Educator-driven data use?

A case study of P-20 data use in Washington State

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Abstract

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The federal government has granted states millions of dollars to build longitudinal P-20 data systems. These systems link early learning, K-12, post-secondary and workforce data so the various educational pathways people follow can be studied in an effort to improve the overall educational system. In Washington State, the state legislature created a P-20 office to focus on the transitions of students from one sector to another and the US Department of Education granted this office millions of dollars to link data and provide information. A result of this grant was a high school feedback report that provides information to high schools about the post-secondary experiences of their graduates. Using the case study method, educators from state, regional, district, school and classroom levels were interviewed about how they use, or hope to use, P-20 data. Findings include different types of data use by different educators within the system: data use to support strategic decisions being made state, regional and district administrators and data use to support tactical decisions being made by school administrators and classroom teachers. P-20 data is best used to identify areas of success or improvement at the school or district levels. It cannot be used to support the tactical decisions made in the classroom. A new data use conceptual framework also highlights the need to define a question and frame the problem prior to seeking data.

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Data-driven decision-making, continuous improvement, and performance indicators, are words one often expects to hear in the business world but these are all words that can be found in recent education research articles (Colyvas, 2012; Herman & Gribbons, 2001; Marsh, Pane, & Hamilton, 2006; Slavin, Cheung, Holmes, Madden, & Chamberlain, 2013; Spillane, 2012; Wayman, Midgley, & Stringfield, 2006). The pressure to use data to make education decisions is not new. Ellwood Cubberley, an educator and the College of Education dean at Stanford University one hundred years ago, thought the job of making education decisions would be easier with test data because it would be objective. "The significance of this new movement is large, for it means nothing less than the ultimate changing of school administration from guesswork to scientific accuracy; the elimination of favoritism and politics completely from the work…" (Cubberley, 1916 as quoted in Gamson, 2007).

As data collections and data systems have become more sophisticated, so have the expectations around data use. Cubberley and his fellow educators were exploring the uses of IQ scores. Educators now have years of formative and summative assessment data, and much more, about each of their students. Longitudinal data, documenting student's progression through schooling and beyond, is only the newest form of data to enable educators to fulfill Cubberley's expectation. The individual data elements collected are the same, such as, demographics, assessments, courses, etc. The difference is that before, a teacher measured a student's progress from Fall to Spring and then they went to a new teacher who measured progress from Fall to Spring. Through the linking of student data from year to year, a student's progress can be

measured and followed across years and across teachers. While these data set the stage for a next round of educators' data use, the availability of this data does not guarantee use in instructional (classroom level) or strategic (school or district level) decisions.

To be sure, data may be used in different ways, and to meet various purposes. A number of studies describe current data use by K-12 educators and what actions encourage data use in making a variety of decisions at several levels of the system, especially the school and district level, as I will review later in this chapter. The research also distinguishes the use of data for improvement from data use for accountability. Most of this use has focused on formative and summative assessments within the K-12 system, and has employed data about contemporary activities, often the latest annual assessment data (e.g., from statewide standardized testing), or various forms of more immediate data about current teaching practices or student performance. Until recently it has not been possible to ask questions about the trajectory of teaching and learning, as it unfolds across multiple years, even though it ultimately matters greatly how schools prepare their students with lifelong skills and knowledge, enabling them to pursue higher education and careers. Longitudinal data systems offer, for the first time, the possibility of addressing such questions systematically.

Asking and answering longitudinal questions about education, no less having the capacity to do so, would not have been possible without a series of events at the federal level, beginning in 1994. While these events were predicated on particular assumptions, the full power of longitudinal data and possible effects on education reform is still being discovered. Now, when the first longitudinal data systems are being made available to the field, is an excellent time to explore what it means for these data to be used, and what insights they are —and aren't—able to provide educators. In addition, it is time to investigate more systematically who in the system

might make good use of these data, and for what purposes. Lest we get caught up in simplistic assumption that these systems serve everyone in the educational system equally well.

While there has been a lot of scholarship in the past decade aimed at understanding how K-12 educators turn data into useful information, and actually use that data in making decisions, little of this scholarship has considered what this might mean for longitudinal data, and more specifically who might be making what decisions with this new data resource, as well as how they might be best supported in that effort. In addition, with the numerous state P-20 (defined as early learning through K-12 through post-secondary) data systems being funded by the federal government, understanding how educators can use this P-20 longitudinal outcome data is integral to the success of these systems. Thus, it is an opportune time for scholars to pay close attention to the new data resource, to figure out what it is enabling educators to do, and what "using" this resource may mean for particular educators in the system.

This dissertation takes a first step in that direction. In this study, I used qualitative case study methods to research P-20 data use in Washington State, a state that has been developing an ambitious P-20 data system, and has for the last several years been making this available to educators throughout the state. This research answers the following overarching questions: How are K-12 educators making use of this new source of data, how are these data being translated into evidence and turned into action, and how are these data being incorporated into decision-making at the classroom, school and district levels? What conditions and actions enable or constrain the effective use of the new data resource?

As mentioned previously, because there has been little work to understand how K-12 educators use P-20 outcome data, and up until now relatively little opportunity to do so, the effort to capture both actual uses and potential uses, as K-12 educators visualize them, is very

timely. As part of pursuing each of these questions, it is important to understand how the results differ by position or role of the educator and if and how P-20 data use differs from other types of data use. It is also very important that investigations determine what P-20 longitudinal systems are not used or useful for. National organizations promoting data collection and use are anxious for the ideas and insight into the potential and limitations of these systems (Data Quality Campaign, 2011b).

As evidenced by over a decade of federal policies and millions of dollars, a number of policymakers in this century agree with Cubberley and believe that data-based decision-making by educators is possible and would make the system more efficient. In the remainder of this chapter, I review the research around current educator data use and the numerous policies enacted by the federal government that support these assumptions.

Educator Data Use in K-12 Educational Systems

A number of studies describe current data use and the kinds of actions and conditions that encourage data use in making a variety of decisions. In addition, the existing research base has helped to distinguish fundamentally different purposes for data, and along with them the dynamics of data use. In this regard, the use of data for improvement differs from data use for accountability and has begun to give us a clearer picture of what educators who engage in data-based practice might be trying to do with the data resources at hand, who those users are, and what types of data they are working with. Finally, the research on data use has helped us see what learning is involved for professional educators, and therefore what kinds of preparation and professional development might enable or promote more use of data in the operation of educational systems, if not in daily practice within schools.

Types of Data Used and Who is Using Them

Accountability systems typically use student graduation rates, demographics, and performance on annual statewide assessments to indicate progress. While these data are useful to state administrators to categorize schools or districts, they do not provide information necessary to make improvements (Honig & Coburn, 2008; Marsh et al., 2006; Slavin et al., 2013). These data also may give educators at different levels a way of locating themselves in a spectrum of performance, but little more.

There are examples of accountability systems at all levels of education. An example of federal accountability is No Child Left Behind (NCLB). This law, further discussed below, required that all students pass statewide assessments in mathematics and reading and also required states to report passing rates for groups of students, such as by race/ethnicity or income level, and not just an overall rate by school or district. This was important because overall measures in the past masked where the education system was failing certain groups of students.

Based on NCLB, the State of Washington's State Board of Education, as required by the Legislature, created an accountability system that identifies districts that were not meeting targets to improve achievement for all of their students. In the beginning the measures were based on passing rates but measures transitioned to measuring student growth. Districts not meeting goals and ranking in the lowest tiers of schools receive additional assistance in the form of funding and technical assistance to help improve instruction for students.

Educators are also held accountable through their annual job evaluations. Teachers and principals are required to use data to demonstrate their effectiveness at educating students.

The federal No Child Left Behind Law has promoted the most comprehensive and recent form of assessment-based accountability systems, and as such this federal law has provided a

dominant template for system-wide data use over the last decade and more. It should be recognized that data use did not begin with the implementation of No Child Left Behind (2001), nor has data use been limited to the high-stakes, system-level accountability processes that the federal law has inspired. Indeed, teachers have been using classroom tests, assignments and homework to guide instruction and as indicators of student learning, and continue to do so. In a similar vein, astute school leaders and those who collaborate with them have assembled different kinds of data to help ensure an "internal" accountability within the school, whereby the school staff assume a professional responsibility for the school's performance, and hold each other to account for meeting school missions and improvement goals. Furthermore, with the advent of statewide assessments and the need to be able to make course corrections during the school year, districts administer local diagnostic tests and teachers also use these data to make decisions. Other data used include mobility and attendance data (Marsh et al., 2006).

The press for data-based practice has also promoted a range of data collection and use activities based on direct observation of teaching practice, any of which are less related to meeting accountability expectations, or rather are more motivated by the goal of offering feedback for the improvement of practice. For example, administrators in many schools and districts are also performing "learning walks" throughout their schools to determine the type of student dialogue occurring in classrooms and administering surveys to students, teachers and parents to determine satisfaction, climate, and perceptions (Marsh, 2012; Slavin et al., 2013). These sources offer a variety of ways for school staff to scrutinize their practice by considering trends in regular climate surveys (of school staff), getting a more systematic picture of parental satisfaction, or by gaining perspective on their practice through site visits by external experts. These data have potential uses at school and district level, as administrators, teachers, coaches,

and others scan the indicators for insight into current performance and ways to improve it.

How Data are Used Currently

The accountability requirements of NCLB created a top-down system where schools and districts felt they were at the mercy of the statewide assessment (Marsh et al., 2006). When educators began inquiring about the data and the meaning of the results in their buildings, these data points were compiled into charts and graphs to try to understand how practices and processes were or were not working for certain students. This understanding would lead to changes in practice. This cycle repeats itself because making changes feeds the need for more or different data in order to understand how to improve (Petrides & Nodine, 2003; Petrides, 2004). "…we use data as a tool, to plan our next actions…Rather than driving change, data should be used to support and monitor change" (Petrides, 2006, p. 1).

The accountability requirements created a need for particular kinds of data, gathered and stored in data systems that could be used by local users (district and school) and state-level users. Statewide longitudinal data systems (SLDS) assisted educators in participating in what Petrides and Nodine (2003) call the "knowledge management continuum." While many SLDS began as systems to report required data to the federal government, they have transformed into systems that can provide information to inform policy and practice that can improve student achievement (Data Quality Campaign, 2011b). For example, in order to understand how to make more and more improvements towards the goal of 100 percent of students passing the statewide assessments, educators began asking questions that could not be answered by the annual transactional data systems, such as questions about student growth. To understand student growth, data systems needed to store and link data from year to year, longitudinally, so changes could be viewed and studied.

Roderick (2012) points out that educators need more than data; they need to understand how it can be used and that data use can differ based on the goals of the use (Weiss, 2012). For example, use for accountability can differ from use for improvement even though the same data may be used.

Data use by district-level administrators related to accountability can include setting school district goals and targets, identifying areas for improvement, and confirming or denying assumptions when related to current beliefs (Coburn, Toure, & Yamashita, 2009; Marsh et al., 2006; Slavin et al., 2013). Data use by state-level administrators associated with accountability also includes rewarding or punishing schools and educators (Marsh et al., 2006). Jennings (2012) writes about productive versus distortive data uses and that pressures related to accountability can lead to distortive data uses, or quick fixes, such as focusing on "bubble kids". "Bubble kids" are those students who are just a few points away from demonstrating proficiency on a statewide assessment. By focusing resources on these students, such as test-taking preparation, goals may be met in the short term but the foundation has not been created to assist the lower performing students in also demonstrating proficiency. Feelings of pressure to perform are more associated with accountability data use than improvement data use and may lead to undesirable practices (Marsh, 2012; Marsh et al., 2006). In addition, Spillane's (1999) work with zones of enactment found that teachers are less likely to believe they have the tools to respond to this pressure because the data associated with accountability is viewed as outside their direct influence.

With all of that said, accountability data use is not necessarily a bad thing. In fact, educators from all levels using data for improvement is a result of the accountability measures that come from the top but the difference is that data use for improvement is viewed by

educators, especially at the school and classroom level, as less threatening to the continuance of their livelihood (Jennings, 2012). Data use related to improvement includes district administrators using data to identify or diagnose problems; keeping track of progress by monitoring students, teachers and schools; identifying problems with curricula, such as disconnects between school curricula and the statewide assessment; and targeting professional development activities related to instruction. When teachers and principals use data to make improvements they use it to develop interventions, supports and solutions; differentiate instruction; and to become more effective in identifying student learning needs (Jennings, 2012; Marsh et al., 2006; Slavin et al., 2013; Wayman and Stringfield, 2005).

Overall, accountability systems are meant to encourage data use for improvement (Jennings, 2012), and it is possible that they do prompt improvement-oriented activity, though the data these systems emphasize may not always be what is needed for improvement decisions, depending on the level of the improvement of activity. For example, the graduation rate measure is used for accountability. If a district implements a program in middle school to improve graduation rates, officials would need to wait over four years to see if the program had an effect on the ultimate accountability measure. However, collecting data about credits earned by students each year would allow for a longitudinal study of progress toward the goal of increasing the graduation rate.

Accountability measures are more likely to be used for decisions by people outside of the classroom or the school. Educators are more likely to engage in data use for improvement when it is more closely related to the decisions they have the power to make, such as curricular or instructional practice decisions. Ideally, data use for improvement is aligned to the accountability system in place at the district or state level (Colyvas, 2012).

Supports that Encourage Data Use

Fortunately, researchers have observed many factors that can encourage data use. Most of these studies focus on how to encourage teacher data use in the classroom (Honig & Venkateswaran, 2012), but a few do investigate supports needed to encourage data use for school and district administrators. Even fewer studies look higher up in the system, at data use by regional or state-level actors. The kinds of actions and conditions that support data use fall into two categories, organizational changes and time and resources. Organizational changes that support regular data use include providing staff the opportunity to create a common vision and supporting the idea of continuous improvement. Building trust amongst staff in the organization has also been found to encourage data use. Meanwhile, researchers have found providing time and resources to use data, in the form of professional development, dedicated time to review data and human support to assist educators in analyzing data, encourages data use.

Organizational Changes that support regular data use. While teachers have been using classroom tests and homework to inform their practice for years, the types of data and uses described above are different. For widespread adoption of the kinds of accountability and improvement practices noted previously, there needs to be organizational changes at multiple levels of the system, and these changes can come in a number of forms. One way for an organization to evolve into one that bases its work on a variety of systematic data inputs is to create a vision, goals, context, attitudes, and expectations that all support a culture of data use. These changes would include developing an environment where data are used daily to make decisions related to practice. (Alliance for Excellent Education, 2011; Hamilton, Halverson, Jackson, Mandinach, Supovitz, & Wayman, 2009; Herman & Gribbons, 2001; Marsh, 2012; Marsh et al., 2006; Wayman, Cho, Jimerson, & Spikes, 2012; Wayman, Jimerson, & Cho, 2011;

Wayman & Stringfield, 2006) For example, in such an organizational culture, educators are allowed to veer from pacing guides or other established expectations for their practice if the data are communicating a need to change course.

Such an organization not only enables change based on data to happen, it also makes it possible to bring data to bear on problems of practice in which people see realistic possibilities for improvement. In his work related to implementing policy, Spillane (1999) found that teachers were more likely to change if they could see that the possible solutions were within their "zone of enactment." A culture of data use also supports the continuous change that is likely to come with extensive data use (Coburn, Honig, & Stein, 2009).

Within the idea of creating a vision, calibration can serve an important function. Calibration is a way for educators in an organization to create a common language, discuss assumptions and coalesce around shared goals. Giving staff time via professional development or professional learning communities to calibrate provides an opportunity to correct individual assumptions about policies, discuss possible implications and communicate more clearly with a common language (Spillane, Reiser, & Reimer, 2002; Wayman et al., 2011; Wayman et al., 2006; Wayman, Snodgrass Rangel, Jimerson, & Cho, 2010).

Another type of organizational change concerns the decision-making structure where the people with the firsthand knowledge of the effects of practice and curriculum on students (namely teachers) are the ones making decisions related to practice and curriculum. Teachers are the personnel with the most knowledge of practice and curriculum and can best predict how decisions can affect the classroom and therefore should be involved in decision-making, especially as it relates to assessments, curriculum and classroom supports. In many cases, these decisions are made by school or district administrators, or even state-level policy-makers

(Coburn, Toure, & Yamashita, 2009; Honig & Coburn, 2008; Wayman et al., 2010; Wayman & Stringfield, 2006).

Many of the actions implied by the organizational changes described above can help with building trust, if people from all levels of the organization are included in how the changes occur. Asking people to change their practice requires trust on multiple levels. Building trust includes making data "safe" and approachable by separating the data from rewards and punishment. Bringing people together to discuss the implications of the data is a great way to build trust, but in some cases, initial steps may need to be taken. For example, early discussions might need ground rules and agreement that job titles are left outside the meeting door (Marsh, 2012; Marsh et al., 2006; Wayman & Stringfield, 2006; Weiss, 2012).

Trust of the data and information being produced and trust in how the data may be used has been found to be important. A way to create trust in the data is to triangulate with multiple types and sources of data. In addition, people in the organization would feel more comfortable in using data if they trusted it would not be used against them (Hamilton et al., 2009; Marsh et al., 2006; Wayman & Stringfield, 2006).

Investment of time and resources. A different set of supportive conditions have less do with changes in the organization, and more to do with the actual resources needed to enable data use to become a regular part of an organization's life. Research shows that time, along with analytic resources that help educators make good use of the time encourage data use. For example, to support teachers in using data, various studies identify the need to provide adequate time to reflect and incorporate the data with their knowledge, along with resources to analyze and research the issues and possible solutions (Coburn, Toure, & Yamashita, 2009; Mandinach, 2012; Marsh, 2012; Wayman et al., 2010; Wayman & Stringfield, 2006). In fact, Supovitz

(2012) found that teachers who were not afforded time and resources to understand the data were less likely to implement a thorough response.

Research highlights different kinds of resource investments that purport to provide the means for more extensive and successful data use. Creating structures and dedicated time in which school or district staff perform an activity that considers data and their implications for improvement activity is one important type. Weiss (2012) described structured interactions between staff as being helpful. In a similar vein, other researchers spoke of the advantage of creating professional learning communities (PLCs) when trying to understand data and support collaboration (Coburn, Toure, & Yamashita, 2009; Marsh, 2012; Wayman & Cho, 2008; Wayman et al., 2011; Wayman et al., 2006; Wayman et al., 2010; Wayman & Stringfied, 2006). Marsh (2012) recommended that the PLCs include people that were horizontally and vertically related to a teacher's role. Mandinach (2012) and others (Hamilton et al., 2009; Marsh 2012; Spillane & Thompson, 1997) called for time to collaborate with others, build human and social capital, and network because data use is a social activity.

Dedicated time and structures for interaction beg questions about how much people need to know about using data, interpreting it, and using it to solve problems of practice. To that end, educational systems have been making various capacity building investments to support the necessary professional learning by potential users. Wayman et al. (2011) found that in order to build capacity across the system, districts needed to build capacity at the individual level. One way to do this is through professional development, preferably professional development that is targeted, connected to instructional practices, and on-going (Data Quality Campaign, 2012; Hamilton et al., 2009; Marsh, 2012; Slavin et al., 2013; Wayman & Cho, 2008; Wayman et al., 2010). Others found that job-embedded professional development were more effective than

stand-alone workshops and training (Data Quality Campaign, 2012; Wayman et al., 2011).

Another type of resource is having dedicated human support to assist and or lead teachers in turning data into action (Coburn, Honig, & Stein, 2009; Weiss, 2012). This can take many forms. Marsh (2012) and Wayman et al. (2010) studied how data coaches worked with teachers to use data to adjust instruction. Numerous researchers (Hamilton et al., 2009; Marsh, 2012; Marsh et al., 2006; Slavin et al., 2013; Wayman & Cho, 2008; Wayman et al., 2012; Wayman et al., 2010; Wayman & Stringfield, 2005; Wayman & Stringfield, 2006), have studied how principals can influence the use of data by teachers. Human support can also be found outside the school and may be provided through relationships with external organizations that have the expertise to help educators turn data into action (Data Quality Campaign, 2011a; Honig & Coburn, 2008; Marsh et al., 2006). Some schools and districts may adopt any combination of these resources.

These people resources serve many functions related to data. They are the data leaders that set the expectations and rules around data use (Marsh, 2012), plan the professional development (Marsh et al., 2006), "filter" all the data coming in (Marsh, 2012; Slavin et al., 2013), serve as the data "go-to" people (Wayman & Cho, 2008), and lead people to the appropriate evidence (Coburn, Honig, & Stein, 2009).

A different kind of resource resides less in human capacities, and more in the tools and equipment needed to use data efficiently and effectively. In this regard, technology to access the data have a supportive role to play. These investments range from those that enable storing the data in a data warehouse that allows for longitudinal analysis to the tools used to view the data in a user-friendly way. Weiss (2012) found that for data use to become a daily part of life in the classroom, the data system focused on the needs of those users. Those users, teachers and

principals, also informed the way the data were stored and how data were accessed. Finally, she found that professional development followed a two-pronged approach: training on how to use the data and the tools (Data Quality Campaign, 2011a; Hamilton et al., 2009; Marsh, 2012; Marsh et al., 2006; Supovitz, 2012; Wayman & Cho, 2008; Wayman et al., 2012; Wayman et al., 2011; Wayman et al., 2006; Wayman et al., 2010; Wayman & Stringfield, 2005; Wayman & Stringfield, 2006).

Researchers have found that these supports for teachers, such as, human supports, the tools and time to analyze data and professional development have been demonstrated to support data use and some have even looked at the relationships between combinations of supports (Marsh, 2012).

Implications for educators

Based on the findings from various studies discussed above, there are a number of implications for educators. The research suggests that rebuilding organizations to enable and support data use would increase the use of data. In addition, investing in time, tools and people would help to encourage data use. Finally, research indicates data use would increase if the data use capacities of the educators were increased, both within educator preparation programs and through on-the-job professional development.

Evolution of Federal Policies That Have Developed and Supported Longitudinal Data Systems

No Child Left Behind can be credited with changing the way educators across the nation looked at school performance (Snow-Renner & Torrence, 2002) because of its accountability requirements, although some states had experimented with a version of accountability-focused standards-based reform in the decade. However, key provisions of NCLB --assessment

requirements, adoption of standards, and the concept of adequate yearly progress (AYP)-- were all introduced in the 1994 version of the Elementary and Secondary Education Act (ESEA), known as the Improving America's Schools Act of 1994. For those states that had not already started defining content standards or administering statewide assessments, this reauthorization of ESEA required all states to engage in this work (Improving America's Schools Act, 1994).

