connected students to the world outside of the school. Figure 2 captures how the respondents described the pervasiveness of learning designs being utilized within the school.
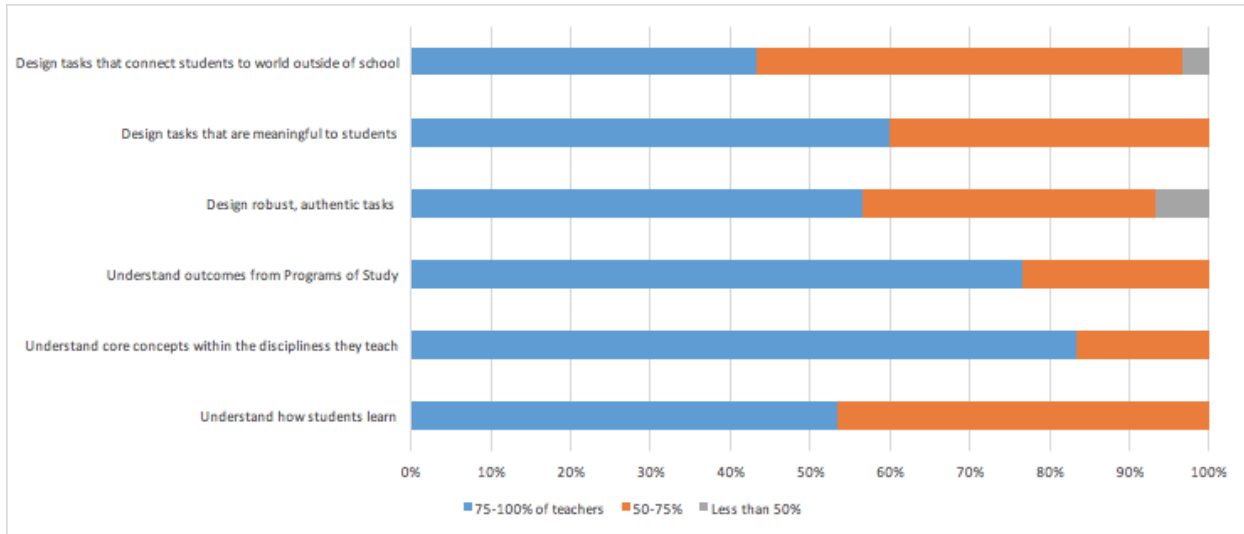
Figure 2. Perceptions of Teaching Practices in Redesigned High Schools

A common focus on assessment in all discipline areas served to develop a comprehensive understanding of the curriculum.

Table 6
Assessment Focus

1. Assessment Expectations	Providing evidence of learning and high standards is an expectation for all learners.
2. Assessment Criteria	Assessment criteria are made explicit to students prior to the work they undertake. (Survey Item 15) Assessment criteria reflect authentic real-world standards for high quality work. (Survey Item 16) Assessment criteria are collaboratively designed with students. (Survey Item 17)
3. Formative Feedback Loops	Students receive ongoing, specific feedback to enable them to increasingly monitor and direct their own learning. (Survey Item 18)

Assessment Expectations.

As discussed in an earlier section, students are viewed as fully capable learners who can achieve high standards. Teachers focus on mastery learning. All students are expected to exhibit mastery and provide evidence of high quality learning in high school. As a result, there is an irregularity in the amount of time individual students need to reach mastery and develop readiness for examinations. Students move through courses and write exams when they are ready.

In one high school in the study, students are all expected to develop student portfolios as an exit requirement. In this study, we noted schools are committed to providing high quality learning and assessment processes. Assessment expectations and process continue to change in these schools. Changes in assessment practice include: a separation of formative and summative assessment, making provisions for re-submitting assignments, separating grades from behaviours, competency or outcome based assessment, and multiple opportunities for learning and demonstrating learning. In the following narrative, a principal describes a strategy developed to help students recognize providing evidence of learning is an expectation for everyone (and by everyone) in the school community and doing the work is not optional:

> "We have a Zeros Are Not Permitted Policy. We run a Zap Room so that kids are not allowed to be given a zero by our teachers. We have a process where they have a form if they miss something. There is Zap for it and they have a couple of opportunities to hand it in. If they do not hand it in they are written up on the Zap Form and then it is brought to the office. Again it has evolved, administration runs the Zap Room. The kids are assigned to the Zap Room, administration tracks them down to get the assignment done and then it goes back to the teacher. There is a Zap folder in the office. Sometimes the administration by the end of the semester may be unsuccessful in getting the student to turn the assignment in. It is very rare but sometimes. In which case, at the end of the learning period they might be assigned a zero but that would be the only time.... We are not giving kids zeros just because they do not turn something in. We are working with them because we want evidence."

Teachers are working collaboratively to design assessment. In one school, the principal described a rotating department shutdown. In this case, each department would take a turn shutting down during the flexibility time to allow for extra collaborative time. In a different school, a teacher described the benefit in being paired with another teacher teaching the same subject for weekly non-instructional time. This weekly time, previously referred to as a "prep" or time for individual teachers to prepare for their classes is now set as collaborative time:

"we are getting together to look at what are good summative assessments to use. What would we consider so we have the same standard for excellence, proficiency and adequacy? That is something that we were working on this year."

In another school, teachers described developing a common grading spectrum and an interdisciplinary team approach to assessment:

In the grade ten communities the core courses [teachers] are able to work together and they do crosschecks. So last year when I was in the grade ten community I worked with social studies and we worked on a project together [English & Social Studies]. And that's when we spoke to the kids and said, "This competency can be seen in all these classes. Here is how we are showing you, you can do this." And they were assessed together. So we assessed them together. I know they've done it between math and science, math and social. So they have done all kinds of different combinations to show students how transferable these skills are."

"We look at the growth of the students on a holistic rubric out of five, allowing them to know that close to level five, the closer we get to our exemplary scale, along our spectrum we have in the school...we will place the students at specific times, so they kind of know where they are, within their writing, within their math. And that's a common language across the entire school. So we needed to learn how to use that with each of our grade groups and each of our disciplines."

Assessment Criteria.

Participants in the study recognize that assessment is an area for growth. Close to 70% (n=20) of respondents agree that most teachers (75-100%) make assessment criteria explicit to students prior to the work they undertake. However, only 37% (n=11) respondents indicated that most teachers' learning designs involve assessment criteria that reflect authentic real world standards for high quality work. And only 13% (n=4) of respondents indicated that most teachers' assessment criteria are collaboratively designed with students.
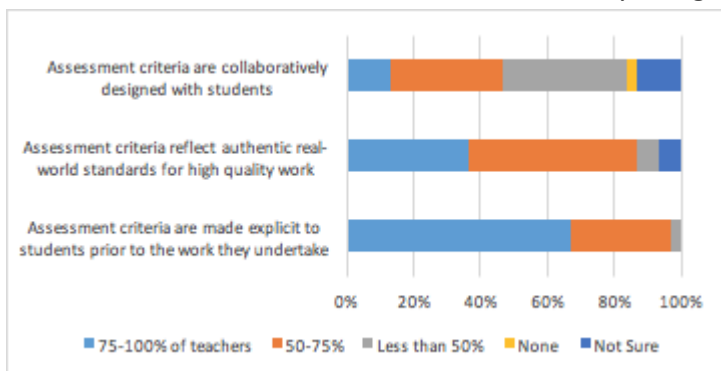

Figure 3. Perceptions of Assessment

In the following quote, a principal describes an ongoing focus and collaborative inquiry approach to improving assessment practices in the school:

> "From more of a global school perspective, I think one of the things that we've tried to do as a staff and this was back in year two of the High School Flex Project, we went to outcomes-based assessment. The motivation for that was to make sure that when we're teaching, the teacher really has a good very solid grasp on what they want the students to know and then have multiple ways to deliver it, but then also be really solid on how to assess that…. we've got to really make sure that our assessment matches what we want the kids to learn and know. And I think that as from a system or a school perspective that's been really critical."

Formative Feedback Loops.

Researchers noted that teachers discussed how they use formative feedback to continually inform teaching and design cycles.

> "We've got to really make sure that our assessment matches what we want the kids to learn and know. And I think that as from a system or a school perspective that's been really critical. And then that drives a lot of what's been happening in departments."

