education northwest

FINAL REPORT PREPARED FOR PBLWORKS

Scaling High-Quality Project Based Learning for Deeper Learning Impact

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Chapter 1. Introduction

Scaling High-Quality Project Based Learning (HQPBL) for Deeper Learning Impact is a research-practice partnership (RPP) comprised of PBLWorks, Manchester School District (MSD), Pearl City-Waipahu Complex Area (PCW), and Education Northwest.

This final report presents results from baseline (fall 2018) through Year 2 (spring 2020) related to two main research questions:

1. To what extent do students, including students furthest from opportunity, experience two high-quality projects each year?
2. How does quality PBL scale and spread in and across schools?

Chapter 1 provides an overview of the RPP, a summary of key findings across MSD and PCW, a description of each school system's implementation context, and the research design. Chapter 2 presents results for MSD, and Chapter 3 presents results for PCW. Results are organized by the key sections of the driver diagram developed by the RPP at the start of the partnership.

RPP Overview

The *Scaling HQPBL for Deeper Learning Impact* RPP aims to increase the number of students engaged in two high-quality projects per year to improve deeper learning outcomes for students. Outcomes of interest include mastery of core content, communication, collaboration, and critical thinking. The RPP is especially focused on reaching students experiencing poverty, English learner students, and students receiving special education services.

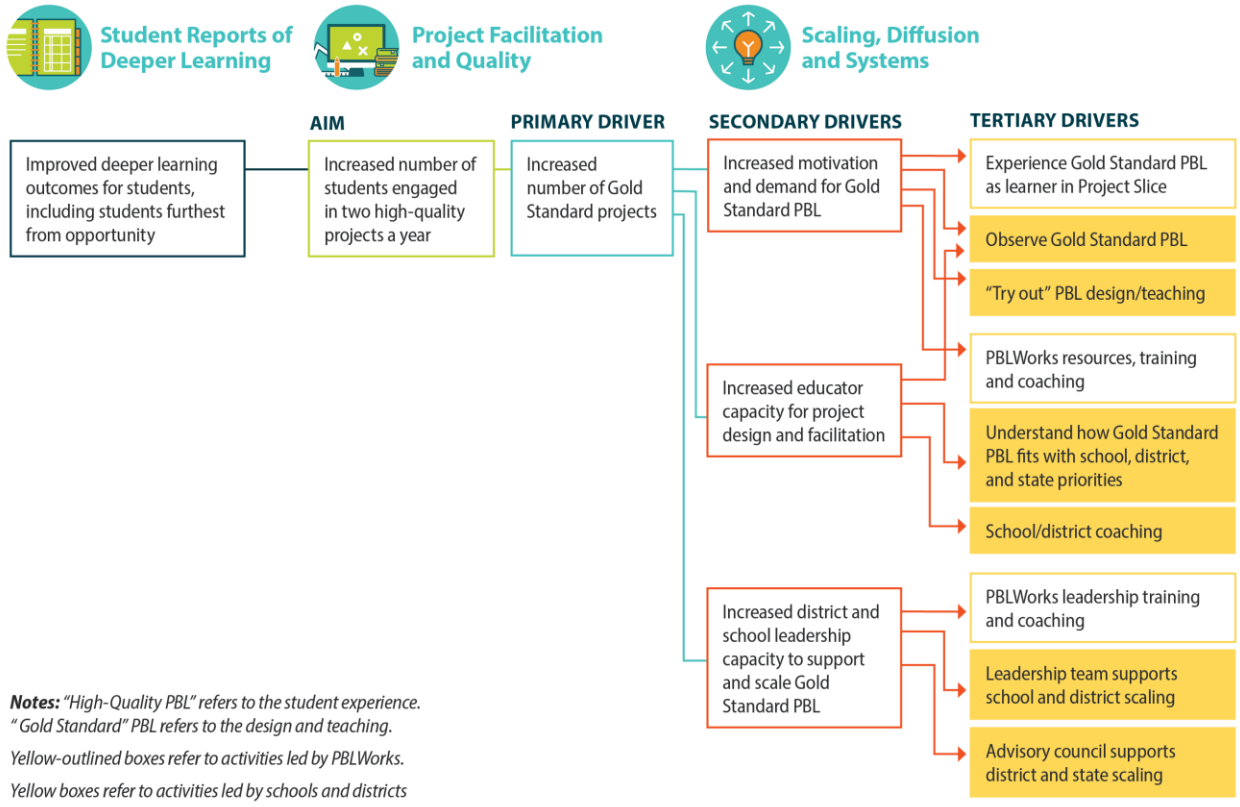
According to the RPP driver diagram (figure 1), to reach this aim, the primary driver is to increase the number of high-quality projects designed and taught by teachers. The innovation being taken to scale is not a specific curriculum or program model. Rather, the RPP is scaling teachers' use of Gold Standard PBL (Larmer, Mergendoller, & Boss, 2015), a set of design and teaching practices implemented across all grade levels and subject areas (see box 1 on p. 15 for more detail). The expectation is that students will experience high-quality projects when teachers implement these practices.