Initial Impetus and Support for Longitudinal Data Systems

While the 1994 reauthorization kicked off statewide standards and assessments, No Child Left Behind (NCLB), the 2001 reauthorization of ESEA, assigned a timeline to AYP. It required that schools make AYP towards a goal of 100 percent of students achieving academic success by the 2013-14 school year. Progress would be measured by looking at students disaggregated so achievement gaps between ethnic or socio-economic groups could be more easily observed. In many cases, state education agencies collected and stored demographic, assessment and graduation data in separate systems, often called "data silos". In addition, systems were not built to follow students longitudinally, across time or even district lines. Acknowledging the difficulty of doing this work with data silos, NCLB also permitted states to create a longitudinal data system where assessment, enrollment and graduation records for a student could be linked together to meet reporting requirements (No Child Left Behind, 2001; Snow-Renner & Torrence, 2002; Wayman, 2007).

In recognition of the increased data demands due to NCLB, in 2005, the Institute of Education Sciences (IES) released a request for proposals (RFP) to provide funding to state education agencies to build K-12 statewide longitudinal data systems (SLDS). The RFP provided a glimpse of how the federal government expected states to use longitudinal data. IES requested states build SLDS that could be used to study the academic achievement growth of

individual students and have this data linked to teachers, programs and interventions. IES believed the education community needed this individual-level data in order to conduct the evaluations necessary to learn what actions led to improved student learning (US Department of Education, 2005).

Next, the federal government began encouraging P-16 (preschool through baccalaureate degree) systems in the America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education and Science (COMPETES) Act in 2007. While the majority of this Act focused on science, technology, engineering and mathematics innovation and competiveness, it included a section on the alignment of K-12 education programs with higher education and workforce demands. Within this section, twelve required elements of a statewide P-16 education data system were listed and included elements such as a unique statewide student identifier, linkages with higher education data systems, and student-level transcript information. Grants were offered to K-12 state education agencies to build or expand their K-12 SLDS to include preschool, higher education and workforce data. The Act also required states to build the following functionality into their statewide P-16 education data system:

> "(i) identify factors that correlate to students' ability to successfully engage in and complete postsecondary-level general education coursework without the needs for prior developmental coursework;
> (ii) identify factors to increase the percentage of low-income and minority students who are academically prepared to enter and successfully complete postsecondary-level general education coursework; and
> (iii) use the data in the system to otherwise inform education policy and practice in order to better align State academic content standards, and curricula, with the demands of postsecondary education the 21st century workforce, and the Armed Forces" (America COMPETES Act, 2007, p. 102).

During this activity around K-12 student data systems, the National Center for Education Statistics (NCES) within IES released a report in 2005 describing the feasibility of creating a

national individual-level data system for higher education. At the time, NCES administered the Integrated Postsecondary Education Data System (IPEDS) that integrated school-level information about enrollment, completions, and finance from the majority of public and private higher education institutions in the United States. The study described how IPEDS could be changed to allow for this expansion, shifting from the collection of school-level data to individual-level data, and recommended that legislative authorization and funding be provided in the reauthorization of the Higher Education Act (Cunningham & Milam, 2005).

Unfortunately, the Higher Education Opportunity Act of 2008 did not include funding for the expansion of the IPEDS system. In fact, it specifically forbade the US Department of Education to build a national database of higher education activity because Congress did not want a federal database of individual-level higher education student data (Higher Education Opportunity Act, 2008). Because of this prohibition, any work linking higher education data with K-12 data would need to be completed through state level systems.

Further Federal Support for Longitudinal Data Systems

Other federal policies, less directly focused on K-12 accountability followed suit. And taken together they have added to the momentum and the means for developing and mounting longitudinal data systems at the state level.

American Recovery and Reinvestment Act of 2009 (ARRA). On the heels of the reauthorization of the Higher Education Act, the economy plunged to levels rivaling the Great Depression. In an effort to provide funding relief to states, the federal government created the American Recovery and Reinvestment Act (ARRA) of 2009, which included the State Fiscal Stabilization Fund (SFSF). Over $53 billion was provided to states to restore state funding for education. State applications for the monetary assistance had to include assurances that the state

was improving data collection related to the data element requirements in the America COMPETES Act and required the reporting of postsecondary enrollment rates for high school graduates.

Another section of ARRA included $250 million for K-12 state education authorities to create

> …comprehensive P-20 systems that permit the generation and use of accurate and timely data, support analysis and informed decision-making at all levels of the education system,…support education accountability systems, and simplify the processes used by State educational agencies to make education data transparent through Federal and public reporting (ARRA SLDS grant, p. 3).

While the previous SLDS grant RFP in 2009 requested the K-12 state education agency build a P-16 system, this RFP requested that states expand beyond baccalaureate work into graduate enrollment, the workforce and other areas where linkages would support better decision-making. Another difference was that the ARRA P-20W (preschool through workforce) SLDS RFP required that states build systems that met the data system capabilities and data element requirements outlined in the America COMPETES Act. The RFP also dedicated a number of pages to describing the potential uses and benefits of a longitudinal P-20 data system. Examples included identifying preschool programs correlated with high numbers of students ready for kindergarten, understanding what is necessary to insure what is needed for all students to succeed after high school, and "determining priorities for allocating resources" (ARRA SLDS grant, p. 3).

A final piece of ARRA, as related to education data systems, was the Race to the Top (RTTT) grants that offered $5 billion to states that were creative and innovative in solving perennial education issues: graduation rates below 100 percent, gaps in achievement between students who differed in race or socio-economic status, and preparing students for postsecondary enrollment AND the workforce. The RTTT grant RFP included building data systems that

tracked student achievement and provided educators with information to improve practice as one of the four core education reform areas.

Understanding that a likely outcome of all the states building their own P-20W data systems was to have 50 data silos that could not talk to each other and working under the limitation that a national data system was prohibited by the Higher Education Opportunity Act, an effort to create a common data language across the states and education sectors began in 2010 within the Department of Education. The effort is called Common Education Data Standards (CEDS) and is a way to link the numerous data systems across education sectors and state lines. CEDS provides a list of common data elements in early learning, K-12, higher education and workforce; defines them and valid values associated with the data elements. Each system or state can then compare their list of data elements to the CEDS list and determine that the elements, while maybe named differently may, in fact, be the same thing. This allows all systems to compare to CEDS and create crosswalks but does not require all systems to use the same data element names, valid values, etc. The ability to have a common language assists in the communication between education sectors where there are a number of common words. For example, "retention" in one system is a negative outcome while it can be a positive outcome in another sector. Additionally, "program" in K-12 refers to some sort of assistance in addition to basic education, such as the free and reduced price lunch program or the special education program while program in higher education refers to area of study.

Workforce Data Quality Initiative (WDQI). Also in 2010 (and again in 2012), the Department of Labor (DOL) announced the Workforce Data Quality Initiative (WDQI) grant program that would award $12 million to states that would build a workforce database linked to education data. DOL incentivized states to build systems where workforce program participants

could be followed longitudinally through education and the workforce (US Department of Labor, 2010). The linkage of this data was valuable because the educational outcomes funded by labor programs could not be shared with the labor agencies due to education privacy laws.

Family Educational Rights and Privacy Act (FERPA). Many of the grant RFPs during this time period included language related to the Family Educational Rights and Privacy Act (FERPA) (US Department of Education, 2005, 2008, 2011). IES required that States ensure student and staff privacy and student personally-identifiable data be kept confidential. These new data systems were pushing the limits of a privacy act written in 1974 when student education records were kept in a filing cabinet. K-12 state education agencies were eager to begin receiving data from postsecondary institutions but some states believed FERPA restricted this sharing of data "backwards" through the system. In addition, there was confusion about how data could be shared with employment agencies that needed student social security numbers in order to follow a student into the workforce.

Some states that had received SLDS grant funding to build a P-20 data system were facing resistance from people in various education sectors who believed FERPA restricted the very sharing states were being funded to build systems to support. The Department of Education published a notice of proposed rulemaking in April 2011. The notice requested comments on proposed rule changes that would eliminate confusion on sharing data with employment agencies, define terms such as authorized representative and education program, and make it clear that data could be shared across states lines, among other clarifications. The Department took comments on the proposed rule changes and finalized these changes in January 2012 (US Department of Education, 2011).

Because none of the language in the Act itself changed, these rule changes represented a

shift in interpretation of FERPA, not a change in the privacy law itself. These changes were important because the comments allowed the federal government to provide examples of the types of sharing that were legal under FERPA. Therefore, what changed was the interpretation of FERPA by the Department of Education, not the law.

Finally, Congress and federal officials are discussing the next reauthorization of the Elementary and Secondary Education Act. Most discussions include the reporting of longitudinal outcomes (Alliance for Excellent Education, 2011). Taken together, these various policy actions at the federal level provided a compelling and supportive context for state level activity in this realm of data system development, and especially so in Washington State.

Washington State Context for P-20 Longitudinal Data Use

Education reform conversations began in Washington State prior to the 1994 Improving America's School Act. In fact, the 1993 Washington State Legislature began reforming education with the passage of House Bill 1209, a law that expected all students to meet statewide learning targets (Washington State House of Representatives, 1993). With passage of this bill, the state's K-12 agency, the Office of Superintendent of Public Instruction (OSPI), began defining statewide standards and creating a statewide assessment for students in the fourth, eighth and tenth grades. When No Child Left Behind was enacted, the state also created statewide assessments for third, fifth, sixth, and seventh grades.

Movement Towards a Longitudinal Data System for the State

Regarding data at OSPI, each program had its own reporting system and the students in each program could not be linked together at the state level to determine the various services students were receiving. In addition, it was difficult to link student data from one year to the next. While this process was sufficient for appropriating money to school districts, it did not

support any actions related to data use and understanding what services or programs were helping students achieve on statewide assessments. For example, a district would report their special education students to the Special Education office at OSPI, their bilingual students to the Migrant/Bilingual office at OSPI and the total number of students served through the Learning Assistance Program. Meanwhile, the Assessment office at OSPI held the statewide assessment results. To study the assessment results by program participation was difficult because it required the matching of various data sets by program coordinators who did not have the expertise to do this work.

In 2003, the Legislature began appropriating money to OSPI, to build a longitudinal data system to link these various programs. The first step in a statewide longitudinal data system was the assigning of a unique student ID, called the statewide student identifier (SSID). This allowed students to be linked across programs and across districts, which was important when students moved to a new district, however, the program information was not consolidated into a centralized data warehouse until the state received $6 million in funding from the third round of SLDS grants in 2009. This K-12 SLDS grant, completed in October 2014, created CEDARS, the Comprehensive Education Data and Research System, and is the data system used to appropriate state funds and to study the longitudinal outcomes of students within the public K-12 system.

In 2007, the Education Research and Data Center (ERDC) was created as Washington's P-20 Workforce (P-20W) office, as a result of Governor Chris Gregoire's study of education called Washington Learns. The Governor and others were frustrated by the limitations of the data systems within each education sector because there were no linkages across the early learning, K-12, higher education and workforce silos. By statute, ERDC is tasked with compiling data and creating a data system for longitudinal analyses (Revised Code of

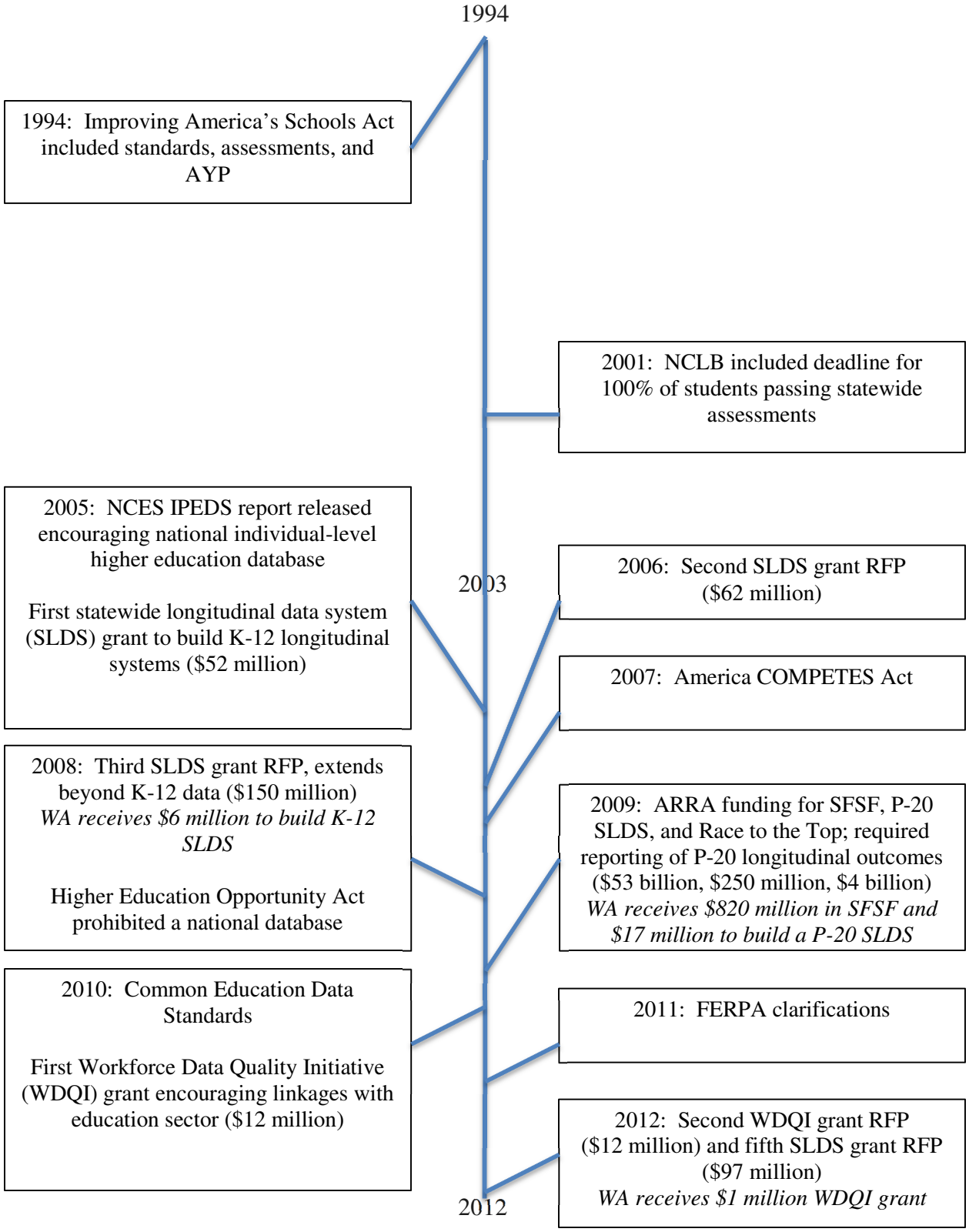
Washington 43.41.400).

With the advent of the Great Recession, ARRA funding was made available to states through the Department of Education in the form of SFSF, SLDS grants and RTTT grants. For the benefit of school districts, OSPI received $820 million in SFSF funding and was not eligible to receive RTTT funding because of the prohibition of charter schools in the state.

In 2010, ERDC received $17 million in funding from the ARRA SLDS grant program to build a P-20W data system that would span early learning, K-12, higher education and workforce. As part of its application, ERDC (2009) requested funding to create a high school feedback report that would link K-12 graduate data with post-secondary enrollment data. The P-20 Reports on Washington Public High School Graduates (ERDC, 2012) were created to serve the data needs of district and high school administrators, went into production in 2012 and have been updated often based on the needs of users (See Appendix A). This report was especially important to OSPI because it met the reporting requirements of SFSF.

Washington also applied for and received a $1 million WDQI grant in 2012. While the SLDS grant funded the incorporation of employment data for K-12 and post-secondary students in Washington, the WDQI grant funded the incorporation of employment data for all covered employees in Washington, along with Department of Labor workforce training program participants. The linking of this data will allow researchers to study the education outcomes and effectiveness of worker retraining programs. See Figure 1 for a timeline of these actions from Washington DC, and the corresponding impact on Washington State, in terms of the resources they provided for longitudinal data system development and deployment.

Figure 1: Timeline of federal actions and corresponding Washington activities (in italics)



Multi-level Education Governance as a Context for Longitudinal Data Use in the State

Even with all of this policy and grant activity at the federal and state level, it is important to understand that many education decisions are made at the local school district level. Washington's state education agency, the Office of Superintendent of Public Instruction (OSPI), is led by a separately-elected statewide official and is mostly responsible for distributing state and federal funding and ensuring the 295 schools districts are being fiscally responsible with the dollars. In terms of collecting data, the agency works closely with a committee of district representatives and other stakeholders to make changes to data collections. It is widely believed that the quality of the data increases when districts understand why data are collected and how data are used.

At the regional level, there are nine educational service districts (ESDs) across the state and each school district is within one ESD region. Each ESD offers services for the districts in their region. For example, some ESDs organize a personnel cooperative and other ESDs manage special education programs, all in an effort to realize efficiencies for the individual schools districts in their region. In terms of data, OSPI has been working with the ESDs to build a network of data coaches so each district has access to data use support. There has been no funding provided to hire a dedicated data coach so each ESD has assigned this role to someone already within the organization. The coaching provided to districts is highly dependent on the person assigned this role in the ESD.

Finally, there are 295 school districts led by elected school board members. Each school district is responsible for contributing student and educator data to OSPI. These data are used to determine funding allocations and calculate accountability measures. With all of these new data use policies and grant funding, these data are now being used to study the longitudinal outcomes

of students.

Exploring Effects that Longitudinal Data May Have on Education Reform and Learning Outcomes

As it stands now, all 50 states have received funding from the federal government to build a K-12 SLDS and 43 states have received funding to build a P-20/Workforce SLDS. With the millions of dollars that have been spent, it is important to understand the expectations of these data systems, by the policymakers who support these systems, the taxpayers whose resources make it possible, and the educators expected to use the systems.

Hoped-for Effects on Decision-making

An expectation shared by many is that the data in these systems will inform decisions at all levels of the education system, from the teacher to the principal to district administrators to state agency officials to state legislators (Alliance for Excellent Education, 2011; Data Quality Campaign, 2011a). Teachers and principals are expected to use the longitudinal data to track a students' progress and academic growth, not merely the passing of an assessment (National Center for Educational Accountability, 2007). Some districts and states are already using the longitudinal data to perform predictive modeling. These models can help educators identify students at-risk of dropping out or understand the high school courses that lead to post-secondary success (McDonald, Andal, Brown, & Schneider, 2007; Data Quality Campaign, 2006). State policymakers and legislators can benefit from evaluations of initiatives. Many evaluations look at the implementation of a policy and SLDS can provide outcome data for program participants to understand whether there was an increase in student achievement (Data Quality Campaign, 2006).

Ultimately, it is assumed that if outcome data are used to make decisions at all levels,

scarce resources will be spent more efficiently because people will have an understanding of what is likely to happen as a result of the implementation of program or intervention and decisions aren't based on anecdote or personal choice (Herman & Gribbons, 2001). Many industries have already embraced the efficiencies technology use can create and some have pointed out that education has been slow to recognize how technology can help free up time for other necessary activities (Cho and Wayman, 2012; Chubb, 2012; Wayman, 2007).

Hoped-for Effects on Collaboration

In addition, a SLDS provides numerous collaboration opportunities between the data partners. The obvious connections between early learning and K-12, or K-12 and post-secondary are intuitive, however, some states are building systems that can link social service participants to education data. In most cases, this previous lack of communication meant these students fell through the cracks in both systems. There is a belief that these new data linkages will encourage staff linkages across education and social service agencies which will lead to better service for these students (Data Quality Campaign, 2007a; Cho & Wayman, 2012; and Jonson-Reid & Drake, 2008).

Interestingly, there is relatively little evidence demonstrating how the use of data will improve student achievement (Ikemoto & Marsh, 2007; Palaich, Good, & van der Ploeg, 2004; Turner & Coburn, 2012). Some have found links between strong accountability and increases in student achievement while others have observed data use and strong school improvement teams to be correlated (Carnoy & Loeb, 2002; Chrispeels, Brown & Castillo, 2000). Understandably, given the recent news of longitudinal data resources, the possible impacts of longitudinal data use on student achievement are less known, as they have not been studied carefully. In particular, realizing the hoped-for benefits of these data systems rests on many assumptions

about the participation of people in the system, on the development of capacity and will, and on the details of what questions can be well- and efficiently-answered by these systems.

Strengths and Limitations of Statewide Longitudinal Data Systems

To understand how, and how well, P-20 longitudinal data systems will help educators achieve these hoped-for effects, one needs to be recognize both the strengths of and their limitations. The numerous policies and the millions of dollars from the federal government are evidence of their belief in the power a SLDS can have in reforming education. There are many advantages of a statewide P-20W system but can they overcome the limitations?

Strengths. A huge strength of these systems is the connection of education data, within and across education sectors. Prior to the building of SLDS, state education agencies consisted of a number of data collection systems specific to the program it was created to administer. There were financial, bilingual, special education, enrollment, assessment, and certification systems that may overlap in the data elements collected but were not connected in any way. Connecting the bilingual program data with a student's assessment and enrollment data was a project that took a lot of time, if completed at all. Data that needed to be combined required manual merging or keying data from paper (Data Quality Campaign, 2007b). Now apply this to the numerous systems in early learning, higher education and workforce. Having a P-20W SLDS becomes a powerful resource in understanding program outcomes (Petrides, 2003).

SLDS are also being built to be flexible, not transactional. Transactional systems typically only collect the data needed to allocate dollars or resources and are specific to the program. They do not collect all information about students, interventions or outcomes. SLDS, on the other hand, link data from a variety of systems in a way that can be easily accessed and related to other records. Mapping data to a flexible system means this only has to be done

once, rather than project by project (Palaich et al., 2004). This flexible, longitudinal system means educators can look at outcomes beyond the current school year and account for student mobility (Wayman, 2007).

Another strength of SLDS is that student data are matched and linked the same way every time, which also means this laborious work does not need to be repeated project by project. The state benefits from this efficiency and consistency because it maximizes the work completed and decreases the costs and burden to state agencies, especially when responding to data requests from researchers (Culhane, Fantuzzo, Rouse, Tam, & Lukens, 2010; Data Quality Campaign, 2011a).

Finally, these systems allow the data to flow back and forth between the education sectors and levels where previous processes included only a flow from K-12 to post-secondary or district to state agency. This flow of data encourages more cross-sector conversations, which leads to common language and potentially more effective solutions to problems (Palaich et al., 2004).

Limitations. A major limitation in understanding student outcomes using a SLDS is that it only includes data from the state in which it is located and in most cases, includes only public schools' student data. While most K-12 systems lose only a portion of its activity by not including private school data, post-secondary loses half of its enrollment by not having private institutions' data. In addition, with our highly mobile society, it could prove ineffective to make decisions based on the outcomes of students or employees who stayed in the state.