> "I don't just stand and sit on my desk and do something, I'm walking around…I'm right there going, so tell what you've got, let me see, immediate feedback as I walk around. And then they [students] all do it when you're doing that too…They work with each other as well."

> "There has been the iterations of assessment documentation…mostly wording but we also cleaned up the descriptors around the competencies. We started with stuff that continues to evolve. So none of the stuff that we've done has been static, it continues to change."

The finding in this section suggests learning systems require a comprehensive understanding of curriculum (expertise in knowing where one is in the larger learning landscape) and assessment. Participants discussed how redesigning assessment practices in high schools served to deepen their understanding of the challenging and engaging curricula. In these schools the overall expectations for student learning and demonstrating learning was set to high standards for all learners. Formative assessment strategies are growing in these schools and becoming a part of day-to-day practice. A formative assessment strategy identified as an area for growth is making learning criteria visible and explicit to students.

F. Seeking input from school and system level influences

Finding 1.6 Students provide input and and are regularly consulted in developing ideas for
high school redesign.

In all the schools, the participants noted the importance of continually seeking student input for
future adaptations. Participants discussed the value for student input in developing ideas for
high school redesign and designing for personalized learning.

> "We started by also asking our students in our school if they felt they had a significant
> relationship with at least one student in our building or one teacher in our building, one
> significant adult in our building."

> "I always give my students the opportunity to fill in a [Teacher's] report card... I'm
> always really impressed how brutally honest they are, and sometimes they'll tell me,
> don't ever teach that short story again, I slept through it, I didn't enjoy it, and they give
> me feedback. And I often say, what activities will stick with you beyond high school?
> What did we do this semester that you will remember? ...Those are the kinds of things
> as a teacher that you reflect on and think about how that has impacted your students
> and how that will impact more students. So I just find that student feedback is incredibly
> powerful."

> "By the end of the semester we have a conversation about what was good, what wasn't
> good, what would they wish I really didn't do again that kind of thing. If they had to take
> my course again, what would they like to see differently?"

> "What we are looking at doing now – and we've just started to do this, is to now invite
> students to run sessions as well. So student directed sessions...When we have been
> meeting with the students we have started to encourage them and say, "We would love
> for you guys to step up and run some of these sessions." I gave some examples like we
> have some students that are very involved in Prezi, they use Prezi all the time. So I said,
> "If someone wants to run a session on Prezi I know there a lot of other students, plus
> myself, who would want to sit down and learn how to do a Prezi presentation." So we
> want to get the wheels turning there. We are trying to encourage students to do more
> community service activities in our Focus Friday."

Teachers recognize that students may be reluctant to seek help or to share misunderstandings
during class time. In these high schools, a variety of options are provided to personalize

learning and provide opportunities for self-agency. One teacher describes the benefits of high school redesign and flexible options for seeing assistance:

> "When you go to your first class and you learn the concept but you don't want to draw attention that you're not the one getting it. So, when you have an opportunity later where you can sit down with a teacher and say, "I really did not understand this concept." And, the teacher says, "Oh, thanks for bringing it to my attention." While before, I think they would kind of slip, just remain unnoticed and in the background until a test comes around.

All the schools in the study reported using Tell Them From Me Survey data to gather input from students.

> "We had the Tell Them From Me surveys and that was probably the tool that gave us the most impact towards seeing that "this was a good thing" that we had going… We saw a 30% increase in student engagement; interested and motivated. This came from a Tell Them From Me survey results. Then truancy was the only one that dropped and great that it did because we wanted that one to drop. We saw a 14% increase in the number of students who reported positive sense of belonging."

> "We rely heavily on the 'Tell Them From Me', ... I think that's where the ideas for me came from, it's probably from the TTFM. Let's look at what boys are saying versus girls, let's look at what the junior high versus seniors, let's look at the kids that have been with us for one year two years versus those that have been with longer, because often that tells a slightly different [story]."

> "Asking them what's their feeling about different courses and different activities and then they will rate themselves as well."

> "We do the Tell Them From Me survey. We listen to the voice of the kids. We make adjustments...We do it twice a year. We are looking at the survey and we do a results release. We show the public what the kids are saying. That is important with us…. I always tell them if you want to get a true feeling for what is happening in your school, what people are thinking and what changes you are considering making or wanting to make, to ask your students first."

> "We also have a formal – it's the Tell Them From Me survey, where they have open-ended where kids can give comments and admin reads those comments, every single one of them. They give us a lot of information. Now we have to check it a little, just because it is anonymous. So sometimes when you're doing anonymous things, they will

skew it, but it gives us a lot of really interesting information about what our teachers are doing fantastic.... It's mostly on administration, when we receive that. I do write a report and send it out to the staff. And for the most part, I would say the majority of the comments and results from that are very, very positive from the student body. They are happy with what's happening."

"With the Tell Them From Me survey, we've actually made changes to our timetable based on student requests."

Clearly, student input and student data (e.g., Tell Them From Me surveys) are valued in these schools and continuously informs strategic planning and actions within the school. The final finding in this section suggests learning systems need to regularly seek and act-on input from students. In other words, students need to be partners in learning. The schools in this study reported their students regularly provide input and and are consulted in developing ideas for high school redesign. The next section provides an overview of findings and discussion related to the second research question.

Research Question 2: In what ways do principals support teachers' professional learning?

In this section, three findings are discussed about the ways principals support teacher professional learning. As discussed earlier, a culture of trust grounds the work in these high schools, including professional learning. First, professional learning is supported through external and internal supports in the learning system. Second, we found that enacting a shared conception of collective leadership and collective responsibility in iteratively making data-informed, research-based changes through cycles of inquiry supports teacher professional learning. Third, our findings suggest multiple indicators (qualitative and quantitative) of success based on a theory of action for change enable principals to lead learning systems and to engage in a dynamic and iterative process of inquiry and professional learning for high school redesign.

A. Professional Learning Supports

Finding 2.1 Continuous professional learning for teachers and for principals guided by a theory of action for change focused on improving, strengthening and deepening student learning (achievement, engagement and well-being) was supported through external and internal supports in the learning system.

Participants discussed a collective leadership and networked support structure as essential conditions for success. In complex adaptive systems it is assumed individuals influence one another and social dynamics can be used to study the types of interaction or influences among group members (Mische, 2011). Social Network Analysis (SNA) (Borgatti et al., 2013) can be used to provide network location metrics. In this research, SNA was used to identify the roles of particular actors (teachers, principals, district leaders) in the system. We specifically asked questions related to influence and types of interactions between actors in the school networks. The notion of influence helped us better understand how interactions occurred in these schools and the key role particular actors played in sustaining effective networks of support. In other words, SNA was used to explore the relationships that existed between members of different system levels (internal to the school, external to the school) involved in the initiative (Figure 4). It became evident the schools are organized using a collective leadership model and through an expanded network of support (Figure 4) external and internal to the school, colleagues offer encouragement, support and make provisions for a fail-safe environment promoting risk-taking.

SNA was useful in this study for exploring the extent of interactions that existed between members of different system levels (internal to the school, external to the school) involved in high school redesign. In this section, we discuss how research participants described the influences of internal and external supports. Internal influences refer to supports accessed within the school and school jurisdiction and external influences refer to supports accessed outside of the school and jurisdiction. We used a 'name generator' or 'recall' method for gathering data for the SNA. Using an open-ended question format in the survey, participants were asked to name three individuals who have been most influential in their learning and practice over the last three years. Participants provided names of individuals at the school level including other teachers or administrators in the school, district level leaders, teachers and principals in other redesigned high schools as well as influences from consultants outside of the district, such as personnel from the ministry, faculty from post-secondary institutions, published authors and other members of professional learning networks.

Figure 4 depicts a network of connections among individuals participating in our study. For purposes of this research, the SNA is useful as it allows us to visualize the differences among individuals in terms of how connected they are across system levels (district level and school level, classroom level). For instance, we can hypothesize that more connections often mean that individuals are exposed to more, and more diverse, information and receive more support to undertake initiatives within their schools and classroom. We recognize one of the limitations in our research design is that some individuals provided more than three names of individuals that have been most influential over the last three years. Despite this limitation, the SNA offers insights about the interactions among individuals participating in high school redesign. These

insights provide valuable ideas, precedents, and guidelines for sites where similar initiatives are anticipated or being established.
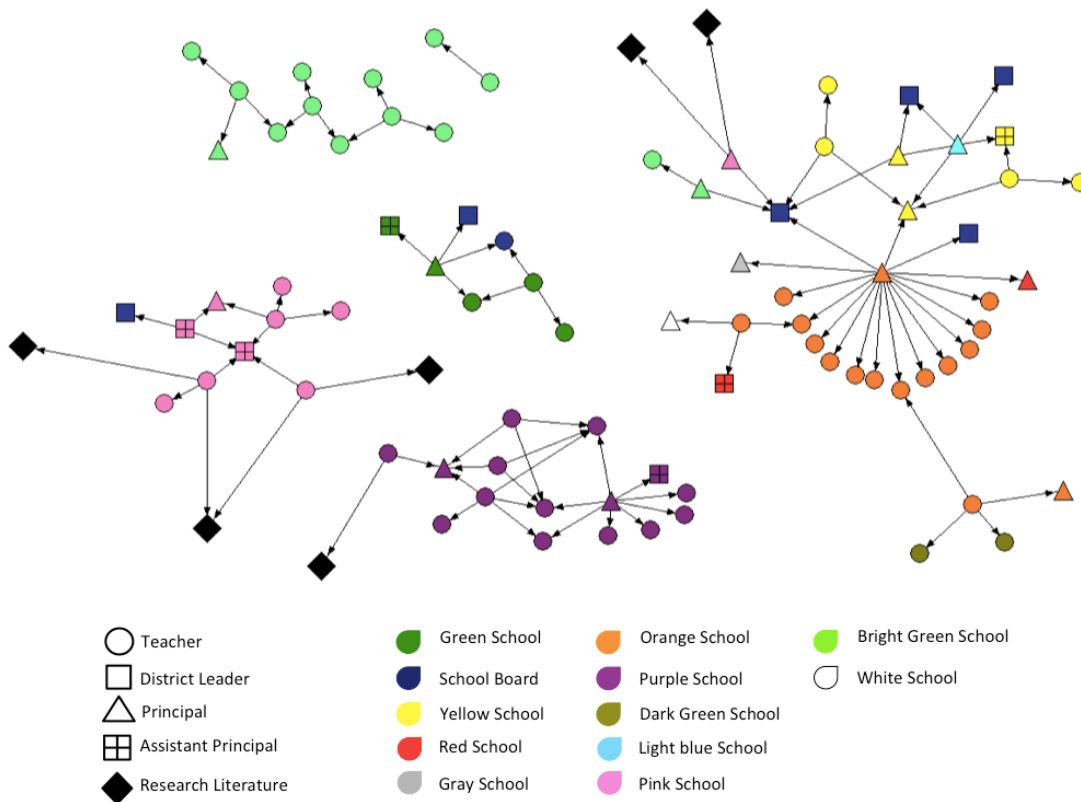

Figure 4. Social Network Analysis (Survey Responses)

During the interviews teachers mentioned working collaboratively with colleagues and the influences of this collaboration. When asked to mention names of specific individual influencing their work in the survey, teachers named other teachers in their buildings (22 mentions). When we reviewed the interview transcripts (Figure 5), we also noted teachers were influenced by other teachers involved in high school redesign outside of their school and district (3 mentions). In other words, three groups of teachers mentioned three different groups of influencing teachers from schools in other districts also involved in redesign initiatives. Teachers also named other administrators within the school (vice/assistant principals, former principals) and other administrators from other schools in the district as influences on their work. This demonstrates teachers are influenced by teachers and administrators from their own school, other administrators from their district, including district level leaders and external influences such as consultants.
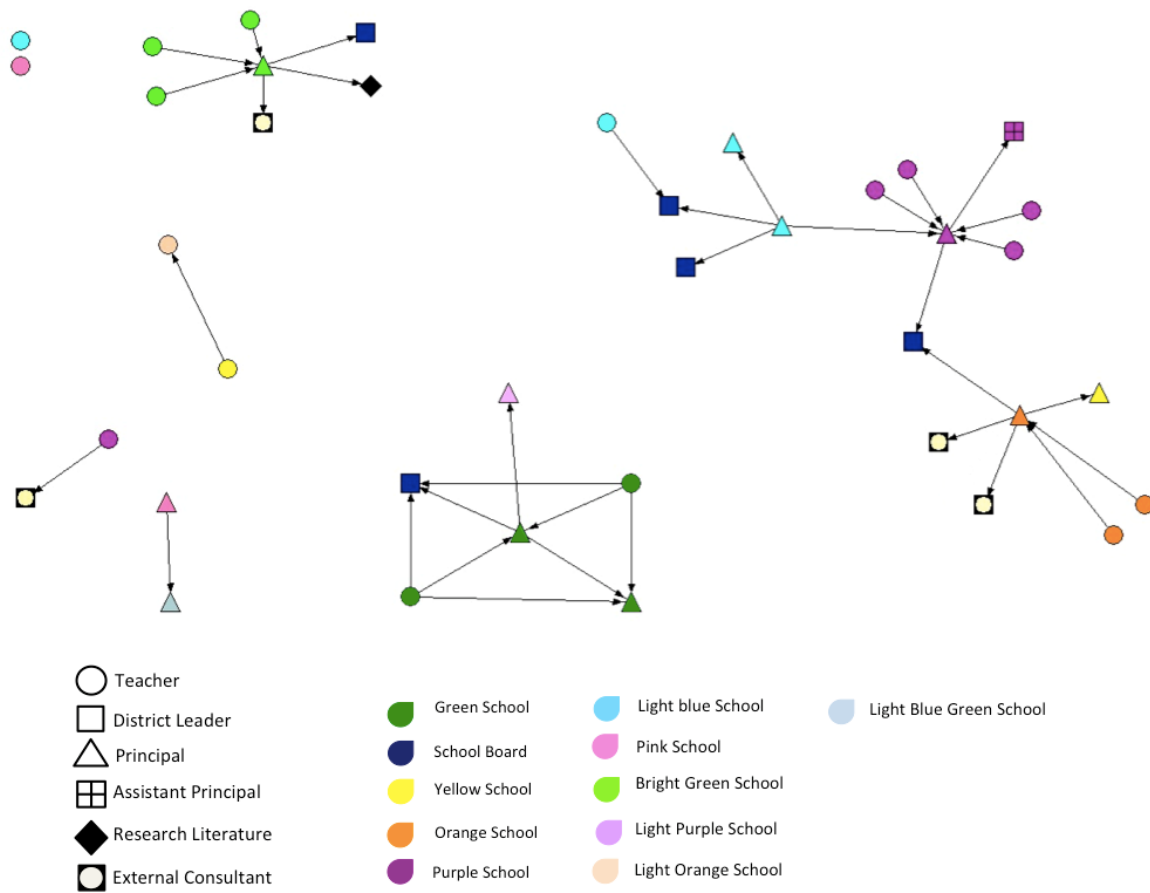
Legend:
- ○ Teacher
- □ District Leader
- △ Principal
- ⊞ Assistant Principal
- ◆ Research Literature
- ⬡ External Consultant

- Green School
- School Board
- Yellow School
- Orange School
- Purple School
- Light blue School
- Pink School
- Bright Green School
- Light Purple School
- Light Orange School
- Light Blue Green School

Figure 5. Social Network Analysis (Interview Responses)

Supports ranged from external supports (network of other schools in the high school success initiative, Ministry, graduate studies) to internal supports from the jurisdiction to within the school and to the classroom level. Networking as a result of the provincial high school success initiative was described as a key influence on the changes and improvements to learning practices occurring in each of the schools. School principals reported a high degree of connection with other school administrators in the province who were also engaging in school improvement with a focus on student achievement, engagement and wellbeing as part of the Moving Forward with High School Redesign. Similarly, individuals from the network of schools were also cited in the survey as influencers and supports for learning improvements. For example, principals from other schools in the network were cited as supports when deliberating changes and developing plans for the high school success initiative. It was clear, the principals are all highly connected with other school administrators in the province that are also engaging in school improvement with a focus on student achievement, engagement and well-being as part of the high school redesign initiatives. Accessing external and internal network supports are important parts of complex evolving systems (Antonacopoulou & Chiva, 2005).

Accessing Internal Supports in the Network.