These systems are also limited in how they can quantify student success. For example, the student success metrics include assessment scores, high school graduation, post-secondary enrollment and completion and wages. While this may resonate with state-level policy makers

who colleges and universities to increase higher education attainment so students can get higher paying jobs and pay more in taxes, other stakeholders such as parents, may not be interested in these metrics. They may be interested in job satisfaction, exposure to new ideas, integrity and increased confidence.

Yet another limitation is based on the funding process for these systems. Because the funding has flowed through the K-12 state education agencies, many P-20W systems are outgrowths of the K-12 SLDS and this may not be helpful in post-secondary or workforce decision-making (Ewell, 2009).

Building a data system for educators does not mean that they are prepared to use it to make decisions. First, states have not considered, on a consistent basis, how to train educators to use the data system. Districts have not prioritized professional development for educators to learn how to use this new system, and many educator certification programs have not required training in learning how to use P-20 longitudinal data to make decisions, let alone specific training for any form of P-20 data use. Staff are generally not prepared, and schools are not structured to be able to take advantage of these new technologies (Petrides, 2006).

A SLDS will not realize its full potential until it engages educators in the design of the system and until that design reflects a careful understanding of the types of data needed to make decisions, for which kinds of users, and for what specific kinds of decision-making. Capacity, in terms of access, tool use and training needs to be created and maintained for all decision makers to be able to benefit from this powerful system. Many recognize that education is not where it needs to be to be completely "data-driven" and merely providing educators access to a data analysis tool does not automatically turn information into knowledge or increase student achievement (Alliance for Excellent Education, 2011; Cho & Wayman, 2012; Data Quality

Campaign, 2011b; Gottfried, Ikemoto, Orr, & Lemke, 2011; Herman & Gribbons, 2001; Mandinach, Honey & Light, 2006).

Many of the articles point to the ironic disconnect between the assumptions that data-based decision making is apolitical and person-neutral and the fact that people influence all aspects of data use, from determining what data to use to transforming it into evidence to describing the theory of the problem and solution (Gamson, 2007; Honig & Coburn, 2008; Knapp, Copland, & Swinnerton, 2007; Ikemoto & Marsh, 2007; Phillips, 2007; Spillane & Miele, 2007). As Phillips (2007) points out, it is unrealistic to believe that decisions will be made on data or evidence only. Politics, knowledge, ethics, goals, budgets and more all play a role in identifying the problem and the solution. Indeed, many policies at the federal and state levels take into account a variety of factors, not just the data or evidence. It is naïve for policymakers to believe that districts and schools do not also operate within a context and are immune from these same influences. In addition to contextual issues, there may be issues with the data itself. For example, the data may be insufficient, missing or inaccurate, meaning some decisions should not be made using the data.

Focus of Inquiry and Research Questions

Washington has a comprehensive P-20 data system because of its breadth of data sources and depth of data shared by state agencies. In addition, Washington has an office dedicated to P-20 work. This is unique as most states' P-20 office is within the K-12 system where resources are split between K-12 reporting and P-20 work. In addition, Washington has focused on sharing data with educators, in the form of data sets or aggregated reports, such as the high school feedback report.

Given the presence of this new P-20 longitudinal system in Washington, and in light of

its strengths and limitations, a substantial opportunity exists to develop much better insight into how it can be used to improve educational operations and outcomes. A sensible approach to seizing that opportunity starts with basic questions about actual use, or potential uses, to a range of users who have current or potential access to these data. Data are used to construct evidence, yet the steps involved and the supportive conditions needed for this process, with P-20 data in particular, have yet to be well understood. There has been a lot of work looking at the use of K-12 assessment data and Koretz and Jennings (2010) talk of the limitations of test data and the need to go beyond this data in order to determine increases in student achievement. ARRA and SLDS grant funding have supported the building of P-20W data systems but there has not been much research on how data from these systems are being used. To that end, this dissertation study asks the following overarching questions: How are K-12 educators making use of this new source of data, how are these data being translated into evidence and turned into action, and how are these data being incorporated into decision-making at the classroom, school and district levels?

Little work has been done to investigate how post-secondary outcome data are used within the K-12 sector. As a relatively new data source available to school districts, now is the time to learn how educators are using this data so P-20W systems can meet the evolving data needs of K-12 educators. Gamson (2007) points out that putting data and information in the hands of teachers is the only way to truly reform. But it is more than just putting data in their hands as Supovitz (2012) outlines in his article. "One of the biggest challenges to teachers is the 'now what?' question of what actions to take as a response to information…" (p. 19).

State-level policy makers have a number of assumptions related to these data. One assumption is that teachers need these data to make decisions. Another assumption is that using

these data will lead to increased student achievement. Undefined by policy makers are the types of decisions they believe can be made using these data and student achievement. For example, is student achievement related to assessment scores or does it also include high school graduation, post-secondary enrollment or earning a wage? Finally, policy makers believe that the data will illuminate a solution when it really only illuminates successes and problems.

Research is needed that explores the process that turns these kinds of data into action, and more specifically, into particular actions that serve the needs of users who are positioned differently in the system. Mandinach (2012) maintains that data needs to be turned into information and then information is turned into knowledge, which leads to action. The existing research does little to describe how knowledge is turned into action.

This dissertation study will take a first exploratory step towards understanding how P-20 data systems are being and can be used in Washington State. Through a strategy that relies on qualitative sources, the investigation explores a "vertical slice" of current or potential uses in the state's educational system. With these users in mind, I ask:

1. How, if at all, are K-12 educators in the state system using the data that P-20 longitudinal data systems provide?
    - For what decisions are these data being used, and specifically how?
    - In what ways is their use of these data related to their level and positioning within the system?
    - What does "data use" mean to them, with regard to this particular data resource?
2. What are barriers to K-12 educators' use of P-20 longitudinal data? How do these barriers differ, if at all, from those barriers that have already been identified to greater use of other forms of data for improving and guiding educational practice and outcomes?

3. What encourages K-12 educators' use of P-20 longitudinal data? In what ways, if at all, do these supportive conditions differ from those supports that help educators use other more immediately framed data resources?

Organization of the Rest of this Document

In Chapter 2, I layout the theoretical and conceptual frameworks used to study longitudinal P-20 data use and in Chapter 3, I describe the methodology used in this study. Chapter 4 contains the results of my study and Chapter 5 is where I discuss the implications of this work.

Chapter 2:

Conceptual Framework

To pursue the questions outlined in the previous chapter, this research relies on a set of framing ideas that consider what data is and what it becomes in the context of actual use. A useful starting point is some thinking about the "life cycle of data", derived from systems theory, that offers an overarching theoretical framework the research. By adapting and elaborating it, I then offer a more specific conceptual framework—that addresses more directly the research problem that is the focus of this investigation.

An Overarching Theoretical Frame: The Life Cycle of Data

In order to understand this transformation of data to action, I used the knowledge management literature base and Peter Fox's Life Cycle of Data (Committee on Earth Observation Satellites, 2011) as a theoretical basis for considering what is happening when educations use data of any kind (Figure 2).

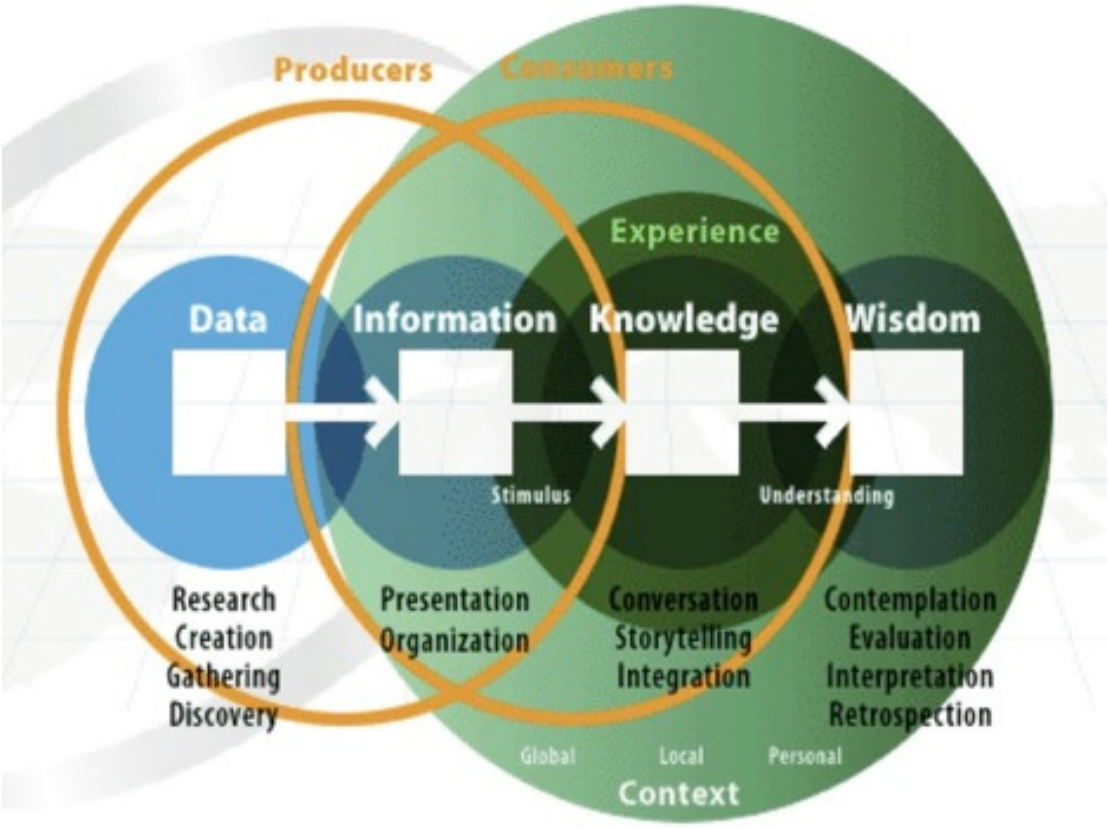


Figure 2: Peter Fox Full Life Cycle of Data (Committee on Earth Observation Satellites, 2011)

This data life cycle appears to be based on the Data-Information-Knowledge-Wisdom (DIKW) hierarchy first described by Russell Ackoff (1989) in a presidential address to the International Society for the System Sciences. In his speech, Ackoff talks of a desire to gain wisdom, just one of the many types of content in a person's mind. The other types of content he described were understanding, knowledge, information and data, with data being the most plentiful and wisdom being nonexistent. While Ackoff did not present a depiction of this hierarchy, others represented this hierarchy as a pyramid, with data as the base and wisdom at the top to represent the relative amount of each type of content (Hey, 2004; Rowley, 2007), and also

the logical relation of each type to the others: information is built on a foundation of the original (raw) data; knowledge, in turn, requires a foundation of information; etc.

But how are these types of content defined? Ackoff briefly describes what he means in his presidential address and others have expanded the definitions over the years (Bellinger, Castro & Mills, 2004; Hey, 2004; Rowley, 2007).

Data

This life cycle begins with data. Data are described as symbols, results of observations. According to Fox's graphic, people (producers) create data through research, gathering and discovery. In the case of this study, P-20 longitudinal data are created by linking data from the various education sectors, such as, K-12 and post-secondary. Each of these sectors contributes data and examples include assessment scores, high school courses taken, post-secondary enrollment and courses, and student demographic data (gender, race/ethnicity). The P-20 longitudinal data system assembles it in a form that others who want to use it can access it because these data do not exist in any single sector.

Information

Information is processed data. Information answers the who, what, when, and how many questions and allows people to see patterns that relate data items to each other, revealing systematic commonalities, differences, trends, and other forms of patterning in these relationships. The presentation and organization of the data are important in this pattern construction process, and they are meant to generate or provide information. Both producers and consumers have a role in this step, because the way the data is collected affects its accuracy and validity, and because the presentation and organization of data will affect how, and how readily,

it will be "consumed." Information takes form in the aggregation of data and comes in the form of tables, charts, graphs, etc.

For most educators, data can be overwhelming. Researchers working with the P-20 data work with educators to turn data into information in an effort to see trends or identify problems. A result of this work is the high school feedback report where K-12 and post-secondary data are linked to provide feedback to high schools about post-secondary enrollment trends or remedial mathematics course-taking by recent high school graduates (See Appendix A). These bits of information, in the form of tables, are generated by linking high school graduate data with their post-secondary course-taking data to determine the percentages of enrollment and remediation and allow educators at all levels of the system to see trends or identify problems at a school or district.

Knowledge

Knowledge is the use of data and information to understand how a system operates. While information answers the who, what, where questions; knowledge represents answers to the how questions. All the authors describe knowledge as very context- and person-specific. Knowledge is gained by learning it from someone else or experiencing it, as highlighted by the experience sphere that overlaps the knowledge step in the cycle. Sense making occurs when the user analyzes the information and applies his or her experiences and context. By reviewing, analyzing, and synthesizing information, consumers' thinking is stimulated and guided. As they consider the meanings of information in context, they generate knowledge—understandings of system operations and outcomes. For consumers, the information confirms, denies, amends, or elaborates current knowledge and wisdom thereby creating new knowledge. Taking this information and integrating it into current thinking enriches the conversation and the overall

story.

An example in the case of P-20 longitudinal data use may be the school district curriculum experts who are trying to understand how to decrease math remediation needs for recent high school graduates. Analyzing information from the high school feedback report, staff members see that remediation needs for graduates from one of the high schools in the district is less than the other school. This may lead to a confirmation that the mathematics curriculum change two years ago at one of the high schools is associated with a decrease in the number of graduates taking remedial math in college. While stopping short of a strong causal claim, this pattern raises new possibilities for understanding what the curricular interventions may be accomplishing. Along with other analyses, the consumers of the original data and information are constructing useable knowledge about the educational system with which they are concerned.

Wisdom

The transformation from knowledge to wisdom is the evaluation, contemplation, interpretation and retrospection of the knowledge discovered. Wisdom is created in understanding what does and does not work and "is the ability to increase effectiveness" (Ackoff, 1989, p. 5). According to Ackoff, wisdom is attained only by moving sequentially through the other types of content and is seldom achieved.

Continuing the example from above, wisdom in the P-20 system may be what is learned from an evaluation of the new mathematics curriculum and whether improvements in remediation rates are or are not related to the new curriculum. Understanding not only whether the new curriculum decreases remediation rates but also the context within which it worked and how the curriculum was implemented provides wisdom for other educators on the subject.

Strengths and Weaknesses of the Fox Life Cycle of Data

There are a number of advantages of using Fox's life cycle of data to describe how data are used in educational systems. First, it identifies two broad types of people involved in the process, the producers and consumers, and depicts their differing yet overlapping roles in the cycle. Second, it demonstrates that each stage in the life cycle builds on the previous one and you need to move through the process in a certain order. Third, the arrows represent a process or action step that occurs between each stage (or in the pyramid representation, each level, however, the pyramid hierarchy doesn't acknowledge that an action occurs in the movement between types of content.)

Finally, I find this framework useful in this analysis because it includes the contexts--global, local and personal--within which data use exists, and for which data turned into information and knowledge is useful. Taking context into account is especially important when looking at the actions that result from using data to inform decisions (Knapp et al., 2007).

That said, the life cycle of data ideas are highly abstract, and not as sensitive to the specific nature of the data under consideration here (P-20 longitudinal data), the specific user context (educators at various levels in the educational system), and the nature of "use" itself (making decisions about the design, resources allocation, etc., in educational systems), and for these matters, my research needs a more finely-tuned framework. In addition, even with the many strengths of the Fox life cycle of data, there are a number of other weaknesses in applying the "life cycle of data" ideas to describe P-20 longitudinal data use in educational systems. First, with the multitude of data in education and the numerous ways it can be displayed as information, the life cycle does not acknowledge any step or process *prior* to the step wherein data is turned into information. Data do not turn into information without an initial vision or

goal, or at least a question—something the consumer or user wants to know or do with the data. Second, the life cycle representation appears to leave out the actual uses to which the data or information or knowledge are to be used. It also doesn't recognize that actions are taken by educators based on what they see in the data (and based on other inputs as well) to address decisions in order to solve problems. Third, despite its title, this broad representation of data and what it becomes does not truly depict a *cycle*, in that it does not show how wisdom affects data, either in the collection of it or the transformation of data to information, nor how what happens at each step can loop back to preceding stages and shape or reshape what emerges from that stage. Fourth, while the arrows are an improvement over a pyramid, the arrows make the process appear to be linear and without obstacles, and this is not the case in education data use, or for that matter, any instance of data use. Finally, the life cycle does not identify where decisions are made, at what point action is taken, and what different actions may be involved. For example, some actions concern the actual processing of the data, information and knowledge; other actions concern operation of the system that the data, information or knowledge informs, and about which further data may be collected.

Other Useful Framing Ideas

Other scholarly work, more specifically developed for understanding education and educational reform or improvement, provides a way to build on the basic elements of the data life cycle described above. In particular, Ikemoto and Marsh's (2007) framework for describing a data-driven decision-making (DDDM) process in education addresses some of the weaknesses of Fox life cycle. First, it acknowledges that data, information, and knowledge are all influenced by past decisions, implementations, and impacts. This addresses a criticism of the DIKW hierarchy—the hierarchy would appear to treat all data collected as equal and that merely

collecting data means it will be turned into information (Fricke, 2008). "This encourages the mindless and meaningless collection of data in the hope that one day it will ascend to information – pre-emptive acquisition" (p. 135). He suggests that if questions are identified, people are more likely to know what type of data and information they will need.

Second, the DDDM framework shows that decisions are made and based on knowledge, which is based on information and data. Finally, it situates this process within the classroom, which is within a school and a district. For data use that concerns the classroom directly, this provides a useful "decision context" reference point, which takes us much closer to the situation confronting users of P-20 longitudinal data.

However, even with these improvements, Ikemoto and Marsh's framework is lacking any recognition of the state or federal policy context and ignores the non-linear and obstacle-laden process of turning data into information and information into knowledge. And while it acknowledges that data are influenced by past actions, it still does not adequately recognize how educators sift thought all the data and information.

Meanwhile, Geier, Smith and Tornow (2012) provide a cycle of inquiry and action that can also inform how data may be used. Their model begins with identifying and understanding an issue and then diagnosing the cause. Based on the diagnosis, an action plan is created, implemented and evaluated. After evaluation, the cycle repeats itself by identifying an issue.

This cycle of inquiry clearly identifies the need to identify a research question, or issue, and the cyclical nature of using data. However, it does not acknowledge the fact that all this work occurs within multiple layers of policy contexts; classroom, school, district, regional, state and federal.

A fourth framework, by Coburn and Turner (2011), describes yet other aspects of data

use, such as, the interventions to promote data use and the potential outcomes of using data. The framework also identifies organizational and political demands that affect data use. This framework for data use identifies "key dimensions of data use that should be attended to and offer a way to understand how these dimensions might interact. Our framework acknowledges that data use implicates a number of processes, conditions and contexts" (p. 174). This framework helps to identify the pressures faced by educators, however it does not describe how data are used.

Conceptual Framework

Drawing on Fox's Life Cycle of Data (2011), Ikemoto and Marsh's DDDM framework (2007), the cycle of inquiry research of Geier, Smith & Tornow (2012), and Coburn and Turner's (2011) framework for data use, I have created a conceptual framework that contributes more directly to understanding P-20 data use. See Figure 3.

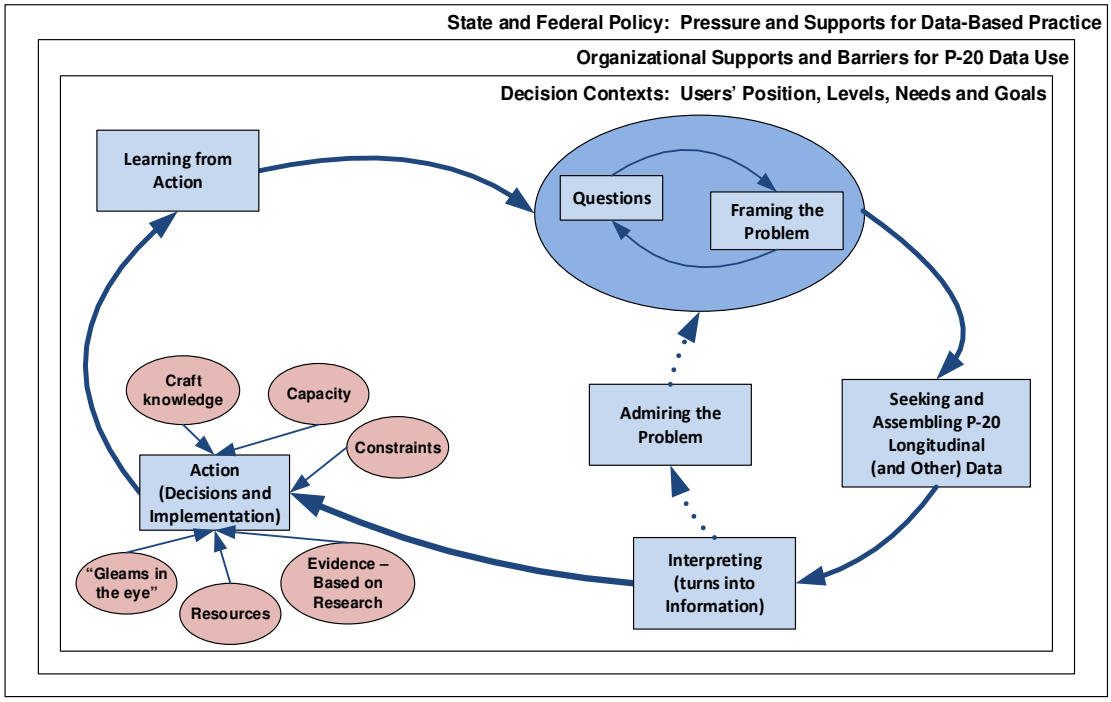


Figure 3: Conceptual Framework for P-20 Data Use

Because there is a lot of P-20 data available, simply putting out data without context is overwhelming for educators so beginning with a question and framing the problem is necessary in order to guide the process. Once people understand the question or problem, it is time to find data that can help provide answers to the questions and then interpreting the data to understand how to turn it into information for people to use and turn into action. Unfortunately, many educators think the process ends once the data are turned into a chart or graph (information) and they "admire the problem" rather than move onto the action step. While the chart or graph is helpful in communicating the problem, it does not tell an educator what action to take. In addition, for many educators, while these first three steps are difficult and time-consuming, there is a lot more support for this part of the process. There is less support for helping educators identify the problem of practice that contributes to the issue under examination that could lead to action, and even less for helping the educators generate or discover useful adjustments, designs,

or new practices that would enable them to alter the data patterns that they found through aggregating, analysis, and synthesis of data.