Table 7
Internal Network Supports

	Sample Quotes
School: Principal - Teacher Connections	"[principal] provided me with an environment to challenge 20th century high school learning norms, the freedom to innovate, the opportunity to be a learning leaders, and an open forum to discuss and challenge the educational program we offer." "A lot of our conversation started around assessment, started around the competencies, because the ministerial order...So how do we assess and pay attention to, in every class in this building, not only outcomes but competencies. So we made a decision then to develop, for better or worse and it's going to evolve a common assessment spectrum that we were all going to use. Language that we were going to use in every subject area, and some really core beliefs, that we were going to hang our hat on." "PD shifted to a lot of work sessions. A combination kind of action research versus just plain old fashioned practice and work...now kind of researching and PDing around specific elements. One of them is really looking at the idea of how to infuse the seven habits in the Leader and Me philosophy within curriculum. One team is really looking at that and trying to make those connections even more. Another group is looking at how can we look at our opportunities for leadership and to bring them outside of the classrooms."
School: Teachers - Teacher Connections	"So, between team planning and team projects collaboration is something that we've not just done but modeled for the kids. And now that's within the flexible timetable, within the project weeks, within everything that we do. We model collaboration for the kids. We expect them to collaborate. Collaboration is just something that is a part of who we are now." "The ability to take risk and look at inter-department's collaboration

	is really important.”
District Connections	“Similar to the way that we shifted our staff meetings, our administrator meetings, and our monthly meetings are now professional learning. So the first two hours is always about instructional leadership. So there might be an article or some facilitated conversations that they put us through and they've started to just keep us in little K-12 cohorts and then you're speaking with principals and the like in similar situation even though I would be in high school re-design and they're not. But we're sharing similar struggles and similar questions and so those are supremely valuable...every time you come away, you come away with a question or a reflection or a learning and they've got processes in place to sort of force you to do that reflecting and do that learning. “

“There are lots of layers and opportunities to talk. We're brought together often around TEF [Teaching Effectiveness Framework], where we have to bring report card samples, or a task, or assessments to the table and there's structured conversation. And I learn a lot from them because I'll often take some of those skills or strategies and I'll use those with my staff as well or use them as the learning leaders to use them with their teams. ...often it's how you frame the question that gives a deeper response. And so our work is often framed around questions.” |

 As discussed earlier, 80% (n=24) of survey respondents indicated most teachers (75-100%) work in collaboration with others to design robust learning tasks and obtain feedback about instructional planning from colleagues and mentors. This suggests many teachers in these seven high schools are accessing colleagues including the school principals as internal supports. In the network of support, participants also cited internal supports from district level leaders in their own jurisdictions and other school based leaders within the jurisdiction. One respondent stated, “These people have influenced my work in terms of task design, assessment (including how to provide both formative and summative feedback) being flexible and allowing for increased personalization from my students.” Overall, in both the survey responses and interviews, respondents clearly emphasized the importance of internal supports for initiating ideas, supporting ideas to action and implementing or enacting changes for high school

redesign. In the next section, the discussion focuses on accessing external supports in the network.

Accessing External Supports in the Network.

Table 8
External Network Supports

	Sample Quotes
Site Visits	"We would take four to six staff members and we would go on a field trip...to see what was going on in the real environment as opposed to hearing about it or seeing it on a slide…. There is just so much but to me the most powerful stuff is when we had opportunities to get out and see what other schools were doing. Whether it was in the Moving Forward sessions, by just going out to the schools or having the schools come to us." "As we get out there and we start sharing with others, they start sharing with us as well, and I think that brings down some of the barriers."
Accessing Consultants, Published Authors/literature-base	"We worked with Galileo [galileo.org/] and I just thought that was amazing. We continue to learn from them." "I spent a couple of professional development days with [author] and after reading his book and being in conversation with him, I have worked at bringing in triangulated and authentic assessment into my classroom. His research and principles once again mirrored the journey I was on in assessment. I have valued having his book as a reference."

Site Visits.

In six of the schools in the study, the principals and teachers discussed the value of visiting and connecting with other high school redesign sites:

"So being part of that whole Flex Project, the initial Flex Project, and being connected with other teachers across the province is important."

"Connecting with other people who are doing this work I think like talking to people at networking meetings. You're always stealing ideas and borrowing things."

"We went on some tours...I remember them saying, "Did you notice how many hats? Did you notice the bra straps that you could see?" - those are our dress code issues here. And I said, "Imagine the bra straps and hats NOT impacting student achievement and student learning because [this school] has the best results in the division. And they went "You're right." So then we were able to talk about "What do we want to spend our time talking to kids about?" We could spend a lot of time taking hats away and measuring the width of the tank top straps."

"We went to two or three different schools throughout the Province to see what they were doing and then we sat down, and discussed all of the different models and said, okay what are the best parts that we can take to make it work in our situation?"

"It was not threatening to go and look at what other people were doing. You didn't feel threatened as an individual because you were learning about what other people were doing."

"...invited me to go along on a PD trip with her to High Tech High, where we were all inspired and brought back a lot of new and innovated ideas to our school and practice."

Accessing Consultants.

Principals and teachers also discussed the importance of external supports and opportunities to network and connect with consultants in the ministry and professional learning supports provided by external expertise accessed through graduate studies. In the following quote, a participant credits the mentorship and guidance provided by a ministry level educator involved in supporting the network of schools:

"[Ministry Educator] has been an inspiration in terms of high school redesign and the work that we are doing at … [Ministry Educator] has provided me with insight into why we must continue to redesign and has given credit to our work and ongoing initiatives to further improve. [Ministry Educator's] support has helped us to realize all the good work that we are doing but also to remind us that the work is not (maybe will never be) finished."

These connections often linked to connections participants formed with other leaders and teachers in the province and from the network of schools. Participants involved in graduate programs also discussed the value of connecting theory and practice:

"...and I have been working on our Masters together and we are constantly pushing and challenging each other to try different things in our classroom and put our studies into our professional practices."

In four of the schools, participants also demonstrated a willingness to actively seek out contemporary research and base decisions on literature-informed practice. For example, one respondent stated, "I had the opportunity to hear [published author] speak twice during the pilot phase of our project. I appreciated his encouragement and advice about educational reform and innovation." When asked to describe how these individuals influence their work, many respondents cited the literature written by or used by the consultants. Data shows participants are influenced by external supports in the network for ideas and inspiration when initiating high school redesigns and to extend learning networks beyond the school and district.

The first finding in this section suggests ongoing, continuous professional learning focused on student learning is required throughout the learning system for leaders and teachers; learning systems need to have high expectations for all learners.

B. Collective Leadership

Finding 2.2 Principals enacted a conception of collective leadership and collective responsibility in iteratively making data-informed, research-based changes through teacher-led, teacher-driven professional learning using cycles of inquiry.

It was evident school transformation was not the result of one heroic leader or a command-and-culture style of leadership. Similarly, the literature supports a collective leadership approach is stronger than an individual leadership approach for school improvement. For example, Seashore Louis and colleagues (2010) define collective leadership as "leadership-as-influence – and the property of the system rather than an individual" (p. 16). This shared conception of leadership was described by participants as a collaborative approach with all members taking collective responsibility in working towards adaptive outcomes. Participants recognized the strengths of colleagues and the importance of collective efforts. In a concerted effort, all members of the learning community including formal and informal leaders were involved in continually designing changes.

Teachers are influenced by the school principal, even in schools with larger student populations. In both the survey and during the interviews, teachers mentioned the type of influence provided by the principal. Likewise, the principal mentioned influence from the teachers in the survey. Even though principals did not mention specific names of teachers

during the interviews, principals did speak about the collective influence of teachers in their school.

> "When I took all of their ideas from all those conversations and put it into that initial project proposal and fed that document back up to them, they kind of went "Holy cow!" That was the start of that shift because they realized "All right, we're in this." Now, there it is in black and white. Now, we've got to do it."

> "It was pretty much universal in that desire to have extended PLC time. So we found that it was very important for us to redo our day a little bit so that we could provide the time for teacher to have extended PLCs."

> "Then we always have talk time and it's usually about either bringing tasks to the table or building case studies and scenarios for discussion…. You need to listen to the anxieties and the unknowns around that because people do this work with their hearts as well as their heads because they want to do it well and because they are feeling some discomfort with that unknown. We need to listen to that, that's the human experience."

> "Just sharing, sometimes talking about the fabulous things that are -- people are trying and doing. And so we've tried to create parts of our staff meeting in our PD, where we are showcasing the things that people are doing in their classrooms, and asking them to share the things that are going on."

Principals employed leadership approaches built on design principles to share responsibility for professional learning and to iteratively make changes in the learning system. This process of inquiry for high school redesign and continual movement through iterative and cyclical stages of reconnaissance, intervention, evaluation, research, and action can be described as a developmental form of action research (Cardno, 2003):

> Action research that is carried out by or for educational practitioners within their own organization in response to some aspect of professional work that needs to be developed, either within the classroom, across the school, or in the management of the organisation. (p.1)

There was a collective strength in these schools as a learning system that exceeded the capacity or strength of the individuals in the school (Davis & Sumara, 2005). Complexity theory focuses on understanding interactions. In other words, an understanding of the whole is developed by understanding the interaction of the parts. Researchers argue there are connections between action research and complexity theory (Davis & Sumara, 2005; Phelps & Hase, 2002). Drawing

on the work of complexity scholars and the study of learning systems, it was also noted in this study that high schools involved in redesign initiatives have key attributes of complex adaptive systems undertaking action research, that is:

- unpredictable, open, nonlinear systems (system greater than sum of its parts)
- emergence or self-organization (change as a self-organized adaptation), adaptability
- ability to co-evolve
- role of agent interaction
- change is adaptive, feedforward and feedback
- reflexivity

Learning systems, where learning is a process, have the ability to adapt to changing environments and demonstrate capabilities for self-organization and self-maintenance (Newell, 2008). Key attributes of complex and adaptive systems can serve to provide a profile for principals and teachers involved in successful high school redesign (Table 9) (Antonacopoulou & Chiva, 2005; Davis & Sumara, 2005; Wang, Han, & Yang, 2015).

Table 9

Profile for Principals and Teachers in Complex Adaptive Learning Systems

Profile for Principals and Teachers	Connection to Key Attributes of Complex Adaptive Systems	Sample Quote
Collaborator	• **Unpredictable, open, nonlinear systems (system greater than sum of its parts)**	"When we go and present to other schools. 90% of the stuff we're doing here has nothing to do with the flexibility project. It has nothing to do with the Carnegie unit, but we've made these changes because we started thinking about changes. And I think that was the key is that we had the freedom to look at best practice, we had the freedom to try things in our classrooms to collaborate."
Leader using design principles	• **Emergence or self-organization (change as a**	"So those people stepped up to the plate. Those people

	self-organized adaptation), adaptability	were the ones' who started saying, "okay, we are going to help you guys, were going to develop things and you guys can come with us." "Our existing staff and our new staff said that this is the most collaborative building they've ever worked in. And that they can't run from it. You can't run and hide from what it is, the work that we are doing."
Growth-oriented and entrepreneurial spirit	• **Ability to co-evolve**	"A couple of years ago we sort of bounced around the idea and then last year we pitched it and this year we got to deliver it. We put together a combined English drama course, English-10 Drama-10, or English-20 Drama-20 all of them in there and it's just such a beautiful fit and it's so much fun to get to deliver a course with a colleague."
Dialectical (discussion of ideas and opinions)	• **Role of agent interaction**	"It was pretty frustrating this year...We had discussions. I think to a point where we had too many discussions. What I had to learn to think was, we need to collaborate on this but when have we over collaborated or when is it too much. When do we have to say, "Okay, let's try this" instead of just keep talking

		about it."
Collaborative Inquirer	• **Change is adaptive, feedforward and feedback** • **Reflexivity**	"People walk through the school and say, it feels different and that's what it is. It's not the walls." "So in the journey, we got to visit the schools and we all got together as the 16 schools, the feedback and hear things and try things…. What they were trying, what we brought back, we could try, that type of thing. So we got an opportunity."

Principals described taking an active role in teacher professional learning by providing supports and resources as well as engaging in field study. Our findings show that highly adaptive high schools use a leadership approach based on design principles for professional learning. As a whole, learning systems require a collective, design-based orientation to leadership guided by a theory of action for change. Key attributes for principals and teachers involved in successful high school redesign include: collaborator, leader using design principles, growth-oriented and entrepreneurial spirit, dialectical and collaborative inquirer.

C. Indicators of Success

Finding 2.3 Multiple indicators of success (qualitative and quantitative) based on a theory of action for change enabled principals to lead a learning system to engage in a dynamic and iterative process of inquiry and professional learning for high school redesign.

In our study, we noted learning and building adaptive capacity required a dedicated focus on learning through iterative cycles of inquiry. Participants described multiple indicators (qualitative and quantitative) of success and used these data to inform the ongoing cycles of inquiry. The schools did not wait until a new semester or new school year to implement changes. It became common practice to design-implement-assess-redesign throughout the school year. Assessing changes on ongoing basis throughout the school year requires an

examination of multiple indicators of success including quantitative and qualitative indicators. The quantitative indicators described by participants included student responses to the Tell Them From Me surveys, achievement data, attendance records and completion rates. The qualitative indicators included observations and opportunities to share success broadly with others beyond the school. Similarly, Seashore Louis et al. (2010) observed:

> Leaders in high data-use schools have clear purposes for analyzing data. They engage their staff collectively in data analysis, build internal capacity for this work, and use data to solve problems, not simply identify them. (p. 179)

The following quotes sampled from participants demonstrate how these success indicators informed professional learning and growth (Table 10 and Table 11).

Table 10

Quantitative Success Indicators Inform Professional Learning

Student Survey (TTFM)	"we rely heavily on the 'Tell Them From Me', I think that's where the ideas for me came from." "[Having a strong relationship with one adult in the building] was at about 40% and then now it's 90-something percent. They have connections with at least one adult at school. Pretty hard not to with the structures that we have with our student learning conferences, where the TA teachers meet with the parent and the student every year."
Achievement Data	"I've kept track of my Math 10 test scores and the scores have increased dramatically. It's just amazing just because they have time to finish and do the work. Kids that usually hate math and had 60's have got them an 85." "I think now we are beginning to see some of the benefits at the diploma level. We had students write Math 30-1, Math 30-2 and Social 30 in the first semester and every single one of our students passed."
Attendance Records	"When kids have that opportunity to direct their own learning and to engage in things that are meaningful and relevant to them then they want to be in school." "I think we have higher attendance rates because the kids really

	buy in. They like to come to school, and I don't think they'd like to miss any day of the school."
Completion Rates	"We have more students who are completing in the first semester of grade 12." "We were supporting those students and our completion rates, just work assignment completion rates, skyrocketed."

Table 11

Qualitative Success Indicators Inform Professional Learning

Observations	"I do see less anxiety when kids miss school...especially for FNMI students the stress level, in the ability to kind of start where you are and continue or to extend a course, to recover a course into the next semester, to kind of work around those times in their lives when things might get a little bit chaotic, and to be just welcomed back when they come back instead of like being where were you? I think that that's made a big difference for them." "I have a student who has a 30% in my class right now. She has 40 absences in the course of the year… last night she handed in a bunch of stuff on Google Docs. She is a marginalized at-risk kid who at the end of the day realizes there's hope for her as opposed to being no hope at all." "I had a grade 12 kid who got accepted to university. He's going into engineering and he said to me the other day, 'I was actually thinking about failing so I can come back and do this class again.' So when you look at student engagement and you look at kids who say, 'I don't actually need a single credit. I have 120 credits. I just want to be here.'"
Sharing Success Broadly	"We had some superintendents from [another province] last week and we were walking around the building and they said

	to me, 'Who's supervising these students?' I looked around and there wasn't an adult right there. Some were on spares; some had flowed out of the math room… [The visitor observed] 'What I feel is an incredible sense of trust here.' There's trust between the students and the teachers, so you might not like everything that's happening, but you are trusting that it is for the right reason."

The third finding in this section suggests school leaders need to continually use data-informed, research-based, multiple indicators (qualitative and quantitative) of success as evidence to inform iterative changes during cycles of inquiry. In these highly adaptive high schools, principals and teachers reported using both qualitative (i.e. achievement results, completion rates) and quantitative indicators of success (observations, sharing success broadly) to continually inform professional learning and high school redesign.

Research Question 3: In what ways do district leaders support the principals' professional learning?