If a school or district is able to take action, the decision is unlikely to be "data-driven" in the pure sense of the term, but rather "data-informed" (Knapp et al. 2007). The action taken is influenced by a variety of factors, and data is only one of them; craft knowledge of the educators involved, capacity of the system, resources (people and money), constraints, availability of evidence-based research and finally, the creative thinking of those involved. Ideally, in keeping with the basic principles of cycles of inquiry, after an action is taken, new data are used to understand the effects of the action, and then the process begins again.

This whole process is influenced by school and district goals, which are influenced by state and federal policies or accountability frameworks, as well as the considerable pressure and support for data-based practices. Each step of this framework occurs within these larger contexts, as well as the more specific decision context, that is directly shaped by the specific data users, who occupy particular positions and levels in the educational system, and their needs or goals. The contexts may influence the goals of a district, which may influence the questions that get asked or which issues are identified as problems in the first place (Phillips, 2007). In addition, these contexts influence the people and resources available to collect or assemble data for use. It is also important to understand these contexts when reviewing the actions taken because the context influences the theory of the problem (Little, 2012) and "viable" solutions (Phillips, 2007).

Chapter 3:

Research Design and Methodology

To answer my research questions, I used a qualitative case study method, which allowed me to understand the processes educators use to turn outcome data into information and knowledge (Bogdan & Biklen, 2007; Gall, Gall, & Borg, 2005). According to Merriam (2009), "a case study is an in-depth description and analysis of a bounded system" (p. 40). In this case, the bounded system is the use of P-20 outcome data in decision-making by educators within the Washington State educational system, which includes school, district, regional and state levels. The nature of the conceptual framework also lends itself to the use of the case study method because of the importance of understanding the context of the system. "As a research strategy, the distinguishing characteristic of the case study is that it attempts to examine: (a) a contemporary phenomenon in its real-life context, especially when (b) the boundaries between phenomenon and context are not clearly evident" (Yin, 1981, p. 59).

A qualitative strategy was especially appropriate for this case, given the newness of P-20 longitudinal systems, and how little is know about how educators at different levels of the system understand, access, and use these data in their normal practice. Qualitative inquiry lends itself well to exploring phenomena that are not well understood. Without a common language around longitudinal data use, the qualitative method allowed me to introduce and explain the idea of P-20 data and the Peter Fox Life Cycle of Data (Figure 2) to my participants and help them explore and reflect upon how they used or could use P-20 longitudinal data.

Using the qualitative case study method is ideal when trying to understand context and process (Bogdan & Biklen, 2007; Gall, Gall, & Borg, 2005). This design allowed me to

understand data use processes in-depth and change direction if my assumptions of the processes were incorrect. This design also provided me with the ability to learn how educators defined P-20 data use for themselves. For example, Marsh (2012) found that definitions of data use differed across the numerous studies she reviewed. I was also able to ascertain details about the supports provided and how they were or were not helpful in data use. Because there is little known about the use of P-20 data, creating quantitative tools may miss important aspects of this phenomenon.

Settings and Participants

The state of Washington offers a particularly good setting for pursuing this research because of the existence of a P-20 office, the Education Research and Data Center (ERDC), in the Governor's budget office. Created in 2007, ERDC focuses on linking early learning, K-12, post-secondary and workforce data. In 2012, ERDC began producing an annual high school feedback report that reported to high schools and school districts the percentage of their high school graduates who enrolled on post-secondary institutions and the percentage of graduates who needed to take remedial math or English courses, among other information. For the first time, educators at state, regional, district, school and classroom levels had free access to statewide P-20 data about their high school graduates via this report.

More specifically, due to my past work experience with the Office of Superintendent of Public Instruction (OSPI), my current role within ERDC and my understanding of education governance in Washington State, I focused on contacting participants who could represent the state, regional, district, school and classroom perspectives and had experience with using data, though not necessarily P-20 data. This was especially important to answer my first research

question, In what ways is their use of P-20 data related to their level and positioning within the system?

To that end, I began by interviewing state-level data use coordinators, one focused on data governance and the other focused on data quality. Using the snowball sampling technique (Merriam, 2009), I asked the state-level staff to recommend regional and district administrators known for using data. After interviewing regional and district administrators, I asked them to recommend other district data users and also data users at the school level.

In addition, in my role at ERDC, I meet with various education groups. Through these meetings, I found a few district administrators who shared they had used the P-20 data in their work. After our meetings, I asked if they wanted to be part of my research.

Across the levels of the system, I looked for participants who could describe how they turned, or planned to turn, P-20 longitudinal data into information and then into knowledge for decision-making. After a few interviews, it became clear to me that there were few K-12 educators using P-20 to make decisions. At this point, I decided to broaden data use to any type of data use, not just the use of P-20 data, because this information from experienced data users could inform the field on how to make the P-20 data more accessible for educators to use for decision-making.

The following table summarizes the number of interviewees, their organization level and role.

Organization Level	Role	Number of participants
State	State agency coordinator	2
Educational Service District	Administrator	3
School District	Administrator	4
School	Principal	2
	Teacher	1
	TOTAL	**12**

Table 1: Organization level and role of participants

The state level coordinators interviewed worked for OSPI and were responsible for data governance and data quality. The three regional administrators worked for three different ESDs on the west side of the state and were chosen for their long history of data use or their role in promoting data use for their member school districts. School district administrators were from four different school districts on the west side of the state and were recommended by regional administrators or identified in meetings with ERDC staff. The four roles represented by the participants were superintendent, executive director, director of research and director of accountability. One district administrator interviewed recommended a principal within the district to interview. Finally, the middle school principal and mathematics teacher were from the same school district, again on the west side of the state. Table 2 below shows the distribution of district and regional participants by educational service district.

Educational Service District	Participants
Puget Sound (serves King and Pierce Counties)	Regional administrator District administrators (3) Principal
112 (Southwest Washington)	Regional administrator
113 (Capital region - the area between PSESD and 112)	Regional administrator Principal Teacher
114 (Olympic Peninsula)	District administrator

Table 2: Location and role of participants at the district and regional levels

Regarding district size, of the five school districts represented in this study, one district has over 20,000 K-12 students. Two districts have between 10,000 and 19,999 K-12 students and two districts have between 5,000 and 9,999 K-12 students. See Table 3 for the distribution of district participants by district size.

School District Size	Participants
Over 20,000 students (1)	District administrator Principal
10,000 to 19,999 students (2)	District administrators (2)
5,000 to 9,999 students (2)	District administrator Principal Teacher

Table 3: School district size and role of participants at the district level

Regional, district and school administrators from the east side of the state were also contacted based on recommendations but none of them responded to email requests for participation in the study.

Data Collection and Analysis

Heck (2004) describes a strength of the case study methodology is that it allows the researcher to analyze an abundance of data, gathered from a multitude of sources. To this end, I gathered two types of data: interviews and documents.

I implemented the responsive interview technique (Rubin & Rubin, 2005) to interview the participants. This technique allowed me to form relationships with my subjects and provide an opportunity to exchange information rather than just taking data. At the beginning of each interview, I showed each participant the Fox Life Cycle of Data and took a few minutes to explain the picture and what I was researching. After this explanation, I used a list of main questions and prompts, thus providing for a semi-structured interview (Merriam, 2009) so I had common questions across my subjects (see Appendix B).

Using the Fox Life Cycle helped the participants to focus on a process and use it to describe their data use practices. It provided a common language between us and the participants referenced the Fox graphic as they talked. Many mentioned that they had not thought about data use in the way Fox described it but many appreciated a picture to help them explain their process.

In addition, I located public documents (Merriam, 2009) that could be used to understand the culture of data use of the school district. These documents describe district student learning goals and policies about data use.

To analyze the data, I used a qualitative data analysis program called ATLAS.ti to highlight responses that related to any type of data use and used in vivo coding. In vivo coding involves labeling data using a word or phrase from the quote. Based on these in vivo codes, I

identified a number of similar ideas and categories that related to the research, especially in the areas of barriers and encouragements. Within a few of these categories, I identified subcategories to better identify the phenomena, which became my codes. I recoded the responses with this list of codes. After coding the interviews, I coded the public documents using the same nomenclature and related interview responses to specific documents, when referenced, using ATLAS.ti.

Once all the interviews and documents were coded, I categorized these codes into a theme related to the research question they answered. In one case, it was necessary to further group the codes according to the type of barrier they represented. Once the codes were organized into themes, I looked to see the roles of the participants whose comments were attributed to a particular code. Categorizing the responses within codes by role of participant helped in moving from themes to assertions.

The variety of data sources and subjects interviewed allowed for triangulation, which increases credibility, dependability, and confirmability (Lincoln & Guba, 1985; Miles & Huberman, 1994). To check the validity of my assertions, I performed member checks with my interviewees and shared processes and interpretations with my co-workers, who provided additional knowledge and perspective related to the data collected (Miles & Huberman, 1994; Merriam, 2009).

Limitations of this Design

While this design allows me to look at data use by educators in various levels of the education system, there are a number of limitations. First, P-20 data has not been widely available to educators in Washington state for very long. I am conducting this study early in the

creation of the P-20 system and because of this, educators do not have experience asking longitudinal P-20 questions or thinking about how these data could be useful in making decisions. Most educators have been limited to the data they collect locally or at the state level within their individual sector, not across sectors.

Another limitation is that I did not have the opportunity to witness data use. I collected data about people describing past data use or imagining how P-20 could be used. Furthermore, this research design did not allow me to determine if data used in these ways lead to increased student achievement. The research base on the topic of data use lacks studies that demonstrate a causal relationship between data use and increased student achievement.

In addition, the district educators I interviewed were mostly from larger school districts and all participants were from Western Washington. I was not able to interview how people from Eastern Washington or smaller school districts used or may use P-20 longitudinal data. The districts represented had histories of data use, either district or P-20 data, and I did not collect data from districts who did not have prior data use experiences.

Finally, as the data governance coordinator for the Education Research and Data Center and past budget advisor for the State Superintendent, I have experience working with the Legislature and have an understanding of their expectations of the P-20 data system. As an employee of ERDC, I assume that the majority of school districts have goals that reach beyond the K-12 system, such as producing college- and career-ready students. I also assume that district administrators and perhaps even high school administrators and teachers are using the information within the high school feedback report to determine if they are meeting their goals. My hope is that they are using this data to determine progress and/or identify whether they are

lagging behind peer districts. Another assumption is that districts and schools are using these data to make improvements for students in order to increase post-secondary enrollment. Yet another assumption in this position is that the state-collected data is the only data needed to make decisions.

However, as a scholar I review the literature and understand that just because data are available, use does not spring forth. Districts have a number of different priorities and limited resources and funding. In addition, I understand that information needs to be displayed in multiple ways in order to reach multiple audiences. I also know that there is more to decision-making than data. Finally, I understand that people at the various levels in the education structure are making vastly different types of decisions where the use of P-20 data may not be appropriate.

My own role within the education system of helping to shape how P-20 data are displayed and shared gave me knowledge of the decisions made in creating the high school feedback reports, for example, what information would and would not be included. Participation in this process gave me an understanding of what districts were requesting when the report was developed and why the requests were or were not fulfilled. The participants interviewed were anxious to provide feedback on the high school reports in hopes that their suggestions could be incorporated into future iterations of the report. Conversely, while this knowledge of the creation of the report was helpful in understanding how various users could use the report, I had to make sure I listened for other potential uses of the P-20 data, even if these uses were not supported by the feedback report.

Chapter 4:

Results

The participants in this study represent a variety of roles at different levels (state, regional district, school) in the education system; as such, the analysis will address how results differ by the position an educator has within the system and will be organized by the three research questions:

1. *How, if at all, are K-12 educators in the state system using the data that P-20 longitudinal data systems provide?*
    - For what decisions are these data being used, and specifically how?
    - In what ways is their use of these data related to their level and positioning within the system?
    - What does "data use" mean to them, with regard to this particular data resource?
2. *What are barriers to K-12 educators' use of P-20 longitudinal data?* How do these barriers differ, if at all, from those barriers that have already been identified to greater use of other forms of data for improving and guiding educational practice and outcomes?
3. *What encourages K-12 educators' use of P-20 longitudinal data?* In what ways, if at all, do these supportive conditions differ from those supports that help educators use other, more immediately framed data resources?

This analysis will also compare and contrast how P-20 data use and barriers and supports for longitudinal data use are related to other types of data, namely assessment data, for which there is a large source of literature.

How are Educators Using the State's P-20 Data?

Participants identified a number of ways the data are being and can be used. In some cases, participants shared examples of how they used the P-20 data but many interviewed did not have prior experience with using the high school feedback report and time was spent discussing possible uses based on their role in education and their experience with data use. Through the interviews and studying district and school documents, I found that P-20 data could be used in making strategic decisions, to provide context for local results, for implementation and evaluation and to connect with other data sources to understand an issue or problem.

Strategic Versus Tactical Decisions

When thinking about how P-20 outcome data is and could be used, participants identified two different types of decisions made by different types of educators. District, regional and state-level administrators and school district board members need data that support "strategic" decisions, described as benchmarking and summative. A state-level administrator described the P-20 outcome data as helpful when school districts are trying to understand if they are meeting their district goals, especially if those goals or strategic plans include college or career readiness. One of the district administrators works for a school district with a goal that "each student will graduate with the necessary skills and appropriate plan to continue to post-secondary options." Up until these P-20 reports were available, districts with these goals did not have a reliable way to know if they were making progress on this goal.

Another district administrator shared that his board wanted a data dashboard. "It had the typical data available on (OSPI's) Report Card and ERDC. One was the ERDC data on college going… It has the potential to inform resource allocation and definitely inform policy decisions that the board will make, as it already has."

Supporting the idea of strategic decision-making, a regional administrator said, "absent a strategic plan, you get distracted" with all the data available. He also acknowledged that he "used to think we were data-driven decision-making. Now I think we are nuanced, it is more data-informed decision-making. It takes control of data away."

Meanwhile, teachers and principals need data that support "tactical" decisions, described as day-to-day (and weekly or monthly) instructional decisions. A high school principal said,

> So the true teachers who use the data well, it's a more classroom-based type basis where they can get immediate feedback themselves and see how they can adjust their instruction. (Teachers) need feedback right away so (they) can adjust instruction. The teacher adjusts, reteaches and the kid does it again and gets it right… So, again, not to be disrespectful, the data I get from (the state) doesn't do me a whole lot of good because I've got live, warm bodies, kiddos who need that structure, attention, adjustment, right in front of me right now. That's what I care about if that makes sense.

This principal felt the annual nature of outcome data was not the right level of feedback teachers need to make instructional decisions.

In addition, a district accountability officer tasked with providing data for the educators in his district was concerned that "the educational system thinks that we're helping teachers but we're not… Real relevance to be actionable. That's not the data that a teacher needs to see. It's too much. Can you draw a clear line between what you are doing and what somebody will actually do with that data?" This district administrator felt it was too much to present these data to the teacher and expect them to process it enough to understand how their work may or may not affect the outcomes being measured.

The regional administrator described the decisions teachers are making as

> what the teacher is wrestling with is, of all of these kids I faced today, where are the dominant misunderstandings and how do I engage them in new and different ways so the students that are not understanding finally do understand? This is what teachers are wrestling with…and the system has culturally figured out that (P-20 data) doesn't affect my craft, it doesn't really affect kids so we massively invest in data warehousing tools

> that display beautiful charts, data that's only updated once a year so there's no short cycle engagement, monitoring.

When asked, the teacher described the data she used to make instructional decisions.

> MSP (Measurement of Student Progress) is one measure. My standards-based grading is one measure. They're just snippets of information. Comparing those students who have low effort and high performance and high effort and low performance, those are just snippets, a window. Now, (in preparation for the annual assessment) what I'm doing is looking back through our student information system and looking at all the performance stuff and anything that is less than a certain score, we're going over again. I am still using that data. Like, they had a hard time with greatest common factor and least common multiple and so we reviewed that today and had a lesson. I'm still using the post-assessment data for some stuff eight months later.

The director of assessment at a school district described how teachers used data in his district; "there were high level ones and there were low level ones, so they decided to split them up, identify who they were so they could get extra help. We have a lot more data than just state tests. And they use the quizzes or the end of unit assessments. They know whom their kids are who are struggling… They're actually using data, not so much the state assessment results."

From these responses, we see that data use is different based on your role. Teachers and principals have experience using data produced in the classroom to make tactical, or instructional, decisions that directly affect their classroom practice. Meanwhile, district and regional administrators are using the data to determine progress toward district or state goals.

Context for Local Results

Many of the state, regional and district-level administrators felt the P-20 outcome data was helpful to understand local results. For example, when a district finds out their post-secondary enrollment for recent high school graduates is 62 percent, should they celebrate? How does that compare to the statewide average or similar and nearby districts? "I don't know how we're doing until I see. Just because we show improvement, I don't have a context. I may know

that it is bad but I wouldn't have a context" (State-level administrator). Along the same lines, the same administrator, now quoting a district administrator, " 'I have no idea that there are districts up here who are doing fine. Who are they? Having known this, I would have moved my building quicker.' Now that's what we want."

Data use has been limited to the data produced within a district. With data being linked at the state-level, reports can be produced that include measures that are calculated uniformly across districts. For example, a superintendent may be proud to learn that the post-secondary enrollment rate increased two percentage points until he or she learns that the neighboring school districts experienced ten percentage point increases.

Implementation and Evaluation

A state-level administrator focused on data quality and data use spoke of using the P-20 data when implementing and evaluating new programs, especially those focused on college and career readiness.

> You have to realize that everything we do is implementing something, (data) is a part of the implementation process. Everything in education is about implementation. Ideally data is the feedback for how something is implemented. How do we build an implementation process that doesn't always start at the beginning? They're not using the data to implement. So because they're not using the data to implement any initiative, the initiatives tend to have the same outcome. So, we're going to implement an initiative and at some point, we're not going to understand why it's not working. If I'm in school improvement consistently and thing don't change, why is that? It's because we're not really looking at root cause.

For many, program evaluations consist of counts of students served, services rendered and resources used, in other words, outputs. Having the availability of P-20 data means programs can begin to gather and evaluate outcome data and understand if the program is meeting the outcome goals; such as, increased student achievement, post-secondary enrollment, etc. These data are especially important to program administrators at the state-level who are asked to

provide information to legislators and policymakers about the impact a program has had on its participants.

Triangulation

State, regional and district administrators spoke about using the P-20 data in connection with other data to understand or explain an identified problem. A district superintendent spoke of using ERDC's data to understand declining enrollment in her district:

> OK, so, let me walk you through what I was explaining. So, our funding disaster, which you may or may not have heard of but we have this huge budget problem… In a school district, the most important thing about revenue is enrollment, so this was our enrollment for 2010-11, 11-12, 12-13 and this is what we budgeted for 13-14 and this is where we are coming in. This is where we were coming in at the beginning of the year, and the difference, again, my background is engineering, the difference here, it appears that our enrollment is exponentially declining, it's not regular. As a data person, I ask, what is happening? One of the things that is happening, in 13-14, this is the number of children that live in the district who are choicing out (students going to a nearby district). And then if you have 300 homeschoolers to add, then that's about 1,000 kids who are choicing out. This number has increased by 120 from the year before [students going to a nearby district] and this number has gone up 10. This is where our big losses are occurring [high school students], other than kindergarten, which is here [students going to other nearby districts].
>
> And so I ask, why would people want to go somewhere else? In particular, in secondary. Then, I pulled the ERDC data [Table 1 comparing surrounding school districts]. One of the key data points that we saw, if you look at (the two nearest schools districts) and (our school district), and this form we actually used with staff, you can actually see the chart of 2011 HS graduates who went on to post-secondary. The state average was 60 and if you look at this [neighboring school district], 70, this [neighboring school district] is at 71 and this is [our school district] at 46… So for me, when I look at a data point, it really started back here [enrollment chart]. Why? Because I didn't start with this [ERDC data].
>
> I also did a parent survey. So we have a community survey and huge, almost 800 responses, almost all of it around academic rigor.

Along the same lines, the state-level administrator focused on data use and quality also spoke of triangulation. "The triangulation part is a cycle because you need to get more data to tell you what the other data is telling you, triangulating the data to do the deeper dive so they can

really understand the root cause of the problem." A regional administrator supported this thought by describing all the data "as a massive mosaic" and the ERDC data "is but one tile."

A school district administrator planned to share the ERDC data with a principal transferring to a new school because he felt "it would be helpful for (the new principal) to review the ERDC data for his new school. This exercise could be really good for him to get familiar with the school he is going into." This same administrator was also using the ERDC "to see what happens after graduation, as well as other data sets. We're going to want to take a look, we'll be more critical of the data sets we've already chosen to collect internally."

Triangulation refers to the use of multiple data sources to confirm a result or conclusion. A regional research director mentioned that she believes her job is to encourage school districts "to think about other data sources because we haven't for a long time because we just start with the data we have." However, she was also concerned that at "the heart, root of the challenge is that we are not collecting the right data." In addition, she worries that this focus on using data to make decisions supports institutional racism. "I don't want to come to the end of my career and find out that I perpetuated racism in my work because data is so embedded in those institutional practices. Disrupting that is so tough because there are so few resources going toward qualitative work."

Another regional administrator echoed this sentiment,

> You know what I think drives 90% of it? I don't know what the number is but 'it's easy to put our hands on.' Quantifiable things. We as a culture are massively invested in concepts of accountability which produces winners and losers. We're massively invested in quantification of learning so we have standards-based assessments. We have all of those things and we're trying to make meaning out of the quantification of displays of data and we miss a whole part.

Both administrators feel that the P-20 data helps with triangulation, but they also feel the data the state collects does not tell enough of the story and the data being used to make decisions may be leading to the wrong actions. This practice is helpful in confirming results but it may be limited because the state only collects certain types of data.

Patterns of Use and Non-use of P-20 Data

In sum, respondents across the system saw different kinds of uses for the P-20 data, though their actual or hoped for uses reflected their positions and the kinds of decision-making they were responsible for.

District, regional and state-level administrators are using these data for strategic decisions, ideally to meet district goals. Administrators can compare to similar districts to see how they measure up and also to find schools that are doing well on certain measures so they can find programs with good strategies. Regional and state-level administrators would like the data to be used in the implementation and evaluation of programs. Finally, administrators are using these data to try to further understand a problem they have identified.

By contrast, teachers and principals are not using these data because it does not help them make tactical decisions, meaning they are not able to use these data to make daily instructional decisions in the classroom.

What are Barriers to Statewide Longitudinal P-20 Data Use?

With all of the emphasis on using data to make decisions, understanding what inhibits data use, in particular the P-20 data from the state, is as useful as understanding how data are used. In my interviews, all the participants identified a number of barriers that need to be addressed in order to encourage more data use. These barriers can be organized into the following categories: educator needs, data provisions, and fears.