A. Highly Adaptive Learning Systems

Finding 3.1 Results from this study provide a conceptualization of highly adaptive learning systems with permeable or blurry boundaries and different levels of connection strength between school and system level influences.
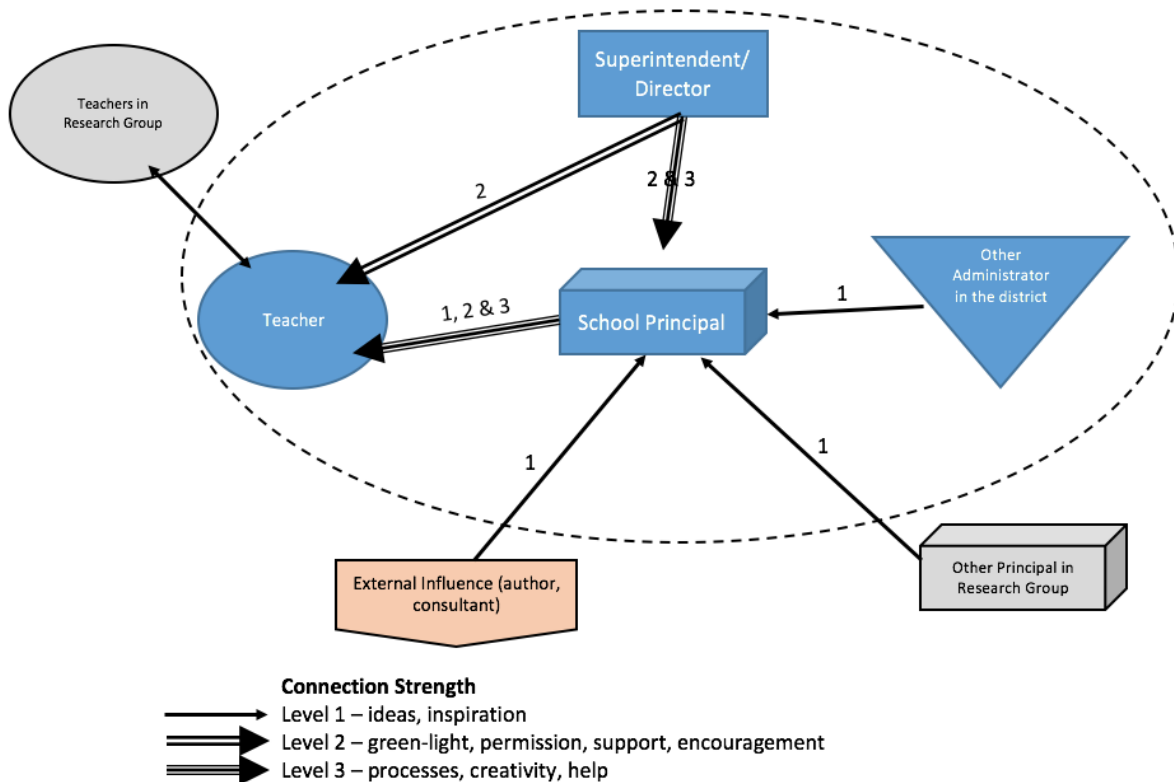

Figure 6. Highly Adaptive Learning System

In our study, district level leaders refer to superintendents, associate superintendents, district directors or other leaders in similar positions with system level responsibilities. In Figure 6 the connection strengths are labelled as level one, two or three. A level one connection refers to influences that spark ideas or inspiration for changes. Level two connections refer to influences that provide permission or offer a green-light to move forward through support and

encouragement. Level three connections influence through providing structures or processes (including policies) required to implement changes. At this level, connections may also help in implementing creative solutions. Using both survey responses and interview transcripts, we noted that district level leaders have potential to influence school principals and teachers. However, the findings also suggest the extent of influence varied across the seven high schools in the study. The variation did not seem to be connected to the size or location of the school. In those schools with district level supports, the participants described the influence or level of support in relation to level two or level three influences. This suggests influences or supports from the district level are not present or not required at all stages during cycles of inquiry.

Overall, principals were influenced by other administrators in the school, district leaders, principals from other high schools involved in redesign initiatives and external consultants outside of the district, such as personnel from the ministry, faculty from post-secondary institutions, published authors and other members of professional learning networks.

B. District Support

Finding 3.2 Levels of connection and supports for principals' learning provided by district level leaders varied.

Superintendents and other district level leaders influenced principals as noted in the survey and during the interviews. During the interviews and in the open-ended survey responses, principals mentioned district influences. The types of influence provided were described as follows:

"Support for initiatives have given confidence to try things."

"They ask questions that make me reflect, they remind me of what is important, they ground me."

"Pushed me to develop a clear vision of our work - and then to align everything we did with that vision."

"Monthly visits...continued and regular focus on my growth plan goals, and school strategic plan."

"Support with staffing decisions."

"Shared, collaborated with and provided the freedom to look and put into practice innovative ways of teaching and learning. We have attended numerous functions together to support redesign."

"Gave us the green light. He said, "See how it works. You have permission to fail. If it doesn't work then it doesn't work, but see what might possibly work for our students so that they can be prepared to be better learners for the 21st century and life after school.""

"They [superintendent and other district leaders] support to go and get in it and try it...They are developing a list of criteria around high school redesign for our school division and they sought input from those of us who have been doing this...they work so collaboratively."

One principal discussed concerns with leadership succession planning: "That's what I worry about – well, any principal does – what will stick after you're gone?" Other principals also commented about the limited support from district leadership:

"Early on, I used to talk to our superintendent - when we first started this. She was kind of my sounding board...I will tell her, I don't really care about the policies, it's more about the practice."

"I have the support of one person at the school division individually but that was it. Everything that we did here, WE did here...we did not really have to ask permission should we do this or could we do this, so it was really nice in that sense."

"That hurdle was that this would be an addition on because we still had the regular Parent/Teacher Interviews. So I went to the school board and I said, "this is something that we are doing as an addition, it is a great thing. Would the board consider giving the staff a day off in lieu?" They said, 'no, we cannot do it."

"So to convince people that a teacher work day was in fact PD took a little bit of convincing, and [district] saying 'we don't really give teachers time to do their units on a PD day.' But we're asking them to do it in a totally new way, connect to a whole bunch of these other things they are new with. They need to do this collectively and collaboratively and supportively."

In our social network analysis, patterns of distribution were noted based on identification and description of influence in both the survey and interview transcripts. The most common pattern

associated both internal and external influences to specific actions or focal points of high school redesign. In a second pattern, the internal influence of district leadership was not associated to focal points of high school redesign described by principals or teachers. Our findings suggest district influence can vary in schools. Further study is needed to determine the implications for district leadership influence on high schools undergoing redesign.

In the cases where district leaders provided limited support, it was evident the principals relied on the support of the larger learning network of schools. Being able to connect to something that was a province-wide initiative allowed these schools to step out of the confines and the isolation within a single school jurisdiction and connect with different school leaders engaged in a high school redesign. The findings in this section suggest a conceptualization of highly adaptive learning systems can be used to describe permeable or blurry boundaries and different levels of connection strength between school and system level influences. All levels within learning systems need highly adaptive networks of school and system level influences guided by a theory of action for change.

Overall Impact

Dynamic and iterative changes collectively demonstrate an impact on school culture, school leadership, school pedagogy and school structure. One teacher observed, "none of the stuff that we've done has been static, it continues to change." Similarly, one principal noted, "Over time it turned out to be the domino kind of effect. We moved one thing, and I think myself and the staff very quickly realized now we need to change, and it just never stopped. And it still hasn't stopped...high school redesign is a lot of chaos." Table 12 shows how the findings in our study demonstrate dynamic and iterative changes according to school culture, school leadership, school pedagogy and school structure as defined by Alberta Education.

Table 12
Dynamic and Iterative Changes: Culture, Leadership, Pedagogy and Structures

Changes	Associated Findings:
School Culture – is made up of the values, beliefs and shared meaning of all stakeholders	Finding 1.2 A relentless focus, growth-orientation, risk-taking attitudes and actions, and value for trusting, cohesive and collaborative relations (i.e., student success grouping) built upon a theory of action for change fostered a highly connected and trusting learning community.