Educator Needs to be Met Before Widespread Data Use

Using P-20 data to make decisions is a new type of data use for many educators. While the high school feedback reports have been available for K-12 educator use for three years, the educators interviewed identified the lack of time, tools and confidence as barriers to using P-20 data.

A number of the regional administrators and a district research director identified the **lack of staff time** as a data use barrier. This is related to the educators within the system using data to do their work and also the lack of educators who are focused on helping others use data. The regional superintendent said, "the resource of time is not present in our system for sustained, purposeful engagement in meaning-making." Another regional administrator said, "we act as if we're supposed to be data-driven but we don't have the people in place." In addition, "small districts, they don't have the manpower" (State-level data quality administrator). There are no people with this particular focus, and if someone is data-savvy, there is no time for them to work with others.

A district research director does feel the P-20 data would help in making decisions, but he also saw time as a barrier to this type of use:

> Yeah, knowing if a kid went off to high school would be helpful; it's just that we haven't had it. We haven't had the time to look at the data because we are overwhelmed by other things. We would love to have data on where our kids went. Did they have remediation? Did they go to college or not? It would then still require us to do further analysis, which we don't have the time to do.

Some see the **lack of tools to create data displays** as another barrier. This also points to the lack of knowledge of how to use available tools. A few participants (district and school administrators) spoke about the need to create their own displays.

> Having the data tools available, having conversations and knowing, that if you are a teacher, you are going to have a conversation with your principal about this, will make the teacher start looking at the data…we are totally in the dark. Data sets, data tools, please. (District-level administrator)

> (The assessment coordinator) is really reliable about putting data packages together and providing data that we want. But I don't ask her for it because then it's not mine. I just went onto the site and found the stuff because if I get in and wrestle with the stuff, I can talk about it. She sends printouts of all the kids and their MSP and MAP, grade in math, this really rich spreadsheet of information but then I can't do anything with that. The NWEA site that has the MAP data has a tool to make charts and stuff but it doesn't do what I want it to do, or I don't know how to make it do what I want to do. So wrestle with it. There's so much data available, you can get what you want and a ton more. That's just the way I can make it meaningful to me, I have to mess around with it. (Middle school principal)

Regional and district administrators talked about the expectations for others to create data displays.

> Trying to figure out how to display the data is part of the challenge and having the skill set to do that is not really my skill set which is why we had to hire someone. We hired a consultant, a graphical guy, and gave him the data points and asked him to make these look good. We are going to hire out for the dashboard enhancements. It's a challenge for us to figure out how to display the data for it to be easy. As soon as you add other things to it, it becomes more complicated like the (P-20) site, which is not productive. (District administrator)

This district administrator's emphasis on finding good ways to display data was echoed by a high school principal's call for really simple representations:

> To me, your job, and folks in Olympia…show me a simple bar graph. I don't need all those percentages, I don't need all that. Just show me. Keep it simple because my life is busy, like everyone else's, but I need the data simplified. I need it quicker, more user-friendly so the layman or the people who don't have any education I can put a bar graph in front of them and say, 'look at where all these kids are going. Where are we going to help your son or daughter go?' But the scores, the sheet (of data), all that, I don't have time for that. Where I see the faults of folks, the folks that compile the data, it's not simplified enough. I need it easy; I need it simple so I can work with families, teachers and kids. It's (P-20 reports) convoluted. (High school principal)

> Along the same lines of displaying data simply, a district administrator described the following situation:

> A principal pulled me aside and said, nobody knows how to read this. So we made an annotated sample that had all these call-out boxes, this is what this means and this is what that means. The second you see that, oh I get it. So we've been trying to build boxes into displays to make it as clear as possible and it's not about end users aren't savvy or aren't smart. They don't deal with this. This is a very small part of what they need to do and they already have a full-time job plus. Nobody on the Internet is saying people should be able to read a pivot table to read an amazon review. We (in education) do (expect) that though.

This district administrator wondered if the data displays would be simpler to produce if "people trusted the data. If we assume people will question the data and methodology, we spend all the time trying to anticipate the fight" and this makes the display complex.

Because of the complexity of data displays, this district administrator created a quality standards document that applied to data and the display of that data. "In the ideal, we could publish a display that a lay person could immediately understand without explanation…" He expressed frustration with a PowerPoint presentation that had too small of font and was overproduced, meaning it had too much data, far beyond the original question.

The state-level data quality administrator felt that helpful tools for teachers would be created only if the technical analysts worked with teachers. The technical staff know how to create the tools and the teachers know the questions that need to be answered. There are few people who possess both types of skills and knowledge to create tools for teachers.

The educators interviewed expressed a need for tools to analyze all types of data, not just longitudinal data. I am unsure if all the participants felt these tools already existed but they all agreed that tools are necessary to increase the use of data.

Another barrier identified was the **lack of confidence** educators have **reading data or information and understanding what a display means**. This was mentioned as a barrier by

people at the state, regional, and district administrator levels. The state-level data quality administrator summed it up by saying, "If I were to say 'data,' to (educators), it's like saying 'math.' Data is intimidating." Because of this, her data use strategy has been to train regional data use experts.

Participants at the regional level, where the state has invested in training data coaches for the school districts, had many things to say about the lack of statistics familiarity. A regional data coach said this lack of knowledge affects participation in the process.

> There are the people who don't feel proficient around the ins and outs of how to read a data display, don't feel confident about their knowledge of quantitative data, so they don't feel as much as part of the process because they have this personal lack of confidence around how to read the data and don't know what to do about it…

How can an educator be a part of decision-making if they are not confident in understanding what the data are telling them?

Not understanding statistics also leads to believing data can help inform decisions where there is no connection. For example, a regional administrator voiced her frustration about a district trying to directly link the existence of a data leadership team to improved student outcomes.

> They absolutely believe that you can measure the effect of developing a data leadership team in student outcomes. It's the same problem in that they aren't trained, they don't know. Like if you take a couple of statistics classes, you are going to stop saying that. You are going to know that that's not true… I worked for the school improvement program for three or five years and I watched a lot of teachers misinterpret data, a lot of administrators, a lot of school improvement administrators misinterpret data… They make mistakes analyzing data so the information they have to make a decision is wrong. People sit around a table and misinform each other and misanalyze stuff and decide that they are right and act.

The state-level data quality coordinator and regional administrators identified that even if teacher and principal certification programs began requiring a certain level of statistics training,

there would still be a large part of the educator population without this knowledge. The state-level administrator felt the answer is

> two-pronged. We're infusing the system with all these teachers and administrators who are coming in with my vision on what they expect it to look like based on how (they were) taught. So we are recreating the framework over and over again. You've got to deal with that. Meanwhile, on the other end, you have thousands of people in the system who are going to be there for a while. How do we provide the kinds of resources that they need to be able to do it and the state needs to go out and elicit this. We need to look at training and all of us need to work together. This includes preparation programs and professional development for current teachers, need to coordinate professional development across all areas.

This participant felt coordinating professional development across all areas meant embedding data use in content area trainings, not separate data use trainings.

Overall, these administrators are saying that it is not enough to have the data available. For the P-20 data to be used, educators need to have time to understand how to use it, they need to have tools to further analyze the data in order to help them determine next steps and they need to be more confident in their ability to read charts and tables. All three of these topics are related in the sense that educators don't have time to learn how to use new tools in order to analyze the data, let alone time to just analyze the data. In addition, tools are more effective if educators understand what the data displays mean and communicate to the audience. Any solutions to address these barriers should account for the relationships between all three barriers.

What the P-20 Data Doesn't Provide

Educators voiced certain expectations of the P-20 data that they felt were necessary for use in making decisions. They felt that P-20 data was not timely or meaningful and it did not provide assistance in identifying solutions to the problems it identified.

This barrier can be classified as a **lack of timely access to the P-20 data**. For educators in or near the classroom, annual outcome is not helpful in day-to-day instructional decisions,

referred to earlier as tactical decisions. Because it comes after their students leave and only once a year, teachers and principals see the state's P-20 data as not timely. The principal of a large, urban high school said,

> If I can get data back in a timely, simplistic form to help teachers monitor instruction, that is useful… The teacher adjusts, reteaches and the kid does it again and gets it right. State scores are great, they tell me how we are doing from a standpoint (but) that timely, relevant, instant feedback so I can monitor the instruction so I can help a student be successful…that is huge. The data that's out there that I'm going to get a year later or six months later, to be honest, gets lost and nothing gets done with it. The data is great, but we got lost in translation between turning data into information and the data I receive from my district or OSPI is not timely enough. It's not relevant enough and at times can be meaningless.

This same principal described working with a teacher and the challenges of using outcome data.

> Take my AP (advanced placement) teacher. She teaches two AP classes. My challenge to her was, OK, if you're so great, I want the best AP scores in the district. She's working her kids, they're working it. I don't get AP scores back until mid- to late July. So she's trying to do all these pre-tests, formative, so she can predict how they're going to do, but she has no clue. So she'll get that data back in July and August and I'll say, OK, let's go back and figure it out and that's a whole lot of work, which she's willing to do. Wouldn't it be great if there were a sample she could do right now, fire it off on the computer and it gets kicked back to her in a day or two days about how we did so she could adjust her instruction RIGHT now, for the live bodies that we have versus the kids that are already gone?

Much like the work of a middle school teacher to implement college-ready programs, there is no feedback to that work until the students graduate five or six years later. In addition, the state-level data quality administrator described analyses using annual assessment or P-20 data as an "autopsy; it already happened."

Another complaint about P-20 data is **the data collected is not meaningful** for some educators, mostly those in and near the classroom. This is related to data timeliness in that educators do not get the data in time to affect the students in their classroom but points more to

the fact that educators do not agree that the P-20 outcomes that are measured (college-going rates, remediation needs) truly reflect the goals of their work.

For example, when thinking about the college-going rate for his high school, the principal of a large, urban high school had this to say,

> (A parent) might want to know how many kids went to a four-year school; sure I can tell you 22 percent. But what (a parent) really wants to know is how are we going to service the child. How are we going to help (the student) grow so (the student) can get to where (he or she) wants to go? That's what (a parent) really cares about…and now we are back to that relationship piece. How are you going to help my kid get into college?

In this case, the principal believes the college-going rate is not meaningful to parents because it does not communicate how students will be served individually. This principal puts more value on the relationships his teachers have with the students. "You can have great data but if a teacher has poor relationships with kids or I have poor relationships with my staff or teachers, data gets lost. It doesn't matter how 'good' it is." This principal does not see P-20 or assessment data as a representative of relationships in his school.

Another regional administrator described his pride in watching his child perform in a band concert as a way to question whether we are collecting meaningful data that matters to people.

> I would love to see parents in a gym and students come in dressed in their finest and sit in chairs and they get out their mathematics assessment and they produce that in front of an audience. We'll show up in droves to see our kids saw away on the viola. We'll applaud and take video and get engaged with that performance of the arts. But the stuff we're measuring right now, no one would want to watch a kid do but we make them do it all the time.

If parent participation is a measure of what is important to this group of stakeholders, are the data collected reflecting the value of education? Of course, while educators may not find these data

meaningful, other stakeholders; policymakers or the public, may find it helpful in understanding the impact of their tax dollars.

In addition, a principal of a middle school spoke about his staff's annual review of data that occurs prior to the school year.

> No one shared any concerns about the data. There really is a faction of teachers that questions the data but not the accuracy of it, they question the validity of it and is this really, this is just a test, we really should be looking at the whole child. What are we doing about the social issues for the kids who are just trying to get by and all we're doing is looking at MSP (Measurement of Student Progress) scores.

The data collected is not meaningful to educators because they see a graduating class as more than a college-going percentage or they see a student as more than a test score. A test score may not reflect the relationship between a teacher and student. The P-20 report also favors college going as the only goal to measure after high school. For some educators, knowing the percentage of students employed is just as important as post-secondary enrollment.

While the previous barriers had a number of various supporters, ten of the twelve participants mentioned that a barrier to using data was that the data did not provide a solution. In other words, it does not tell educators what action to take, which is characterized as "**Now what?**". One of the regional administrators said, "data helped identify that but it hasn't helped us solve the problem. A district administrator said, "A friend of mine calls it the dog chasing the car. The dog doesn't want to catch the car but the dog catches the car and now asks himself 'What do I do?'.

Educators from all levels voiced this issue. At the state level, the data quality coordinator had a number of things to say about this barrier:

> I can make brilliant data displays but it's the 'what's next' piece that people are completely stymied… They've been admiring the problem, they have all sorts of data to show that they've got terrible issues with dropout prevention but they still don't necessarily understand how to implement a program that focuses on the 'what next'…We already know we have a problem. You can beat people over the head with the data we have but it is the 'what next' piece and then how we implement it and then plan for sustainability. (Educators) need time to analyze the data and get to the root cause of the problem… That's the part of using data. Just because this kid is not coming to class or is failing doesn't necessarily mean it is all about the academics. You have to go back to the root cause of that.

A regional administrator agreed that many data users were stuck at the "admiring the problem" stage and can't move forward.

> Acknowledgement becomes wisdom when we turn it around from it being an admiration of the problem to exploring the behaviors we need to shift in order for that problem to see some measureable impact or change… So, we've analyzed and we see our problem and we can identify what success would look like, but what do I do? That's at the heart of it, right?

At the district level, all the administrators interviewed described their difficulties in understanding what actions to take once they used data.

> The piece that is missing is some direction… At some point, how do we intervene to fix it? What do I prescribe as the solution? How do I respond to all of this that shows we suck at this? That is the big piece. That is kind of what RTI (Readiness to Intervention) is going to do. But at a building level, how do we respond, how do I intervene to correct this whole big thing that is happening in a bad way? That is the piece that principals are struggling with the most. It (Data) doesn't lend itself well to a prescription… We're really trying to say, OK, what is the right thing to do to correct it? What do we prescribe? What do we do to intervene? How do we change for the better? That is what most people I work with are struggling with. (Large district administrator)

> I think there's a lot of data that people will look at. I don't know if people understand what to do with it all the time. I think sometimes people feel like measuring, gathering, and presenting and then you're done. 'Phew, Thank God, I've done my data stuff.' Instead of saying, 'Wait a minute, that's the start.' I mean, hopefully, someone would say, 'Well, what are you going to do about it?' But a lot of times I don't hear that question, 'what are we going to do about it?' Or we lack the will to do what we should do about it. Neither one is acceptable to me. (Large district superintendent)

> "The state test data doesn't tell teachers very much about how to teach better." (Large district chief accountability officer)

One school district has identified this as a problem and their director of research is addressing it. "So each of these things have a root cause. So we're designing systems to tell us what to do, what works with certain kinds of problems. Our interventions, that's where we are now."

At the school level, a teacher and principal described how they used assessment score data to identify a problem in their school. The district assessment coordinator provided data and during a staff meeting in August, all the teachers from the sixth, seventh and eighth grades reviewed data and identified sixth grade math and reading as areas of focus for the 2013-14 school year.

> The staff prioritized and they identified 6th grade math and reading as the priority so we made sure we built an extra learning assistance program class for reading and math, we had a big math group, we used to have our paraeducators who were funded with special ed money in the special ed classrooms and the paraeducators funded with LAP (Learning Assistance Program) money in the LAP classes but we changed part of that. We took the paraeducators out of the LAP classes because they're smaller, and put them in the regular classes serving those students. They were also able to serve the rest of the class but they focused on the kids who were LAP kids. So having extra support in the regular math class was a conscious shift that we made in where we put our resources. (Middle school principal)
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> How were these actions decided? Group discussion? (Beard)
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> Eventually, but it was this is what we want to do and so it was sort of a decision made for them but it was easy to justify because as a staff, they had decided we need to do something for 6th grade and that was something that we could do. It was sort of like, find some interventions for us, found some and now implement it. We also, as a side note, we also had a school board presentation that we made and presented our data and the impressive thing that I really tried to emphasize with the school board was that where the kids are as sixth graders, if they're with us for three years, they leave at a much higher achievement spot. It was nice evidence that there are lots of good things happening for kids. (Middle school principal)

The middle school math teacher identified that the extra help in her classroom and the LAP classes were making a difference in her ability to get through the curriculum at the

suggested pace and also positively affecting the scores on her formative assessments. When asked if she was going to get to keep this level of support in her classroom, she said she would "bark" if she didn't because it is clear that these interventions are working.

From these examples, it appears that educators have been using data to identify problems but they are expecting that identifying the problems will also highlight solutions. The middle school teacher and principal spoke of interventions they implemented after they identified sixth grade math as a problem, and this was a function of available resources and experience with these interventions. The data itself did not point to solutions. Educators might be more willing to use data if they were also presented with potential solutions to the problems the data uncover.

Overall, educators need to be made aware of what questions P-20 data can provide answers for. For those who are familiar with the uses of P-20 data, these stated expectations of educators will never be met. Conversations about the uses of P-20 data would be helpful so all educators, stakeholders and policymakers have a better understanding of how the data may be used to improve outcomes.

Fear of the Data and Compromising Student Privacy

Because the use of P-20 is new, the educators interviewed for this study expressed a fear of what the data would illuminate in terms of areas needing improvement. Some educators also identified that their colleagues were unsure about the legality of sharing P-20 data and there were concerns about student privacy.

The regional and district administrators voiced concerns about data quality and confidence in the data presented. Sometimes explicitly and sometimes not, they communicated a

degree of **fear of what the data will show** and how it might affect them or their fellow educators. A systematic linking of data to create a longitudinal P-20 data warehouse is a new function for the state. While some schools and districts may anecdotally know about the outcomes of their students, they are unsure of were they measure up against similar schools. Statewide P-20 data allows districts to compare themselves and prior to ERDC's High School Feedback Report, a number of school and district administrators were fearful that the report would not accurately represent all the positive things they did for their students. When describing the lead up to the release of the reports, a regional administrator said, "I would say that fear is predictable and we've seen that when the school districts first learned that their data were going to become public, there was a ton of fear and resistance…The districts were all really terrified."

As part of that fear, districts questioned the quality of the data, understanding that quality does not increase if the data are not used and reflected back to the data contributors. A regional administrator said,

> The way data quality has worked, the short of it is, when you use data, you find there's no quality. That's where you find the problems. That's pretty much how we've done it. Well, what the data quality folks at OSPI want is that they want to get ahead of the ball. We want to solve the problems before they go public. Before the data get used, it is good. Which is an interesting idea and I don't know how we accomplish it.

An interesting barrier is created in fearing the data. Data should not be used until quality increases and educators have confidence in the data, but generally, data quality does not increase until it is used and displayed. Many educators would prefer for data not be used until the quality increases, because a misrepresentation of the data may have negative consequences.

A district administrator of a large urban district said lack of confidence in the data could ruin any future use of the P-20 data. He had printed out a P-20 report for his many high schools.

One of those high schools had a similar name to a high school in another school district and he chose the wrong school.

> Having confidence in the data and the data set is important. Once I discovered my error, I printed out the right one but people (the principals in his district) were already wary of the data, they lost their confidence in the data. (Mistakes like this one) give them the out to not use it. Teachers need to see that this is worth their time. When it becomes not worth their time, we don't just take one step back, we take two steps back. So when I display data it has to be just right and perfect because if you don't, you just not move forward, you move back two steps.

This administrator now has an uphill battle in using the P-20 data because without the principals trusting the data, there will be no chance teachers will see it. He also pointed out, "if the data were favorable, there wouldn't be a question."

Another fear that acts as a barrier is the **fear of compromising student privacy**. The Family Educational Rights and Privacy Act (FERPA) protects student data and the consequence of not protecting student data is the loss of federal funds. While no education agency has ever lost federal funds over a FERPA violation, many educators and their attorneys are conservative about sharing student data. A regional administrator described a situation in a district she had previously worked.

> So, forever, FERPA has been used in one way, and when we didn't share data it was OK, now everyone wants to look. There was a rule in the school district where teachers could not know who was free and reduced priced lunch. OK, that makes sense in a way because who cares and it shouldn't matter and we're teaching all the kids so from an equity lens you might say that is not data people need to know. Everybody matters, everyone is equal, teach them. But in the lunchroom, every kid knows already so why are we acting like no one else knows? So FERPA is this weird, it is actually a pretty clear policy, it is a business need to know and if we have changed the business model in that teachers need to know then we have to change the access to the data. And if we have decided that there is a link between poverty and school achievement in a particular building in a particular district in a particular state and we're expecting teachers to fix that problem then they have to have data that can help them understand that. The lunch lady should not be in charge of who gets to know that because for the classroom teacher, their job is on the line and they have a business need to know. FERPA allows them to

> know but the lunch lady doesn't believe that and they believe it is their data and they have been trained and nobody can have it and they are very serious about it.

Along the same lines, the state-level data quality administrator said, "this is not a data issue, this is an access issue." Both felt FERPA trainings for educators would enable educators to advocate for themselves in accessing the data they need to make decisions.

These fears of what the data will show and compromising student privacy are strong barriers to data use. With the federal, state and district accountability structures focused on punishing schools for not meeting targets, it is hardly surprising that educators are concerned about what the data may reflect about their practice and that administrators may resist the sharing of data.

What Encourages Statewide Longitudinal P-20 Data Use?

Educators from all levels described two important supports needed to encourage P-20 data use; a process tied to district goals, led by questions and that is transparent, and an organization that fosters a culture of inquiry in all work. In addition, a couple participants had advice for how ERDC could display data that would encourage use.

Follow a Process That Encourages Data Use

In the interviews, the state, regional and district administrators described a number of steps that would encourage data use. Some felt it was important for the data use to be tied to a district's goals or strategic plan. "In our context, what are the problems of practice we want to wrestle with?" (Regional superintendent). In this case, the context is the district's goals. It helps people focus on what data would be helpful and what interventions they may implement. A large district administrator said he was "looking for data sources that will help determine the success of a graduate" because that is a district goal. He found the information in the high

school feedback report to be helpful because "it also fits our mission where we are following through beyond graduation." Also, a district director of research said having a specific district agenda helped him to do his work and provide data to staff.

In addition, a few of the state-level and regional administrators talked about the need to use "the cycle of inquiry as part of our work" (Regional director of research). "The process, no matter what the problem is, is actually the same until you get down to unpacking the problem of practice" (State-level data quality coordinator).

Two of the regional administrators and a state administrator described the problem with having no questions or problems identified to anchor the process:

> You bring everyone together, you give them the data and you have them write narrative comments about what do you see in the data. It is as anti-researcher, anti-inquiry as you could possibly get, right? You've got no question, you've got no problem, you've got no idea why you are looking. (Regional administrator)
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> I'm beginning to believe that one of the supports we can provide are some guiding and unpacking questions that will help someone do the meaning making about the display that we've created. If the end is wisdom, we should backward plan from wisdom, problem-solving where are we falling off the rails around this? We fall off the rails perhaps because we don't have questions. We fall off the rails perhaps because we don't have protocols. (Regional superintendent)
>
> You really have to start with what you think the problems are. What is it that you want to solve? …unless we start with questions we don't really know what kind of data we need to pull together. (State-level data quality coordinator)

A regional superintendent believes that starting with questions also helps in making meaning out of the data. "We never explicitly bring those questions forward and state them which helps in the meaning making process and we skip a critical step in the meaning-making process. We're not giving assistance like helping them with framing questions initially so they can frame their own eventually."

A large district administrator agreed with this idea that questions are missing in the analysis of data;

> It would help us to have guidance on the questions. That could be a recommendation of your study. Point us to a protocol that might already exist to help us have a conversation about data. If I could package it in a way for my principal, then what I would want is to model a conversation about the data that the principals could have with their teachers when you go back to your school. Still one of my goals. Here's the protocol that you follow. Here's the protocol you would follow about this data. Here are the questions that you might ask. Here's how you would generate questions about this data set. That simple piece isn't, principals aren't universally equipped to begin with that.

One of the reasons questions are missing from the process is because the state's School Improvement office encouraged the use of "data carousels." Data carousels is a practice that involves all of the school staff. The staff reviews data chosen by the data team and then write narrative statements about what the data says. A regional administrator described the practice:

> Here's the data, now find your problem in the data. Then do something about your problem and look at the data again to see if you solved your problem. The linkages between what the problem is, what you are doing and what the data say, it's as if there's supposed to be some causal chain there but there isn't but people are really unaware of that.

In fact, the middle school principal and teacher interviewed described their data activity during the summer as the data carousel activity. They had heterogeneous groups of teachers look at data displays of attendance, discipline and achievement data and write objective comments. "We just looked at the data and saw we needed to make sixth grade math the number one priority and it was resounding" (Middle school math teacher).

Also missing from the current process is a focus on identifying the problem of practice. Part of this work includes doing a root cause analysis. "The minute they get the data, they want to solve the problem but they are choosing. They really are not saying what is feasible, what's

reasonable, not identifying the root cause analysis" (State-level data quality coordinator). When this process is not systematic, solutions are usually limited to the life experiences of people sitting at the table and they may not solve the root cause. "In education we jump to answers too quick and we solve problems that don't exist and create other problems more often larger than not" (Large district superintendent).

Interestingly, one of the regional superintendents sees this lack of process as a problem of practice in itself:

> If we, as a K-12 system, had that stuff in place, my thesis is that we would see significant closing of the learning and opportunity gap but what we have is random acts of improvement because we have incoherence around all stages of this continuum of your framework. We have lack of clarity around the data. We have lack of clarity about what questions. We have lack of clarity about displays. We have lack of clarity around the protocols that people use and so we get inconsistent wisdom. That is at the heart of our K-12 system's problem of practice**.**

Washington appears to be moving in a positive direction on this topic in that OSPI has created a toolkit for use by district data teams and trained a cadre of data coaches working at the ESDs to serve as facilitators. The toolkit has outlined a process for districts to begin incorporating data into decision-making based on the cycle of inquiry work by Geier, Smith and Tornow (2012). It is clear from these interviews that a process is needed and it is also clear that many districts are not aware of the resources available.

Organizational Needs

Many district and school educators talked about a culture of data use being present in their organizations. This culture of data use, unfortunately, was not always in the positive sense. To create a positive culture of data use, educators must experience

> trust and people are allowed to explore and take risks and make mistakes and fail and that is not punished. So, I think for where it works, it's because people have been involved in the generative part that is so value-laden. That is important and that carries through to how to make meaning of the information. I do not believe in data for data sake. Like a culture of data use, if a school had a healthy culture of data use, it would be because they had an inquiry mindset. Data is one piece of how they move through their work. Being inquisitive about their reality and what was working and what wasn't. (Regional director of research).

> The other piece of the conversation is that there has to be an understanding and belief system that the data are not used to blame. This is where the trust becomes important. It is really about building a trust relationship. We are building this project and it is not about blame. It goes back to building a trust relationship where we all say, 'I will do everything in my power to make sure you are successful and we need to trust one another for that to happen.' That does not just come about. You really have to engage in the conversation and build the trust and it takes time. (State-level data quality coordinator).

> I need positive relationships with my staff so I can begin to explain the data when it's timely and relevant so they can make the classroom adjustments. (High school principal)

All three of these participants describe or imply that trust is a crucial element in a culture of positive data use. This trust is important especially in consideration of the fact that educators already fear what the data may say about them or their school. If they also have a fear of how the data may be used, data use can be stymied.

The large district director of research felt it was leadership's job to set this culture. Leadership needs to focus on data.

> Data matter. We are going to make decisions based on data. The expectation is that you know where kids are and data is one part of that…I think it really starts at the top. I think whoever is supervising principals has to make data use a priority. If that is a priority that means principals will use the data and that will force teachers to use it.

In addition, state-level administrators are concerned that this culture of trust and collaboration is not being built at the district, regional or state levels. If this culture is not replicated outside of a school building, the school is set up for failure if the principal leaves the

district does not replace that person with a leader with similar values. One of the regional administrators said all levels of the system lacked protocols on how to build trust.

> Usually it's the most passionate, articulate vocal person absent the protocol, which creates safety through structure, equity and voice. We haven't practiced as adults, how to make decisions in a group setting on things we're really passionate about so we need protocols that create safety around that dialog so that the team can say we agree that these things are what we're going to focus on.

In addition to creating a place of trust, part of a positive culture of data use is how educators look at the problem. "It's easy to blame the kids or the parents or the legislature or everybody in the world but what is it internally that we have to do to change the culture?" (State-level data quality coordinator). It is an issue of defining the problem as a problem of practice versus a problem of the students or organizational structure. The middle school principal faced this same issue as he led his staff through analyzing data. "The blame game is still going on. It's a reality and it's so easy to fall back on that. But then we just, well I just said, these are the kids in our building and we're going to work with these kids. The idea is that wherever they are when they arrive, we're going to move them down the road when they leave."

> But when you're way down here looking at the data as if it is about the student, there's a complete disconnect. It's so common for teachers to think the data are about the kids and then you have victim blaming and deficit-model thinking and all of these intellectual tools that maintain this structure of oppression that are racism and classism in our schools. It just holds it right there. So it has to be about their instructional decision-making. (Regional administrator)

One of the regional administrators said the blame game even affected the way educators "see" the data.

> When you put data in front of them (teachers), they only interpret things that they have control over. They sort of subconsciously filter those things they have not had any control over. They would look at (data) and you would see so much to be addressed and

> they never reported any concerns. And you think, why is that? At the core, either they are blind to the concerns or they have a disposition to blame what is external to them. The locus of control for the data is not the school team; it's the community, the family, the children. They bring in all those things as the root cause of this so they see no concerns they can impact so I don't interact with it and I don't take meaning from it other than some celebrations of look at how much improvement we've made in these areas.

For example, teachers looked at the data and saw that the students on free and reduced price lunch were not performing as well as kids not in the lunch program. They did not report a concern about this. The regional administrator maintained that this was because the teachers did not see that was a problem they could solve with teaching. They accepted this lower rate of achievement because they saw the problem as poverty, not education.

A culture of data use can also create a negative situation.

> There is an accountability; almost a fear factor at stake, that someone is going to be watching and looking. (The) accountability component is forcing people to wake up. If we give this test and we look at the data, the teachers will be forced to teach math. I thought this is a real stupid reason to get people to do their job, (but) everyone was motivated to teach math. (Large district director of research)

> Data is seen as bad. (We) need to change the culture around it. (Large district high school principal)

> She's using it (data) as some kind of a stick in a way. Data gets used a lot like that. (State-level data quality coordinator)

The middle school teacher felt "backed up into a corner" when the entire school agreed that sixth grade math should be a focus for the next school year. As the only sixth grade math teacher, she felt tremendous pressure and said, "everyone thinks I'm a horrible teacher."

Similar to the fear of data barrier discussed earlier, a negative culture of data use can lead to mistrust of the data. One of the regional administrators described what happened when she

provided a district data team with their data. "They would say, 'This is bad data. This isn't our data. This isn't true data. This is wrong data.' This is just bad in any way they could think of."

Creating a culture of data use also means the organization puts resources toward using data. "We act as if we're supposed to be data-driven but we don't have the people in place" (State-level data quality coordinator). One of the regional administrators agreed.

> We don't have leadership around data or good skills in leaders around it. We're not well-trained on getting the right data to the right people and thinking that we can. And we're not analyzing continually at the right level. For example, it would be really great for OSPI to put out weekly or monthly analyses. Another thing is to develop these data leadership teams, (but) no district is going to want another leadership team, so repurpose a leadership team to get more focused on data as a part of their charge instead of their whole charge being about data.

Another regional administrator described resources in this way:

> So the places where I see some hope, the leaders have built a culture around data use, which is probably multi-dimensional, not just achievement data, state-level achievement data. They've created hunger for teaming around it. They've problem-solved how to get people common planning time, common collaboration time. The district has usually supported it with resources that go beyond the school day but they also have some specialists that come in to produce some release time from instruction so the teams can meet, in ideal settings, two or three times a week on an on-going basis in a quick, rapid problem-solving setting. What do we know instructionally? What have we seen? OK, let's try this? Did we see an affect? We produce treatment plans that are implemented and monitored in real rapid fashion.

In the end, however, the regional director of research said each organization needs to ask itself

> How useful is data in making things better for kids? It is the same question we ask about anything else in the system. How useful is anything in the system? Because if the school system is functional and is in the right place and has good leadership, meaningful data use will come of that. When people are thinking of institutional racism and how data

> perpetuates that thinking, (meaningful data use will come of that). It would be difficult to have meaningful data use if all the other important culture pieces weren't in place.

Two regional administrators and high school principal questioned whether the use of data perpetuated a white dominant culture and wondered who is questioning whether a system built to use data is actually creating the desired results.

> When we choose to measure things, we change the nature of reality. So when we choose to measure certain things in school, we change the nature of reality, we change the definition of what school success looks like, we change the definition of what individual success looks like. So my anxiety about data use is that we seldom, as the people responsible for the systems, stop and ask, is this emperor fully clothed? What is it that we really wanted from our system? Did we want a system that pushes elementary kids out of the playgrounds because we want them to be STEM focused? Did we want a system that pushes the Arts out of high school. Did we want a system that 60% of high school students on the Healthy Youth Survey answered high school was not relevant to me. Do we want that kind of system because that is the system we're getting? It is the same system that we are getting 80% of kids meeting standards on the End of Course or most of our kids are able to graduate with high stakes assessments built in. At the end, that is one of the things I worry about. Readily-accessible data, measuring things that matter but at the same time we've changed the nature of reality of our system. When do we stop and ask, what is it that we really wanted from our system? (Regional administrator)

> I hate to keep harping on this white dominant culture idea, but it is such a big part of our data work that the data that we depend on to help us understand the next step is so rooted in white dominant culture that it leads us to conclusions that perpetuate that same white dominant culture way of thinking and because we aren't disrupting that cycle by speaking directly to families and kids and asking them what would make most sense to them, we keep moving down a path making more data informed decisions that just continue reinforcing our current practices. (Regional director of research)

For many, the conversation around institutional racism is a difficult topic. These two regional administrators are questioning this system of data-based decision-making but the majority of educators interviewed did not voice any thoughts about the unintended consequences of this focus on using data to make decisions.

Advice for ERDC

While pondering the high school feedback reports and the data needs of educators, the regional and district administrators mentioned a few pieces of advice. First, ERDC should provide training on how to use their reports, either on-line or in-person. One of the regional administrators also mentioned that drop-down questions would help lead people through the report. One of the state-level administrators said it is the state's "responsibility to provide back to (districts) information" since they provide us a wealth of data, but if they can't understand the reports, we have not fulfilled that commitment.

The large district chief accountability officer also felt ERDC could fill a void by creating an early warning system related to college and career success, similar to the early warning dropout system implemented by many school districts. Using the data to understand what high school characteristics are related to college and career success would be very helpful to the K-12 field.

The participants described many ideas that would encourage data use related to process and organization. Beginning with a research question in order to determine what data should be used and reviewed and following a cycle of inquiry process was desirable. In fact, their advice for ERDC followed this same logic. In addition, many of the participants described creating a positive culture of data use, which includes trust at all levels of the organization, is crucial.

Chapter 5:

Discussion and Implications

In this chapter I will summarize the main findings and then discuss what this means for P-20 data use in education, and more specifically, how this form of data resource can serve a state educational system, such as that in Washington State. I will also revisit the conceptual framework and discuss how, in the case of this kind of data resource, my findings support a more nuanced flow of data when it is used to make decisions. Finally, suggestions for future work and implications for this current work will be made.

To begin, it will help to recall the essential issues and questions addressed by this dissertation. The State of Washington's investment in building a P-20 data system and making it available to educators throughout the state offers a particularly good opportunity to understand what this kind of data resource can mean and how it can be useful to educators in contemporary efforts to improve and sustain a high-quality education system. Washington's P-20 data system includes the linking of student data from early learning, K-12, post-secondary and the workforce in an effort to understand the longitudinal paths of students and their outcomes. The enrollment, completion and assessment data from the state agencies that collect these data are sent to the Education Research and Data Center (ERDC) to be linked. P-20 data is typically looking at annual outcomes; such as, summative assessments, enrollments, completions, employment, etc. for a teacher's past students. The timing of the data lags to allow local education agencies (colleges and school districts) to ensure accuracy of the data, however, some educators do not find P-20 data timely and it may not be timely for the tactical decisions they are making. Due to the timing, data in ERDC's data warehouse is best suited for research purposes, not for student intervention.

Specifically, this study tries to understand how K-12 educators can benefit from understanding the post-secondary outcomes of their high school graduates. The ERDC produces a high school feedback report (ERDC, 2012) that tells school and district educators what percentage of the graduating class enrolled in two-year and four-year institutions disaggregated by race and ethnicity, free-and-reduced-price lunch eligibility (typically a proxy for low-income), amongst other categorizations. The educators also discover what percentage of their graduates enrolled in remedial math or English courses (See Appendix A).

The analysis I have undertaken and presented in this dissertation explores this question within a larger context, in which educators and system leaders are urged to use data extensively to guide their practice. In that context, all kinds of data are invoked, and we have begun to learn a great deal about the dynamics of data use and its potential as well as pitfalls in so doing. In this concluding chapter I will take care to shed light on the way the P-20 data resource does or does not fit into the larger press for data-based practice and policymaking, in an attempt to identify its unique potential—as well as its limitations—in helping the state create a stronger, more effective educational system.

Summary of the Main Findings

After talking with twelve educators from the state, regional, district and school levels, I found that not many of them used, or were even aware of, the P-20 data and information being produced at the state's Education Research and Data Center. The participants were chosen for their experience with data use and while few had experiences using the P-20 data directly, all participants were able to provide insight into my three research questions:

1. *How, if at all, are K-12 educators in the state system using the data that P-20 longitudinal data systems provide?*

- For what decisions are these data being used, and specifically how?
- In what ways is their use of these data related to their level and positioning within the system?
- What does "data use" mean to them, with regard to this particular data resource?

2. *What are barriers to K-12 educators' use of P-20 longitudinal data?* How do these barriers differ, if at all, from those barriers that have already been identified to greater use of other forms of data for improving and guiding educational practice and .outcomes?
3. *What encourages K-12 educators' use of P-20 longitudinal data?* In what ways, if at all, do these supportive conditions differ from those supports that help educators use other, more immediately framed data resources?

How are Educators Using, or Might They Use P-20 Data?

In this study, I found very few educators using P-20 data but for those who are not yet using it, many of them described the potential for it to be used in four different ways: for decision-making, providing context, program evaluation and triangulation.

They identified two types of decision-making, tactical and strategic, and these data are most helpful in making strategic decisions to meet district or state goals. For example, some districts have a goal of educating students who are ready for college or career. The high school feedback report could be used to find out the percentage of the graduates attending post-secondary institutions. In addition, the report provides information on the percentage of those students who took remedial math or English courses. A deeper analysis could look at the high school patterns of the students taking remediation, for example, What was the high math or English course taken? Did the students all take the same teacher? Are there curricular changes

that could be made? The P-20 data could inform decision-making if a district was going to try to decrease remedial course-taking of their graduates.

In contrast, all agreed that these outcome data are not helpful in making the tactical, classroom-level decisions that teachers and principals are making. Educators at the school level (principals and teacher) find this information interesting but for many, the outcomes are so far removed from their time with the group of students, sometimes years, they do not see how the data or information helps them make improvements. Instead, school-level decision makers—whether they are deciding what to do next in a science classroom, or figuring out how to build cultural responsiveness into the School Improvement Plan—are likely to turn to different data sources (e.g., formative assessments, attendance, discipline), if they use data at all. They want data that shed light on particular students, units of study, planning steps in the here and now and near future. In Rainey's (2013) study of data use in school-level decision making, she found educators used student demographic data, test scores, attendance, grades, discipline referrals, and community satisfaction data, among other data. Honig and Coburn (2008) and Marsh et al. (2006) found similar data being used in their research of school-based decision making.

Beyond specific decision-making, however, there is a broader need that P-20 data can clearly meet, in its capacity to help state, regional and district administrators understand better the situations or context for current educational issues or problems. These educators are using these data to compare districts in an effort to understand progress on reaching goals and can see other ways of doing so in the future. For example, a district superintendent used the P-20 to understand why the district was losing enrollment. By using the high school feedback report, she was able to compare her post-secondary enrollment rates to surrounding districts. Her district had a 46 percent post-secondary enrollment rate but she had no context that helped her

understand if this was good or bad until she looked at the districts surrounding her and found they post-secondary enrollment rates 70 percent and over.

A state administrator uses the data to show districts context in terms of improvement. For example, if a district only focuses on the percentage of remedial course-taking, they may assume that they are making good progress if the percentage decreases one or two percentage points a year. This state administrator uses the P-20 data to show districts how peer districts are doing on the same measure and this provides context for the decrease. In this case, peer districts experiencing decreases of ten to fifteen percent shines a different light on a one or two point decrease.

While the data are not being used in evaluating school or district programs, many administrators see the power of these data in program evaluation but there is still a lot of work to incorporate these types of measures in implementation plans and evaluation. Because these data have not been available without surveying participants, schools and districts would need to change how they think of "success" in these programs. For example, a school implementing a program to increase post-secondary enrollment rates for low-income students could now get actual post-secondary enrollment rates. Many current evaluations focus on the data that can be collected by the school, such as number of contacts with a student, number of applications filled out, whether financial aid forms were completed, etc because that is all that is available.

Finally, state, regional and state administrators see the P-20 data as another source of information to consider when trying to understand a problem or area of concern. Again, the district administrator with declining enrollments used the P-20 reports to try to understand why she was losing students. She said the parents knew for years what the P-20 reports showed, if they wanted their child to go to college, they needed to get out of the district. At this point, she

did a deeper dive into the data and found that very few eighth graders took algebra. When she talked to her middle school math teachers, she found that few of them believed that the eighth graders in their district were capable of doing algebra. Believing that algebra is a gateway course, she focused her efforts on finding qualified teachers to teach math and having them implement a math curriculum in elementary school that would prepare students to take algebra in eighth grade. She feels this course of action will ultimately lead to increased enrollment in the future.

What are Barriers to P-20 Data Use?

All of the participants identified a number of barriers to using P-20 data and they can be divided into three categories: unmet educator needs, unrealistic expectations about what the data can provide, and fears of what P-20 data will reveal.

Educators need more time and resources, in terms of assistance, to understand the P-20 data and what it could mean for their work. For example, the middle school mathematics teacher in this study talked about working closely with the district's mathematics coach when analyzing the formative assessment data in the Fall. The mathematics coach had the content and assessment knowledge to help the teacher make instructional decisions based on the data. If there were other grade level teachers in the school, the teacher would have also likely used common planning times to analyze and discuss the formative assessment data.

However, just providing more time will not increase the use of these data. Educators also need tools that will help them dig into the data to get details and also to help them display it in ways to communicate the issue they have identified. The middle school mathematics teacher showed me a chart of the formative assessment data displayed in quadrants to understand how the various data points she had on each student aggregated together by gender and by class

period. While she had lists of tests scores, she was not able to make instructional decisions without visualizing the data.

In the same sense, the high school feedback reports display data longitudinally and administrators can see when schools or districts are improving or declining, however, as one of the state-level administrators described, having the data plotted on a graph so district administrators can see the slope of the improvement or decline next to other districts is much more powerful and instructive. The administrators who are visualizing data are using Excel now but the district assessment coordinator said many administrators in his district are not comfortable with Excel. Data visualization tools that would allow users to drag and drop data may increase data usage.

Finally, many of the state and regional administrators said that all educators need better training in how to read and understand data. This issue is not unique to P-20 data. One of the regional administrators felt more training in statistics was necessary before educators could be expected to use data in decision-making. Understanding significance and effect size, among other statistical terms, may affect how an educator views the data and how much weight to put behind it.

Another set of barriers that need to be addressed is the expectations of policymakers and educators about what the data can provide. Much of the research on data use looks at teachers using formative assessments to make instructional decisions (Jennings, 2012; Marsh et al., 2006; Slavin et al., 2013; Wayman and Stringfield, 2005). These data can come in monthly, weekly or even daily and can be acted upon immediately and applies to the students in front of the teacher at that moment. Though less studied, a parallel pattern pertains to administrators whose work connects directly and continually with teachers' work, as implied by my discussion about tactical

uses of data in decision making. P-20 data is typically looking at annual outcomes within the K-12 system, such as, grade progression, graduation, assessments but also outcomes in the sectors following K-12, such as, post-secondary and workforce. For a third grade teacher, it takes ten years to find out if a student enrolled in post-secondary education or is employed full-time. Some educators do not find P-20 data timely and it may not be timely for the tactical decisions they are making.

Other educators question whether the P-20 data are able to shed light on the full range of student trajectories in which they are interested. Currently, the high school feedback report looks at college-going patterns of high school graduates (See Appendix A). For some educators, they are just as interested in which of their graduates have jobs because going to college is not the only goal of a K-12 education. Educators also were frustrated that with all these data available, the data could not provide them with the solutions needed to fix the problem identified. Data never provides solutions and I am unsure why the participants I interviewed had this expectation. I do not know if this expectation was directly related to the P-20 or of all data. Again, this is different than the current use of formative assessment data. When looking at the results of formative assessments, a teacher is provided with information about the topics his or her students have mastered and those topics still causing confusion. P-20 data only shines a flashlight on a problem in that the data may highlight a problem of practice but much more work needs to be done to understand the problem of practice and then to determine a possible solution.