	Finding 1.3 A collaborative inquiry approach focused on student learning (achievement, engagement and well-being) is required at all levels of the learning system to develop new conceptions of teaching, learning, assessment and leadership in high schools. Finding 1.6 Students provide input and and are regularly consulted in developing ideas for high school redesign.
School Leadership – has a key role in improving classroom practice, informing school policies and making connections beyond the walls of the school building	Finding 2.2 Principals enacted a conception of collective leadership and collective responsibility in iteratively making data-informed, research-based changes through teacher-led, teacher-driven professional learning using cycles of inquiry. Finding 2.3 Multiple indicators (qualitative and quantitative) of success based on a theory of action for change enabled principals to lead a learning system to engage in a dynamic and iterative process of inquiry and professional learning for high school redesign. Finding 3.2 Levels of connection and supports for principals' learning provided by district level leaders varied.
School Pedagogy – is the art and science of teaching	Finding 1.4 Visible teaching, that included peer mentoring, planning and teaching improved teachers' effectiveness and also allowed teachers to actively seek and receive feedback from their peers in their own and other disciplines. Finding 1.5 A comprehensive understanding among teachers of the curriculum across, within and between grade levels and subjects and employing formative assessment strategies are becoming a part of day-to-day practice; making learning criteria visible and explicit to students is an area for growth.
School Structure – includes organizational structures that allow learning to occur under a	Finding 1.1 Changing structures, such as removing a strict adherence to time required by the Carnegie Unit promotes high school redesign. Finding 2.1 Continuous professional learning for teachers and for principals guided by a theory of action for change focused on

variety of circumstances and conditions.	improving, strengthening and deepening student learning (achievement, engagement and well-being) was supported through external and internal supports in the learning system. Finding 3.1 Results from this study provide a conceptualization of highly adaptive learning systems with permeable or blurry boundaries and different levels of connection strength between school and system level influences.

Participants in this study described key redesigns in their schools and changes to culture, leadership, pedagogy and structure. Redesigns can positively impact student experience, increase or maintain student achievement, student and teacher engagement, student and staff well-being, student attendance, student retention, and involvement and satisfaction of parents.

Student Experience.

Changes in student experience over the years of high school redesign has improved. Most schools report student intellectual engagement as reported in the Tell Them From Me survey have increased. For example, in one site, 76% of students reported they are intellectually engaged. This is a 30% increase from the previous year. Furthermore, over 95% of the feedback provided in the open-ended questions were positive comments. The school surpassed Canadian norms in most categories. The principal noted:

> "We found this to be quite substantial growth you know, intellectual engagement. So this is when we (principal and assistant principal) would go to the classrooms and do our intellectual student engagement. We saw a 30% increase in student engagement; interested and motivated. This came from a Tell Them From Me survey results and stuff like that. So all this stuff was great. Then truancy was the only one that dropped and great that it did because we wanted that one to drop. So we saw a 14% increase in the number of students who reported positive sense of belonging. We began to see some results."

The following results (Table 13) from one school in the study demonstrate an overall increase in student experience across all categories including a decline in truancy rates.

Table 13
Sample Tell Them From Me Survey Results

Survey Results	Site 1

Intellectual Engagement	+30%
Interested and Motivated	+16%
Students that Value School Outcomes	+13%
Relevance	+12%
Effective Learning Time	+12%
Effort	+11%
Planning to Finish High School	+11%
Rigor	+10%
Positive Homework Behaviours	+8%
Truancy Rates	Minus 4%

Student Achievement.

Achievement evaluation in the Accountability Pillar is based upon a comparison of current year data to a set of standards which remains consistent over time. According to this standardized achievement measure, schools are showing positive results in diploma exams at the acceptable level and excellence level. Overall, schools are either maintaining or improving results in diploma exams and participation rates. Classroom assessment practices are developing with an increase in formative assessment practices where students receive ongoing feedback and opportunities to improve work. In the survey, 57% of respondents agree most of the teachers' learning designs allow for students to receive ongoing, specific feedback that enable them to increasingly monitor and direct their own learning. The following comments demonstrate a focus on student achievement:

> "This is a work in progress and it is certainly not perfect. A lot of the students have been responding very positively and he can tell you some of the reasons they listed, why they enjoyed it. So that is one thing. For myself, personally, I look at how well work is getting accomplished, the achievement rates on exams and project completion. I look at all those things and I see all the benefits of having this kind of a program in place. What it

will be like next year or two years from now? It is a work in progress but it is certainly, I think, moving in the right direction. The kids seem happy."

"The idea of streams and grade levels…the dash one and twos and fours are together and blending because kids have missed some prerequisite skills or strengths, or even the dash four students who were supposedly the really weak students, often have some interesting insights to things and perspectives, that because they weren't out of the box thinkers typically than some of our dash one students. And they tend to do a lot better just by being exposed to the conversations."

Accountability data (Table 14) was provided by four sites confirming positive measures reported according to the following categories: safe and caring schools, student learning opportunities, achievement, preparation for lifelong learning, and parental involvement. Similarly, participants from all of the sites supported the positive view of these measures during our interview dialogue.

Table 14

Sample Accountability Data

	Site 1	Site 2	Site 4	Site 6	Site 7
Safe & Caring School	Excellent	Excellent	Excellent	Good	Excellent
Student Learning Opportunities	Good	Good	Good	Good	n/a
Achievement Grades 10-12	Good	Good	Excellent	Acceptable	n/a
Preparation for lifelong learning, world of work, citizenship	Good	Good	Good	Good	n/a
Parental	Excellent	Excellent	Good	Good	Excellent

Involvement					

* Site 3 reported parental involvement in student learning conferences of nearly 85%.

Student and Teacher Engagement.

Teachers and students are engaging in their work. For example, respondents (57%) indicated that most teachers (75-100%) intentionally design strong robust, authentic tasks that focus on issues, questions or problems central to the discipline. Respondents (40%) perceive most students (75-100%) are deeply engaged in their work and know why it matters to them, to the discipline and/or beyond the classroom. The following quotes also demonstrate the changes in student and teacher engagement.

> "Get together some materials and build yourself a model for mitosis and meiosis and be able to explain the steps...They like to build things even when they are older. Other years I have done this for marks and taken it in. This year there are no marks. This was for them, a Focus Friday activity."

> "My room is ten times noisier than it ever was. I've got kids all over the place doing stuff and I find that they're far more engaged now than they ever were when I was taking control and 'listen to me I'm awesome.'"

> "Knowing they have that flex block, you can do more group work….and inquiry stuff and project stuff because you know it's easier for them to get together as a group having that block and not trying to do it after school."

> "If we combine things, then we can teach a lot more things, and so many things kind of connect. So that really appealed to us...the idea of how can we get the students to connect deeper with their learning. because one of the issues that we identified in terms of success, or lack of success, was that the kids really weren't transferring and holding on to the things we were teaching."

Student and Staff Well-being.

Interview participants discussed establishing meaningful connections to create a sense of belonging in the schools. There was evidence of concern for both student and staff well being. For example, Teacher Advisory (TA) groups were established in schools (including all staff members, small number of students, same TA for gr.9-12) to establish relationships and a sense of belonging. Participants noted the importance in having an accountable and significant adult for every student in the school:

"It is fundamentally different on how – because you have a bigger – because of those relationships. Now you care at a whole different level, and you have to be accountable now of what I'm teaching my Science kids. If I decide to give a kid a zero... I'm going to have somebody, a colleague coming to and say, well, what's up with this, or why this kid is at 35% in your class and you haven't said anything to me?"

Student Attendance.

Student attendance is on the rise. For example, in one school, there was an increase of attendance from 66% to 99% over the years since the school started focusing on high school redesign. Another school reported a 4% decrease in truancy rates over the last year. One principal described how ideas from high school redesign can impact attendance in other schools in the district:

"What she really noticed was the attendance. Her school is an attendance concerned school. She said that she implemented it in her classroom and the attendance on that Friday picked up right away."

Student Retention.

Student retention. All schools report that student retention has increased. This finding is supported by the Alberta Accountability Reports within the increase in Student Completion rates and decrease in Dropout rates.

"Flexible dismissal was based on the thought that not all students learn at the same pace. Those students who – they get it. They get their work finished, we could dismiss them. We could dismiss them early. We had the freedom because we weren't tied to the instructional hours like we once were. We were looking more at outcomes and proficiency at outcomes so those students we could dismiss. Those students we could dismiss and then they had an opportunity to de-stress, have a nutrition break and to catch up on other homework or to engage in enrichment type of projects. While they were doing that we were able to go back and to focus with the students who struggled."