Finally, the educators interviewed spoke of two types of fears of using these data. One fear was the fear of what the data would reveal, what would the data say about the school or district and could the data be trusted? In some cases, these educators seem to feel that it was better to not know the results than to have to confront the issues the data would uncover. For

example, one district administrator shared the high school feedback report with the high school principals. For one principal, the report did not reflect a post-secondary enrollment rate he expected so he questioned the sources of data ERDC uses. This principal is not using the high school feedback report as a source of data.

Another fear was the fear of compromising student privacy. Regional and state-level administrators spoke about district administrators that did not want to share data because they were concerned about violating the student privacy law (FERPA). Violating FERPA has federal funding consequences and districts saw the risk of losing federal funding as a higher priority than sharing student data to possibly improve student outcomes. Some districts who were not interested in sharing data used FERPA to halt the sharing of the information, even if the sharing of the data was legal under FERPA.

What Encourages P-20 Data Use?

The educators interviewed described ideas that could encourage more use of all kinds of data, not just P-20 data of the sort that Washington state is providing. They felt that any data use could be encouraged with the following of a deliberate process and the creation of positive culture of data use in organizations at all levels; school, district, region and state.

In a variety of ways, the state, regional and district administrators described a process that began with a question that should be tied to a goal. In contrast, many reflected upon the use of data carousels where teachers in a school were shown charts of information and they were told to share what the data tell them. The process did not start with identifying goals or questions and these administrators feel that data use should be anchored within a context. Once anchored, data use cannot stop with the chart on the wall. Data must also be used to identify the problem of practice and this may require different data.

Data use can also be encouraged by leaders creating a positive culture of data use in their organization and creating a positive culture of data use means addressing the barriers identified. As my informants saw it, trust needs to be built and the idea of continuous improvement, or a cycle of inquiry, needs to be adopted by the organization. In their view, two types of trust needs to be built, trust in the people in the organization and trust in the data, which is related to the fear barriers and accuracy of the data. This was also found in Hamilton et al. (2009), Marsh (2012), Marsh et al. (2006), Wayman and Stringfield (2006) and Weiss (2012). The participants representing the state and regional levels felt the organization also needs to dedicate resources to data use in the forms of time, tools and training. This is related to the first set of barriers of educators needs and reinforces the findings of Coburn, Toure and Yamashita (2009), Mandinach (2012), Marsh (2012), Supovitz (2012), Wayman et al. (2010) and Wayman and Stringfield (2006). In addition to training about how to understand the data, the training advocated for by the state-level and regional participants should also address what the data does, or does not, provide the educational system.

What the Findings Say About the Use of and Prospects for P-20 Data Systems

This research highlights that educators in different roles within a state education system are making different types of decisions and need different data to do so. Previous research (Marsh et al., 2006) looked at teacher data use and the types of data they used (classroom and diagnostic tests, mobility and attendance). Educators in this study reinforced these findings that teachers need data to make tactical decisions and P-20 data does not support this type of decision-making. This study uncovers current and potential uses for P-20 data and highlights that the data is likely more useful to district, regional and state administrators and identifies these types of decisions as strategic. For example, increasing post-secondary enrollment or decreasing

remediation course-taking are related to districts' goal of preparing college and career-ready graduates.

Documents from national organizations encouraging states to make these P-20 data available to teachers, principals, and administrators make it appears that the federal level treats all educators in the same way, in that they all need the same data and are making the same decisions (Data Quality Campaign, 2011b). It is clear from this study that P-20 data is different from formative assessments and classroom test data and it cannot be used in the same way. These data serve particular kinds of decision-making needs, and answer particular kinds of questions well. For example, what are the outcomes of students once they leave one education sector and go on to another? Are particular K-12 programs or achievements related to post-secondary or workforce success or failure?

When looking at the accountability data from No Child Left Behind, some researchers mentioned that while the assessment data are useful in categorizing schools and districts, it didn't provide educators with the information needed to make changes (Honig & Coburn, 2008; Marsh et al., 2006; Slavin et al., 2013). This same complaint was raised by educators in this study when talking about the P-20 data in that the data did not provide a solution to the identified problem. Again, data never provide a solution, they help to pinpoint the problem of practice and shed light on the implementation and effects of certain interventions but the data never invent or suggest the intervention.

In addition, many of the supports that encourage data use found in the research were identified by educators in this study. Building trust in the organization and data (Hamilton et al., 2009; Marsh, 2012; Marsh et al., 2006; Wayman & Stringfield, 2006; Weiss, 2012), providing time and resources (Coburn, Toure, & Yamashita, 2009; Mandinach, 2012; Marsh, 2012;

Supovitz, 2012; Wayman et al., 2010; Wayman & Stringfield, 2006), and including data literacy in educator preparation programs and in-service professional development (Alliance for Excellent Education, 2011) were all mentioned in previous research. To be sure, most or all of this research has been focusing on the more immediate use of data taken from a given school year, and potentially used in that year at the school level—or at most revisited soon into the next school year to shed light on current practices. None of this research considered the lengthy time horizons that are inherent in P-20 data. That said, the same kinds of conditions may apply in the latter case, though perhaps they take a somewhat different form with P-20 data use. For example, basic data literacy as part of administrator preparation programs (aimed at the district level) might be somewhat helpful, but it wouldn't; necessarily get at the professional learning necessary to visualize what longitudinal data might mean or say.

This study also highlighted the fears educators have about the data and that a process is needed to fully realize the power of P-20 data. Educators fear what the data will reveal about their practices and they also fear additional accountability for outcomes out of their control. For example, enrolling in post-secondary is a choice and K-12 educators do not have direct influence over that outcome. There is a fear that, in addition to being held accountable for test scores, they will also be held accountable for post-secondary enrollment or employment. Including educators in the question formation and analysis of the data will provide a way for everyone to learn about and understand how the P-20 can be used.

P-20 data is unique in that it is created outside of an organization. Most data use has focused on data produced within an organization and thus, may have a level of trust because the people using it are typically the same people producing it. This fact was not explicitly stated in the interviews but was demonstrated in responses related to fear of the data and its quality.

When discussing the idea of data and what it represents, it appears that P-20 data may prove to be a better indicator of success, and more important to educators in their measurement of success, than a summative assessment score or graduation rate in that outcome data can include a variety of outcomes; such as, going to college and/or entering the workforce. For example, while the average assessment score for a school may be considered an important measure of school success, administrators may find they are more interested in measuring their success based on the post-secondary enrollment and employment of their graduates.

With the sheer volume of P-20 data available, it is easy to forget these data points do not fully capture the success of a person or organization. Some educators in this study raised the concern of institutional racism being promoted in this work in that only certain outcomes are considered in measuring success. The system as it is currently created, does not allow for other measures of success, such as quality of life, which may be an important measure for some educators. No one is really looking at the unintended consequences of focusing on increasing measureable outcomes at the expense of other work.

Student privacy is a big consideration in this work, as identified by educators when they speak of the fear of compromising student privacy. There is a contingent of parents and other stakeholders who are concerned about the government linking all of this data and who is allowed to access data. Some employers require access to an employee's Facebook page. Will employers attempt to access these data systems for use in hiring decisions?

Reconceptualizing P-20 Data Use

Finally, these interviews changed the way I conceptualized data use. During each interview, I shared the Peter Fox Life Cycle of Data (Figure 2) as a way to communicate how I was thinking about data use. Comments made by participants informed adjustments and resulted

in Figure 3, Conceptual Framework for P-20 Data Use. Missing elements identified by participants include the following ideas: the life cycle did not include stating the question the data were to answer, there was no action step and the arrows of the life cycle made it appear that moving from one step to the next was simple.

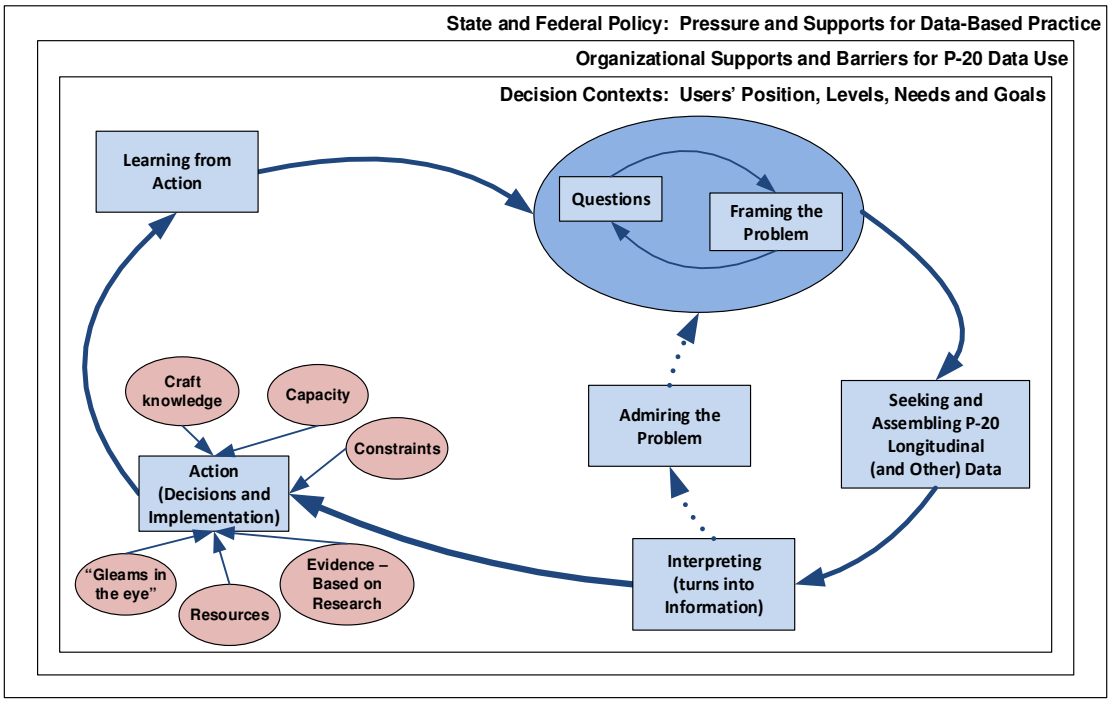


Figure 3: Conceptual Framework for P-20 Data Use

This conceptual framework first acknowledges at the entire process operates within contexts influenced by the school, district, state and federal government. These contexts and policies affect the questions and the framing of the problem. The participants with data use experience, though not necessarily P-20 data use experience, remarked right away about this step of the process missing. This framework also recognizes the cycle of focusing on the data and turning it into information. The state-level and regional administrators said most of the data use work focused on these steps without moving into knowledge and wisdom, as the Peter Fox life cycle suggests. Finally, Figure 3 creates an action step of the process, which is missing from the

Fox life cycle. It also acknowledges that actions are not influenced only by data. There are many thing to take into consideration before making a decision, making "data-based decision making" somewhat of a misnomer.

Limitations to the Findings and Possible Future Research

While I was able to learn about some P-20 data use in decision-making through my interviews, I did not observe any decisions being made using P-20 data. To do so would have meant attending staff meetings or common lesson planning meetings, and/or tracing backwards and forward through the various considerations that figure in strategic decision-making situations. In addition, more evidence of P-20 data use would have been desirable. For example, for the districts with college and career ready goals, it would have been interesting to see how the districts were using data from the feedback report to track progress and how they were using the data to make decisions related to improving the measure. It also would have been interesting to see districts using the data to try to further understand the achievement gap by looking at post-secondary enrollment by free and reduced-price lunch status or race and ethnicity. Many participants drew on their experiences using other data and their reservations about using P-20 data, hence the large amount of information about the barriers to using the P-20 data. In coming years, more publicity about the data availability should provide educators opportunities to use the data and provide more examples of P-20 data use.

Much of the data use described was limited to the step of turning "data" into "information" on the Peter Fox Life Cycle of Data. Educators interviewed did not speak to how information was turned into knowledge and how that knowledge was turned into wisdom. They also tended to leave "action" out of the cycle.

In addition, the high school feedback report is only one type of outcome report provided by the Education Research and Data Center. ERDC also provides feedback data to post-secondary institutions in the form of subsequent enrollments and completions and workforce data. Perhaps more people are using the information provided to the community and technical colleges or the universities. These findings cannot be applied to data users in post-secondary institutions.

Future research could focus on one organization and how the educators within it use data to make decisions. A case study of a school, district, educational service district or the state agency would provide an opportunity to observe decision-making rather than relying on interviews. Along these same lines, a study focused on non-users might reveal new techniques to encourage slow-adopters to get on board. In addition, a different level of organization or education sector could be studied to see how they use P-20 data. For example, a project could study how the Department of Early Learning, Washington Student Achievement Council, the colleges and universities or the Legislature uses P-20 to make decisions.

Another topic of interest would be to study the different decisions the P-20 data can be used to make. This information would be helpful in building the reports for the intended audience. Perhaps of interest may be to understand why policymakers and educators believe data provide interventions and solutions instead of just highlighting a problem of practice. Research found, and many participants voiced, this misconception and it might be interesting to understand why this belief exists. Finally, additional studies could be conducted to determine what type of staff resources are needed to support data use and the amount of statistics knowledge an educator needs to use P-20 data effectively would be instructive for colleges of education and in-service training.

Implications for Practice or Policy

Over the years, federal and state policies and grant programs have built P-20 data systems so educators can have data to make decisions. This study found that educators use data in different ways and P-20 data may be most useful in strategic decision-making for district, regional and state administrators. P-20 data is not helpful to teachers in making the tactical decisions they face on a daily basis. While educators talked about providing time to teachers to use data, it appears that administrators may also want to think about carving out time to dedicate to using data. Until people see the value of data use in doing their job, they will never make time to learn it or do it.

This study has implications for the design and scope of P-20 data systems. First of all, when combining data from different sectors, users need to take time to learn about the new data and how they may or may not relate to another sector's data. For example, while K-12 and post-secondary each have terms of enrollment, they may differ in the naming convention and the time period. Simply knowing the details about K-12 data may lead to wrong assumptions about post-secondary data.

When educators use data, this study highlights that beginning with a question and framing the problem are very important steps in the process. However, this step is not limited to educators. Any policy maker or decision maker should start with a question they want to answer and then ensure that the data available can answer the question. The system cannot answer every education question.

Therefore, understanding how P-20 can be useful and when it is not can lead to more efficient data use because these data cannot answer all questions. Having this understanding means data users will be better informed as to the type of questions that can be answered. As

identified by many participants, the P-20 data do not reveal the solution to a problem. P-20 data is rich with outcome information, dependent variables, if you will. The system does not collect independent variables, such as curriculum, intervention or obstacle. Because of this, P-20 data is useful in detecting, or illuminating, a problem or success. In every situation, if an educator wanted to know the cause of the problem or success, he or she would need to conduct further study to understand the reasons for the results in the P-20 data.

Related to the data use process, another important implication is the recognition that users need to take time to determine the problem of practice instead of going straight to solutions once a problem is identified. For example, consider a district that found their free and reduced price lunch students enrolling in post-secondary at a lower rate than other students. The staff would need to take this information they received from ERDC and do additional research to determine the solution. A problem of low grades dictates a solution different from a problem of students not receiving financial aid because they did not fill out the application form.

Communication is also important. Communication about the data and what it represents is necessary so users understand what is and is not included and also helps to build trust in the data. This can be difficult because of the silos between the education sectors. This type of data system can assist in a cross-sector communication strategy where educators from K-12 and post-secondary can come together to look at the high school feedback report and discuss the data and implications.

In Washington State, the Education Research and Data Center has a role in creating this communication opportunity along with providing training to all users in how the data are stored and may be used to make decisions. Understanding the data use cycle also informs ERDC on how they may provide data so it can be easily consumed by educators. For example, the data can

be organized under commonly-asked research questions. In addition, the research about the lack of data visualization tools may also help ERDC in how they provide and display data.

Data literacy is an important topic, not just for educators, but also for the public. With all types of data use in the media, it is important for everyone to understand how to read a chart or graph and what conclusions can be drawn. P-20 data and information shared with educators and the public should include supporting information, context and assistance in drawing conclusions.

In addition, this research identifies that the different roles in education need different types of data related to their influence and the decisions they make. Teachers need individual student information and feedback quickly so they can adjust their instruction. Principals need data at the classroom level so they can determine what kind of support his or her teachers need. Administrators need data at the school and district level so they can evaluate progress on district goals. Understanding the different decisions made at the different levels helps inform future products and define audiences.

Finally, it may prove to be more useful if the data were presented in a way that answered identified questions. This would support the process of data use described by participants and would assist users in locating the data within their context. As the data are presented now, many are unsure of what it means.

When increasing graduation rates was the ultimate goal of a school district, P-20 data was not useful or needed. Now that many districts and state systems include college and career readiness as a goal, P-20 data is necessary to understand progress and where improvements need to happen. As a result of the federal policies and grant programs, Washington has developed a P-20 data system that can assist in providing data to make these decisions, however, building a system is not enough. Understanding how P-20 data are used, what the data mean and sharing

this information with educators so improvements can be made goes beyond the building of a system and is the way to realize the true benefits of this investment.

BIBLIOGRAPHY

Ackoff, R. L. (1989). From data to wisdom: Presidential address to ISGSR, June 1988. *Journal of Applied Systems Analysis, 16*(1), 3-9.

Alliance for Excellent Education, Civic Enterprises, & Data Quality Campaign. (2011). *Education as a data-driven enterprise: A primer for leaders in business, philanthropy, and education.* Retrieved August 21, 2013, from http://www.dataqualitycampaign.org/find-resources/education-as-a-data-driven-enterprise/

America COMPETES Act of 2007. (2007). Retrieved August 15, 2013, from http://www.govtrack.us/congress/bills/110/hr2272/text.

American Recovery and Reinvestment Act of 2009. (2009). Retrieved August 12, 2013, from http://govtrack.us/congress/bills/111/hr1.

Bellinger, G., Castro, D., & Mills, A. (2004). *Data, information, knowledge, and wisdom.* Retrieved November 21, 2014, from http://www.systems-thinking.org/dikw/dikw.htm.

Bogdan, R. C. & Biklen, S. K. (2007). *Qualitative Research for Education: An Introduction to Theories and Methods* (5th Ed). New York: Pearson Education, Inc.

Carnoy, M., & Loeb, S. (2002). Does external accountability affect student outcomes? A cross-state analysis. *Educational Evaluation and Policy Analysis, 24*(4), 305-331.

Cho, V., & Wayman, J. C. (2012). *Districts' efforts for data use and computer data systems: The role of sensemaking in system use and implementation.* Paper presented at the annual conference of the American Educational Research Association, Vancouver, BC. Retrieved August 21, 2013, from http://edadmin.edb.utexas.edu/datause/papers/Cho%20%20Wayman%20AERA%202012%20v2.pdf.

Chrispeels, J. H., Borwn, J. H., & Castillo, S. (2000). School leadership teams: Factors that influence their development and effectiveness. In *Understanding schools as intelligent systems* (p. 39-73). (Vol. 4 in series, *Advances in research and theories of school management and educational policy).* Stamford, CT: JAI Press.

Chubb, J. E. (2012). *The best teachers in the world: Why we don't have them and how we could.* Stanford, CA: Hoover Institution Press.

Coburn, C. E., Honig, M. I., & Stein, M. K. (2009). What is the evidence on districts' use of evidence? In J. D. Bransford, D. J. Stipek, N. J. Vye, L. M. Gomez, & D. Lam (Eds.)

The role of research in educational improvement (p. 67-88). Cambridge: Harvard Education Press.

Coburn, C. E., Toure, J., & Yamashita, M. (2009). Evidence, interpretation, and persuasion: Instructional decision making at the district central office. *Teachers College Record, 111*(4), 1115-1161.

Coburn, C. E., & Turner, E. O. (2011). Research on data use: A framework and analysis. *Measurement, 9*, 173-206.

Colyvas, J. A. (2012). Performance metrics as formal structures and through the lense of social mechanisms: When do they work and how do they influence? *American Journal of Education, 118*(2), 167-197.

Committee on Earth Observation Satellites. (2011). *Data life cycle models and concepts.* Presented at Rennselaer Polytechnic Institute at USGS CDI, Denver, CO.

Culhane, D. P., Fantuzzo, J., Rouse, H. L., Tam, V., & Lukens, J. (2010). Connecting the dots: The promise of integrated data systems for policy analysis and systems reform. *Intelligence for Social Policy, 1*(3).

Cunningham, A. F., & Milam, J. (2005). *Feasibility of a Student Unit Record System Within the Integrated Postsecondary Education Data System* (NCES 2005–160). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Data Quality Campaign. (2006). *Data use drives school and district improvement.* Retrieved August 21, 2013, from http://www.dataqualitycampaign.org/files/events/resources/Meetings-DQC_Quarterly_Issue_Brief_092506.pdf

Data Quality Campaign. (2007a). *Linking education and social services data to improve child welfare.* Retrieved August 21, 2013, from http://www.dataqualitycampaign.org/files/1303_DQC-Research%20capacity%20May17.pdf

Data Quality Campaign. (2007b). *The right data to the right people at the right time: How interoperability helps America's students succeed.* Retrieved August 21, 2013, from http://www.dataqualitycampaign.org/files/events/resources/Meetings-DQC_Quarterly_Issue_Brief_061307.pdf.

Data Quality Campaign. (2011a). *From compliance to service: Evolving the state role to support district data efforts to improve student achievement.* Retrieved August 21, 2013, from http://dataqualitycampaign.org/files/1455_From%20Compliance%20to%20Service.pdf.

Data Quality Campaign. (2011b). *Leveraging the power of state longitudinal data systems: Building capacity to turn data into useful information.* Retrieved August 21, 2013, from http://www.dataqualitycampaign.org/files/1303_DQC-Research%20capacity%20May17.pdf.

Data Quality Campaign. (2012). *Investing in educator data literacy improves student achievement. Evidence of impact: The Oregon Data Project*. Retrieved August 21, 2013, from http://www.dataqualitycampaign.org/find-resources/investing-in-educator-data-literacy-improves-student-achievement/

Education Research and Data Center. (2009). *Washington ARRA SLDS grant application.* Retrieved September 8, 2013, from http://www.erdc.wa.gov/arraslds2009/application/

Education Research and Data Center. (2012). *P-20 Reports on Washington Public High School Graduates*. Retrieved September 8, 2013, from http://www.erdcdata.wa.gov/.

Ewell, P. T. (2009). "Shovel-ready" data: The stimulus package and state longitudinal data systems. *Assessment Update, 21*(5), p. 11-12.

Fricke, M. (2009). The knowledge pyramid: A critique of the DIKW hierarchy. *Journal of Information Science, 35*(2), p. 131-142.

Gall, J. P., Gall, M. D., & Borg, W. R. (2005). *Applying Educational Research: A Practical Guide* (5th Ed). San Francisco, CA: Pearson Education, Inc.