Involvement and Satisfaction of Parents.

Involvement and satisfaction of parents is increasing. In one school, student-led conferences with parents increased from 5-80% parent involvement over the years the school has been involved in high school redesign. According to the Education Plan from one of the high schools, the results suggest the school demonstrates collaboration and community engagement:

"We will continue to focus on implementing methods to increase voices of our stakeholders and parental involvement in decisions about their child's education. Our forums, parent presentations, comment box, focus groups and Tell Them from Me surveys have provided avenues for stakeholders to be involved in their child's

education. Our Student Learning Conferences also increase communication between students, parents and teachers, with participation rates of nearly 85%. We have also worked with School Council to discuss ways to increase parental involvement at [school]."

"we have had way more parents in school here now. And they are not complaining, they want to help solve the problems or make us aware of certain things. So contact time with parents, and teachers, and students, and increasing that really listening and becoming more responsive, I think that's been a change for me."

"[student learning conferences] as another way of personalizing the learning in our school, the reporting to the parents...this is time that parents had an opportunity to sit down with their kids' one on one to hear them talk about what it is they were planning to do. Very emotional, lots of tears and as you can – when kids get older parents do not get a lot of chances to even come into the school. High school kids and parents are disengaged from high schools."

Overall, the research outcomes include a deeper understanding of the school culture, school leadership, school pedagogy and school structure required to create adaptive learning systems in high schools, evidence of effective implementation strategies and results, and actions required to scale up and sustain results.

Recommendations for Sustainability and Scalability

1. Learning systems need to remove structures such as a 25-hour per credit requirement for all learners.

2. Learning systems need to embrace a theory of action for change in which the attitudes and actions that foster highly collaborative, connected and trusting learning communities are expected and supported.

3. Learning systems need a collaborative inquiry approach to redesign.

4. Learning systems need visible teaching.

5. Learning systems require a comprehensive understanding of curriculum and assessment.

6. Ongoing, continuous professional learning focused on student learning is required

throughout the learning system for leaders and teachers; learning systems need to have high expectations for all learners.

7. Learning systems require a collective, design-based orientation to leadership guided by a theory of action for change.

8. School leaders need to continually use data-informed, research-based, multiple indicators of success as evidence to inform iterative changes during cycles of inquiry.

9. Learning systems need to regularly seek input from students and other school and system level influences. Learning systems need to embrace the attitudes that foster highly connected and trusting learning communities.

10. All levels within learning systems need highly adaptive networks of school and system level influences guided by a theory of action for change.

References

Alberta Education (2010). *Inspiring education: A dialogue with Albertans*. Edmonton, Alberta: Alberta Education. Retrieved from https://ideas.education.alberta.ca/media/14847/inspiring%20education%20steering%20committee%20report.pdf

Alberta Education (2012). *High school completion strategic framework*. Edmonton, Alberta: Alberta Education. Retrieved from http://ideas.education.alberta.ca/media/64673/september_2012_hscsf_newgoalogo.pdf

Alberta Education. (2013a). *Government of Alberta department of education: Ministerial order (#001/2013) student learning.* Edmonton, Alberta: Alberta Education. Retrieved from http://education.alberta.ca/media/6951645/skmbt_c36413050707450.pdf

Alberta Education (2013b). *Tell them from me: Moving forward*. Edmonton, Alberta: Alberta Education. Retrieved from https://ideas.education.alberta.ca/media/80327/albertaed_ttfm_web_may08-2013.pdf

Alberta Education. (2014). *Moving forward with high school redesign: Where we started, where we are today and where we are going*. Edmonton, Alberta: Alberta Education.

Alberta Education (2015). *Moving forward with high school redesign Questions and Answers.* Edmonton, Alberta: Alberta Education.

Antonacopoulou, E., & Chiva, R. (2005). *Social complex evolving systems: Implications for organizational learning.* Paper presented at OKLC 2005 Conference, Boston.

Borgatti, S., Martin, E., & Johnson, J. (2013). *Analyzing social networks*. Los Angeles, CA: SAGE Publications, Inc.

Bransford, J., Brown, A., & Cocking, R. (2000). How people learn: Brain, mind, experience, and school. Washington, DC: National Academic Press. Retrieved from http://www.nap.edu/catalog/9853/how-people-learn-brain-mind-experience-and-school-expanded-edition

Bryk, A. S., & Schneider, B.L. (2003). Trust in schools: A core resource for school reform. *Educational Leadership*, 60(6), 40-45.

Cardno, C. (2006). Leading change from within: action research to strengthen curriculum leadership in a primary school. *School Leadership & Management*, *26*(5). doi: 10.1080/13632430601007907

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed). Thousand Oaks, CA: SAGE Publications, Inc.

Creswell, J. & Plano Clark, V. (2011). *Designing and conducting mixed methods research, second edition.* Thousand Oaks, CA: SAGE Publications, Inc.

Clarke, A. E. (2005). *Situational analysis: Grounded theory after the postmodern turn*. Thousand Oaks, CA: Sage.

Friesen, S. (2009). What did you do in school today? Teaching effectiveness: A framework and rubric. Toronto, ON: Canadian Educational Association.

D'Amour, L., Davis, Brent., Sumara, Dennis. (2012). Understanding school districts as learning systems: Some lessons from three cases of complex transformation. Journal of Educational Change, *13*(3), 373-399. doi: 10.1007/s10833-012-9183-4

Davis, B. & Sumara, D. (2005). Complexity science and educational action research: toward a pragmatics of transformation. *Educational Action Research*, *13*(3), 453-465. doi: 10.1080/09650790500200291

Davis, B., Sumara, D., & D'Amour, L. (2012). Understanding school districts as learning systems" Some lessons from three cases of complex transformation. *Journal of Educational Change*, *13*(3), 373-399. doi:10.1007/s10833-012-9183-4

Herrington, J. & Oliver, R. (2000). An instructional design framework for authentic learning environments. *Educational Technology Research and Development, 48*(3), 23-48.

Meadows, D. H. (2008). *Thinking in systems: A primer*. White River Junction, VT: Chelsea Green Publishing.

Mische, A. (2011). Relational sociology, culture, and agency. In J. Scott & P. Carrington (Eds.), *Sage Handbook of Social Network Analysis* (pp. 80-97). Newbury Park, CA: Sage Publications, Inc.

Newell, C. (2008). The class as a learning entity (complex adaptive system): An idea from complexity science and educational research. *SFU Educational Review*, *2*(1), 5-17.

Newmann, F., Bryk, A., & Nagaoka, J. (2001). Authentic intellectual work and standardized tests: Conflict or coexistence? *Chicago: Consortium on Chicago School Research*. Retrieved from http://ccsr.uchicago.edu/sites/default/files/publications/p0a02.pdf

Perkins, D. (2009). *Making learning whole: How seven principles of teaching can transform learning.* San Francisco, CA: Jossey-Bass.

Perkins, D. (2014). *Future-wise: Educating our children for a changing world.* San Francisco, CA: Jossey-Bass.

Phelps, R. & Hase, S. (2002). Complexity and action research: exploring the theoretical and methodological connections. *Educational Action Research*, *10*(3), 507-524. doi: 10.1080/09650790200200198

Robinson, V. (2011). *Student-centered leadership*. San Francisco, CA: Jossey-Bass.

Schwartz, D. L., Bransford, J. D., & Sears, D. (2005). *Efficiency and innovation in transfer*. Retrieved from http://web.stanford.edu/~danls/Efficiency%20and%20Innovation%204_2004.pdf

Seashore Louis, K., Leithwood, K., Wahlstrom, K. L., & Anderson, S. E. (2010). *Investigating the links to improved student learning: Final report of research findings*. Wallace Foundation.

Timperley, H. (2011). *Realizing the power of professional learning.* New York, NY: McGraw-Hill Education.

Timperley, H. & Earl, L. (2012). *Learning and change networks: A background paper on designing networks to make a difference*. Report to the Ministry of Education. Auckland, NZ.

Wang, Y., Han, X., & Yang, J. (2015). Revisiting the blended learning literature: Using a complex adaptive systems framework*. Educational Technology and Society*, *18*(2), 380-393.