Gamson, D. (2007). Historical perspectives on democratic decision making in education: Paradigms, paradoxes, and promises. *Yearbook of the National Society for the Study of Education, 106*(1), 15-45.

Geier, R., Smith, S., & Tornow, M. (2012). *District data teams: A leadership structure for improving student achievement.* A PCG Education White Paper. Boston: Public Consulting Group. Retrieved November 26, 2014 from http://www.publicconsultinggroup.com/education2/library/white_papers/District_Data_Teams.pdf.

Gottfried, M. A., Ikemoto, G. S., Orr, N., & Lemke, C. (2011). *What four states are doing to support local data-driven decision-making: Policies, practices, and programs* (Issues & Answers Report, REL 2012-118). Retrieved August 21, 2013, from http://ies.ed.gov/ncee/edlabs/regions/midatlantic/pdf/REL_2012118.pdf.

Hamilton, L., Halverson, R., Jackson, S. S., Mandinach, E., Supovitz, J. A., & Wayman, J. C. (2009). *Using student achievement data to support instructional decision making* (IES Practice Guide, NCEE 2009-4067). Retrieved August 21, 2013, from http://ies.ed.gov/ncee/wwc/PracticeGuide.aspx?sid=12

Heck, R. H. (2004). *Studying Educational and Social Policy.* Mahway, NJ: Lawrence Erlbaum

Associates, Inc.

Herman, J., & Gribbons, B. (2001). *Lessons learned in using data to support school inquiry and continuous improvement: Final report to the Stuart Foundation*. Center for the Study of Evaluation, University of California, Los Angeles Technical Report 535. Retrieved August 21, 2013, from http://www.cse.ucla.edu/products/reports/TR535.pdf.

Hey, J. (2004). *The data, information, knowledge, wisdom chain: The metaphorical link.* Retrieved November 21, 2014, from http://www.dataschemata.com/uploads/7/4/8/7/7487334/dikwchain.pdf.

Higher Education Opportunity Act of 2008. (2007). Retrieved August 12, 2013, from http://www.govtrack.us/congress/bills/110/hr41.

Honig, M. I., & Coburn, C. (2008). Evidence-based decision making in school district central offices: Toward a policy and research agenda. *Educational Policy, 22*, 578-608.

Honig, M. I., & Venkateswaran, N. (2012). School-central office relationships in evidence use: Understanding evidence use as a systems problem. *American Journal of Education, 118*(2), 199-222.

Ikemoto, G. S., & Marsh, J. A. (2007). Cutting through the "data-driven" mantra: Different conceptions of data-driven decision making. *Yearbook of the National Society for the Study of Education, 106*(1), 105-131.

Improving America's Schools Act. (1994). Retrieved August 21, 2013, from http://www2.ed.gov/legislation/ESEA/index.html.

Jennings, J. (2012). The effects of accountability system design on teachers' use of test score data. *Teachers College Record, 114.*

Jonson-Reid, M., & Drake, B. (2008). Multisector longitudinal administrative databases: An indispensable tool for evidence-based policy for maltreated children and their families. *Child Maltreatment, 13*(4), 392-399.

Knapp, M. S., Copland, M. A., & Swinnerton, J. A. (2007). Understanding the promise and dynamics of data-informed leadership. *Yearbook of the National Society for the Study of Education, 106*(1), 74-104.

Koretz, D., & Jennings, J. L. (2010). *The misunderstanding and Use of data from educational tests.* Paper presented at the Spencer Foundation Meeting, The Process of Data Use, Chicago, IL. Retrieved August 21, 2013, from http://www.spencer.org/resources/content/3/3/8/documents/Koretz--Jennings-paper.pdf.

Lincoln, Y. S., & Guba, E. (1985). *Naturalistic inquiry*. Newbury Park, CA: SAGE.

Little, J. W. (2012). Understanding data use practice among teachers: The contributions of micro-process studies. *American Journal of Education, 118*(2), 143-166.

Mandinach, E. B. (2012). A perfect time for data use: Using data-driven decision making to inform practice. *Educational Psychologist, 47*(2), 71-85.

Mandinach, E. B., Honey, M., & Light, D. (2006). *A theoretical framework for data-driven decision making*. Paper presented at the annual conference of the American Educational Research Association, San Francisco. Retrieved from http://cct.edc.org/publications/theoretical-framework-data-driven-decision-making

Marsh, J. A. (2012). Interventions promoting educators' use of data: Research insights and gaps. *Teachers College Record, 114.*

Marsh, J. A., Pane, J. F., & Hamilton, L. S. (2006). *Making sense of data-driven decision making in education: Evidence from recent RAND research*. Retrieved August 21, 2013, from http://www.rand.org/pubs/occasional_papers/OP170.html

McDonald, S-K., Andal, J., Brown, K., & Schneider, B. (2007). *Getting the evidence for evidence-based initiatives: How the Midwest states use data systems to improve education processes and outcomes* (Issues & Answers Report, REL 2007-016). Retrieved August 21, 2013 from http://ies.ed.gov/ncee/edlabs/regions/midwest/pdf/REL_2007016.pdf

Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation*. San Francisco: Jossey-Bass.

Miles, M., & Huberman, M.A. (1994). *Qualitative data analysis: A sourcebook of new methods* (2nd Ed). Beverly Hills, CA: Sage.

National Center for Educational Accountability. (2007). *Six key uses of longitudinal data.* Retrieved August 21, 2013, from www.DataQualityCampaign.org/files/Publications-Six_Key_Uses_of_Longitudinal_Data_021307.pdf.

No Child Left Behind Act of 2001. (2001). Retrieved August 15, 2013, from http://www2.ed.gov/policy/elsec/leg/esea02/index.html.

Palaich, R., Good, D.G., & van der Ploeg, A. (2004). State education data systems that increase learning and improve accountability. *Policy Issues, 16*. Retrieved August 31, 2013, from http://www.coweninstitute.com/wp-content/uploads/2010/03/STATE-EDUCATION-DATA-SYSTEMS.pdf.

Petrides, L. (2003). Turning data into decisions. *The National Association of College and Business Officers Business Officer, 37*(5), 25-28. Retrieved August 14, 2013, from

http://www.iskme.org/sites/default/files/admin/petrides_2003_11_data_into_decisions1.pdf.

Petrides, L. (2004). Knowledge management, information systems and organizations. *Educause Center for Applied Research: Research Bulletin, 2004*(20), 2-12. Retrieved August 21, 2013, from http://www.iskme.org/sites/default/files/admin/knowledge_managment-information-systems-and-organization.pdf.

Petrides, L. (2006). ISKME Special Series Part 2: Data use and school reform. *T.H.E. Journal.* Retrieved August 21, 2013, from http://www.iskme.org/sites/default/files/admin/iskme-special-series-part2_data-use.pdf.

Petrides, L., & Nodine, T. (2003). Knowledge management in education: Defining the landscape. Retrieved August 21, 2013, from http://www.iskme.org/sites/default/files/admin/km_in_education.pdf.

Phillips, D. C. (2007). Adding complexity: Philosophical perspectives on the relationship between evidence and policy. *Yearbook of the National Society for the Study of Education, 106*(1), 376-402.

Rainey, L.R. (2013). *What are you driving at? How school leaders use data when making school-level decisions about instructional improvement* (Doctoral Dissertation). University of Washington, Seattle, WA.

Revised Code of Washington 43.41.400 Office of Financial Management Education Data Center. Retrieved September 8, 2013, from http://apps.leg.wa.gov/rcw/default.aspx?cite=43.41.400.

Roderick, M. (2012). Drowning in data but thirsty for analysis. *Teachers College Record, 114.*

Rowley, J. (2007). The wisdom hierarchy: Representations of the DIKW hierarchy. *Journal of Information Science, 33*(2), 163-180.

Rubin, H. J. & Rubin, I. S. (2005). *Qualitative Interviewing: The Art of Hearing Data* (2nd Ed). Thousand Oaks, CA: Sage Publications.

Slavin, R. E., Cheung, A., Holmes, G., Madden, N. A., & Chamberlain, A. (2013). Effects of a data-driven district reform model on state assessment outcomes. *American Educational Research Journal, 50*(2), 371-396.

Snow-Renner, R., & Torrence, M. (2002). No child left behind policy brief: State information systems. Retrieved August 21, 2013, from http://www.ecs.org/clearinghouse/34/61/3461.pdf.

Spillane, J. P. (1999). External reform initiatives and teachers' efforts to reconstruct their practice: The mediating role of teachers' zones of enactment. *Journal of Curriculum Studies, 31*(2), 143-175.

Spillane, J. P. (2012). Data in practice: Conceptualizing the data-based decision-making phenomena. *American Journal of Education, 118*(2), 113-141.

Spillane, J. P., & Miele, D. B. (2007). Evidence in practice: A framing of the terrain. *Yearbook of the National Society for the Study of Education, 106*(1), 46-73.

Spillane, J. P., Reiser, B. J., & Reimer, T. (2002). Policy implementation and cognition: Reframing and refocusing implementation research. *Review of Educational Research, 72*(3), 387-431.

Spillane, J. P., & Thompson, C. L. (1997). Reconstructing conceptions of local capacity: The local education agency's capacity for ambitious instructional reform. *Educational Evaluation and Policy Analysis, 19*(2), 185-203.

Supovitz, J. (2012). Getting at student understanding – The key to teachers use of test data. *Teachers College Record, 114.*

Turner, E. O., & Coburn, C. E. (2012). Interventions to promote data use: An introduction. *Teachers College Record, 114.*

U.S. Department of Education. (2005). Statewide longitudinal data system grants request for applications. Retrieved August 13, 2013, from http://nces.ed.gov/Programs/SLDS/pdf/RFA_2005.pdf.

U.S. Department of Education. (2008). Statewide longitudinal data system grants request for applications. Retrieved August 13, 2013, from http://nces.ed.gov/Programs/SLDS/pdf/2009_84372A.pdf.

U.S. Department of Education. (2009a). Grants for statewide, longitudinal data systems under the American recovery and reinvestment act of 2009 request for applications. Retrieved August 13, 2013, from http://nces.ed.gov/Programs/SLDS/pdf/2009_ARRA_RFA.pdf.

U.S. Department of Education. (2009b). Race to the Top Fund. Retrieved August 15, 2013, from http://www2.ed.gov/programs/racetothetop/index.html.

U.S. Department of Education. (2011). Family educational rights and privacy final regulations. Retrieved August 12, 2013, from http://www.gpo.gov/fdsys/pkg/FR-2011-12-02/pdf/2011-30683.pdf.

U.S. Department of Labor. (2010). Workforce data quality initiative solicitation for grant

applications. Retrieved August 12, 2013, from http://www.doleta.gov/performance/workforcedatagrant09.cfm.

Washington State House of Representatives. (1993). *House Bill Report, 1209.* Olympia, WA: Washington State Legislature.

Wayman, J. C. (2007). Student data systems for school improvement: The state of the field. In *Educational Technology Research Symposium: Vol. 1* (p. 156-162). Lancaster, PA: ProActive.

Wayman, J. C., & Cho, V. (2008). Preparing educators to effectively use student data systems. In Kowalski, T. J., & Lasley, T. J. (Eds.), *Handbook on data-based decision-making in education* (p. 89-104). New York: Routledge.

Wayman, J. C., Cho, V., Jimerson, J. B., & Spikes, D. D. (2012). District-wide effects on data use in the classroom. *Education Policy Analysis Archives, 20*(25).

Wayman, J. C., Jimerson, J. B., & Cho, V. (2011). *Organizational considerations in educational data use.* Paper presented at the 2011 Annual Meeting of the American Educational Research Association, New Orleans, LA.

Wayman, J. C., Midgley, S., & Stringfield, S. (2006). Leadership for data-based decision-making. Collaborative educator teams. In A. Danzig, K. Borman, B. Jones, & B. Wright (Eds.), *New Models of professional development for learner centered leadership* (p. 189-206). Mahwah, NJ: Erlbaum.

Wayman, J. C., Snodgrass Rangle, V. W., Jimerson, J. B., & Cho, V. (2010). *Improving data use in NISD: Becoming a data-informed district.* Austin: The University of Texas.

Wayman, J. C., & Stringfield, S. (2005). *Teachers using data to improve instruction: Exemplary practices in using data warehouse and reporting systems.* Paper presented at the 2005 Annual Meeting of the American Educational Research Association, Montreal, Canada.

Wayman, J. C., & Stringfield, S. (2006). Technology-supported involvement of entire faculties in examination of student data for instructional improvement. *American Journal of Education, 112*(4), 549-571.

Weiss, J. A. (2012). Data for improvement, data for accountability. *Teachers College Record, 114.*

Yin, R. K. (1981). The case study crisis: Some answers. *Administrative Science Quarterly, 26*(1), 58-65.

APPENDIX A: P-20 HIGH SCHOOL FEEDBACK REPORT

http://www.erdcdata.wa.gov/hsfb.aspx

Table 1:

EDUCATION RESEARCH & DATA CENTER *P-20 Reports for Statewide History*

What percentage of high school graduates enrolled in postsecondary education?

Table 1. Student enrollment by type of institution Enrolled in Postsecondary Ed Percent of Enrollments	2007	2008	2009	2010	2011	2012
Washington	85%	85%	84%	83%	83%	83%
⊞ Public 4-year	30%	30%	29%	28%	29%	31%
Private 4-year	5%	5%	5%	5%	5%	5%
⊞ Public 2-year	50%	50%	50%	50%	48%	47%
Private 2-year	0-1%	0-1%	0-1%	0-1%	0-1%	0-1%
Out of State	15%	15%	16%	17%	17%	17%
Public 4-year	5%	6%	6%	6%	6%	7%
Private 4-year	8%	7%	8%	8%	8%	8%
Public 2-year	2%	2%	2%	2%	3%	2%
Private 2-year	0-1%	0-1%	0-1%	0-1%	0-1%	0-1%
Total High School Graduates	62,902	62,019	62,866	65,706	66,350	66,241
% Going to College	60%	63%	63%	62%	60%	60%

Table 2:

EDUCATION RESEARCH & DATA CENTER *P-20 Reports for Statewide History*

What are the postsecondary education enrollment patterns of graduates by demographic characteristic?

Table 2. Postsecondary status for high school graduates by demographic characteristic.	2007				2008				2009				2010				2011				2012			
	2-yr enroll	4-yr enroll	Not enroll	Total grads	2-yr enroll	4-yr enroll	Not enroll	Total grads	2-yr enroll	4-yr enroll	Not enroll	Total grads	2-yr enroll	4-yr enroll	Not enroll	Total grads	2-yr enroll	4-yr enroll	Not enroll	Total grads	2-yr enroll	4-yr enroll	Not enroll	Total grads
Race/ethnicity (1)																								
Total	30%	31%	40%	100%	31%	32%	37%	100%	32%	32%	37%	100%	31%	31%	38%	100%	29%	31%	40%	100%	29%	32%	40%	100%
American Indian/Alaska Native	25%	16%	59%	100%	28%	16%	56%	100%	30%	16%	53%	100%	26%	16%	57%	100%	23%	16%	61%	100%	26%	17%	57%	100%
Asian or Pacific Islander	32%	42%	26%	100%	32%	43%	25%	100%	33%	43%	24%	100%	33%	43%	24%	100%	29%	43%	27%	100%	30%	45%	25%	100%
Black	33%	23%	43%	100%	33%	28%	40%	100%	36%	25%	39%	100%	35%	27%	39%	100%	33%	25%	42%	100%	33%	27%	41%	100%
Hispanic	29%	14%	57%	100%	31%	16%	52%	100%	32%	17%	52%	100%	33%	16%	50%	100%	31%	16%	52%	100%	30%	18%	52%	100%
White	29%	32%	38%	100%	31%	33%	35%	100%	31%	33%	36%	100%	31%	32%	37%	100%	29%	33%	39%	100%	28%	34%	39%	100%
Two or More Races	33%	28%	39%	100%	35%	29%	36%	100%	32%	31%	36%	100%	32%	28%	39%	100%	29%	31%	39%	100%	28%	32%	40%	100%
Gender																								
Female	30%	33%	36%	100%	31%	35%	34%	100%	32%	34%	33%	100%	32%	34%	34%	100%	30%	34%	36%	100%	30%	35%	35%	100%
Male	29%	28%	43%	100%	31%	29%	40%	100%	31%	29%	40%	100%	31%	28%	41%	100%	28%	27%	45%	100%	27%	28%	44%	100%
Free/Reduced Lunch Program																								
Yes	29%	15%	56%	100%	32%	16%	53%	100%	32%	17%	52%	100%	32%	16%	52%	100%	30%	17%	53%	100%	29%	18%	52%	100%
No	30%	35%	35%	100%	31%	37%	32%	100%	32%	37%	32%	100%	31%	37%	32%	100%	29%	38%	33%	100%	28%	40%	32%	100%

(1) Total includes other race/ethnicity not separately shown

Table 3:

EDUCATION RESEARCH & DATA CENTER *P-20 Reports for Statewide History*

For graduates, what is their high school academic performance by postsecondary enrollment?

Table 3. Pre-graduation indicators by postsecondary status

Indicators for Percent Graduated	2007			2008			2009			2010			2011			2012		
	2-yr enroll	4-yr enroll	Not enroll	2-yr enroll	4-yr enroll	Not enroll	2-yr enroll	4-yr enroll	Not enroll	2-yr enroll	4-yr enroll	Not enroll	2-yr enroll	4-yr enroll	Not enroll	2-yr enroll	4-yr enroll	Not enroll
High School GPA less than 3.0	35%	9%	56%	38%	10%	52%	38%	10%	52%	37%	10%	53%	33%	9%	57%	33%	10%	57%
High School GPA greater than 3.0	24%	56%	20%	25%	57%	18%	25%	57%	18%	25%	57%	18%	24%	56%	20%	24%	57%	19%
Met HSPE/WASL Proficiency Standard in Reading	30%	38%	31%	32%	35%	33%	32%	34%	34%	32%	33%	35%	30%	33%	38%	29%	34%	37%
Met HSPE/EOC/WASL Proficiency Standard in Math	27%	49%	24%	30%	43%	26%	31%	43%	26%	30%	43%	27%	28%	43%	29%	28%	41%	30%

Table 4:

EDUCATION RESEARCH & DATA CENTER *P-20 Reports for Statewide History*

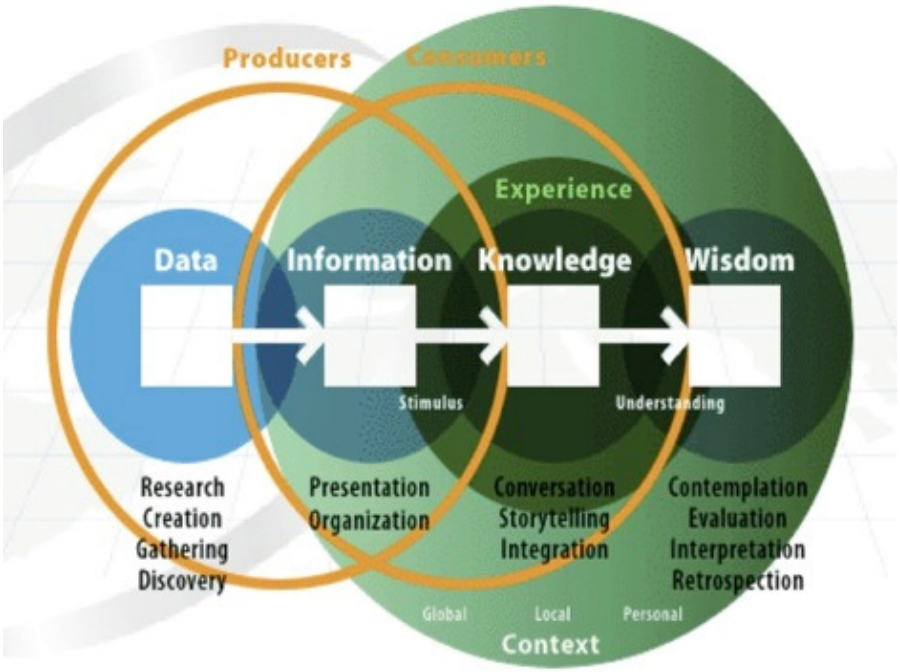
For graduates who enrolled in postsecondary education, what are the characteristics of their participation?

Table 4. Postsecondary participation characteristics for students enrolled in Washington public institutions

	2007		2008		2009		2010		2011		2012	
	2-yr enroll	4-yr enroll	2-yr enroll	4-yr enroll	2-yr enroll	4-yr enroll	2-yr enroll	4-yr enroll	2-yr enroll	4-yr enroll	2-yr enroll	4-yr enroll
Percent Enrolled												
Enrollment in Pre-college coursework in Math	51%	10%	51%	11%	51%	11%	51%	11%	50%	10%	50%	7%
Enrollment in Pre-college coursework in English	26%	4%	25%	4%	27%	4%	26%	3%	26%	2%	26%	2%
Enrollment in Pre-college coursework in English and math	18%	2%	18%	2%	19%	2%	20%	2%	19%	0-1%	18%	0-1%
Enrollment in any pre-college coursework	58%	12%	58%	12%	59%	13%	58%	12%	57%	11%	57%	8%
Continuously enrolled	58%	75%	60%	74%	60%	74%	58%	76%	57%	69%	58%	69%
Enrolled in less than12 credits	12%	0-1%	11%	0-1%	11%	0-1%	12%	0-1%	12%	0-1%	12%	0-1%
Enrolled in 12 or more credits	88%	99-100%	89%	99-100%	89%	99-100%	88%	99-100%	88%	99-100%	88%	99-100%

APPENDIX B: INTERVIEW PROTOCOL

Preamble: I am working on my dissertation at UW and I want to study data use in decision-making. I am coming to you to get more information about using data how you believe it can affect decisions. Please take a look at this life cycle of data. I am interested in learning about the process educators use to turn outcome data into information and then how educators use information to make decisions. I have various open-ended questions to learn how you turn data into decisions.



- Describe to me how you use data on a daily basis. What data do you use?
- Turning data into information:
  - You have attended a data coaching institute and during that institute, you and a team of educators learned about data use. What kinds of data did you focus on during your training?
  - How did you decide on this data? (What were your questions?) How did you decide how to display this data?
- Turning information into decisions
  - How does this information influence decisions? Does it influence your decisions or decisions of others?
  - How has this information helped you to determine the root cause of the problem?
  - Have you changed your practice based on this analysis? If so, how?
  - Has this work led to more data analysis?
- Have you identified new issues? If so, what is the cycle of inquiry and action you plan to follow with this new issue?

- Culture of data use
    - Has data use in your district changed since your training? If so, how?
    - Does the district encourage or discourage data use? How?
    - What do you need to support your data use? What would encourage more data use?
    - Describe decisions in your district that you feel could be made with data.