From 2018 to 2020, PBLWorks offered various professional development and technical assistance services to support the implementation of PBL across MSD and PCW. These services

constituted a nested implementation support system with opportunities for capacity building at the classroom, school, and school system level. A different cohort of schools participated in services in each year of the grant, reaching all schools in MSD and PCW (except charter schools).

Drawing on diffusion of innovation theory (Rogers, 2003), school system leaders worked with PBLWorks to map each school's experience with PBL, willingness to adopt innovative practices and level of influence within the system, and percentage of students furthest from opportunity. They used these scaling maps to strategically consider these factors in the composition of each cohort to maximize the diffusion of innovation from "early adopter opinion leaders" to the rest of the school system. Similarly, each school completed a scaling map to identify teachers who were both willing to adopt an innovative practice, such as PBL, (or who were already teaching PBL) and who were influential with other teachers. They used these maps to strategically select teachers to participate in PBLWorks services. The plan was for about half of all teachers in each school system to receive services by the end of the project and that other teachers would be inspired to adopt PBL by these early adopter opinion leaders.

Figure 1. Driver diagram for scaling HQPBL for deeper learning impact



Below is a summary of PBLWorks services to support implementation at the classroom, school, and school system level:

- *Teachers* from each school, alongside peers from other schools in their cohort, participated in a multiday **PBL 101 training** before the start of the school year. Each teacher who participated in this training was expected to facilitate two projects over the ensuing school year, with implementation support from PBLWorks staff members during **two sustained support visits**. The original project design called for 245 strategically selected teachers from each cohort to participate in PBL services.
- *School leadership team members* participated in a **series of trainings, coaching workshops, and related activities** (including leadership learning walks to observe other schools in their cohort) over the course of the school year designed to support them in creating the systems conditions to support scaling HQPBL in their schools.
- S*chool system leaders* worked closely with lead PBLWorks staff members to coordinate these activities, and they received **ongoing coaching and support** in the process. At the end of each school year, school system leaders organized a systemwide presentation of learning in which educators and students shared their projects and observed PBL in action.

PBLWorks services (white boxes under "Tertiary Drivers" in figure 1) are designed to increase motivation, demand for HQPBL, educator capacity for design and facilitation, and school and school system leadership capacity to create the conditions necessary for teachers to design and facilitate high-quality projects with all students—especially those who are furthest from opportunity (secondary drivers).

Leaders at the school level and systems level use various strategies (yellow boxes under "Tertiary Drivers" in figure 1) to support scaling and spread. HQPBL is proposed to diffuse throughout each school system – including to teachers who did not participate in PBL 101 training with PBLWorks—through a combination of teachers' social networks and direct support from school and school system leadership teams.

Key Findings

The following are high-level findings from this investigation of the processes and outcomes associated with efforts to scale HQPBL in two school systems. An in-depth discussion of results for MSD and PCW are presented in Chapter 2 and Chapter 3, respectively.

PBL is starting to scale and spread as more teachers facilitate projects. Educators report many signs of progress, including increasing comfort with PBL, teacher adoption of new practices and mindsets, and additional collaborations and connections in and across schools. At least 80 percent of teacher survey respondents are facilitating projects in Year 2, an increase of 23 percentage points for MSD and 27 percentage points for PCW compared with Year 1.

Students do not yet commonly experience high-quality projects. Although less than a quarter of projects reported on the teacher survey meet the criteria for high quality, this is progress from baseline, when 12 percent of MSD teachers and 8 percent of PCW teachers reported high-quality projects. The percentage of students experiencing two high-quality projects in Year 2 is estimated to be 34 percent in PCW and 14 percent in MSD. This is far below the goal of 80 percent, but it does represent an increase—including for English learner students, students receiving special education services, and students eligible for free or reduced-price lunch.

Students rate public product and authenticity as the strongest areas of quality. Open-ended survey responses indicate that most students were highly engaged in their projects and appreciated the opportunity to learn in a new way. Comparing teacher and student ratings for the same projects, most students rate project quality lower than their teachers do.

Students report that projects helped them grow their deeper learning skills, especially communication and critical thinking. Students furthest from opportunity reported higher gains on some items compared with the overall student population. Students rated their gains in academic knowledge lower compared with other deeper learning outcomes. This aligns with findings from educator focus groups, during which participants said increased overall student engagement was the most common outcome they observed. Educators and students both described engagement as a foundational process and outcome of PBL. If students become engaged in projects because the topic interests them or they feel a sense of ownership and motivation for other reasons (such as teamwork or a public presentation), they may be more likely to participate fully and experience multiple deeper learning outcomes.

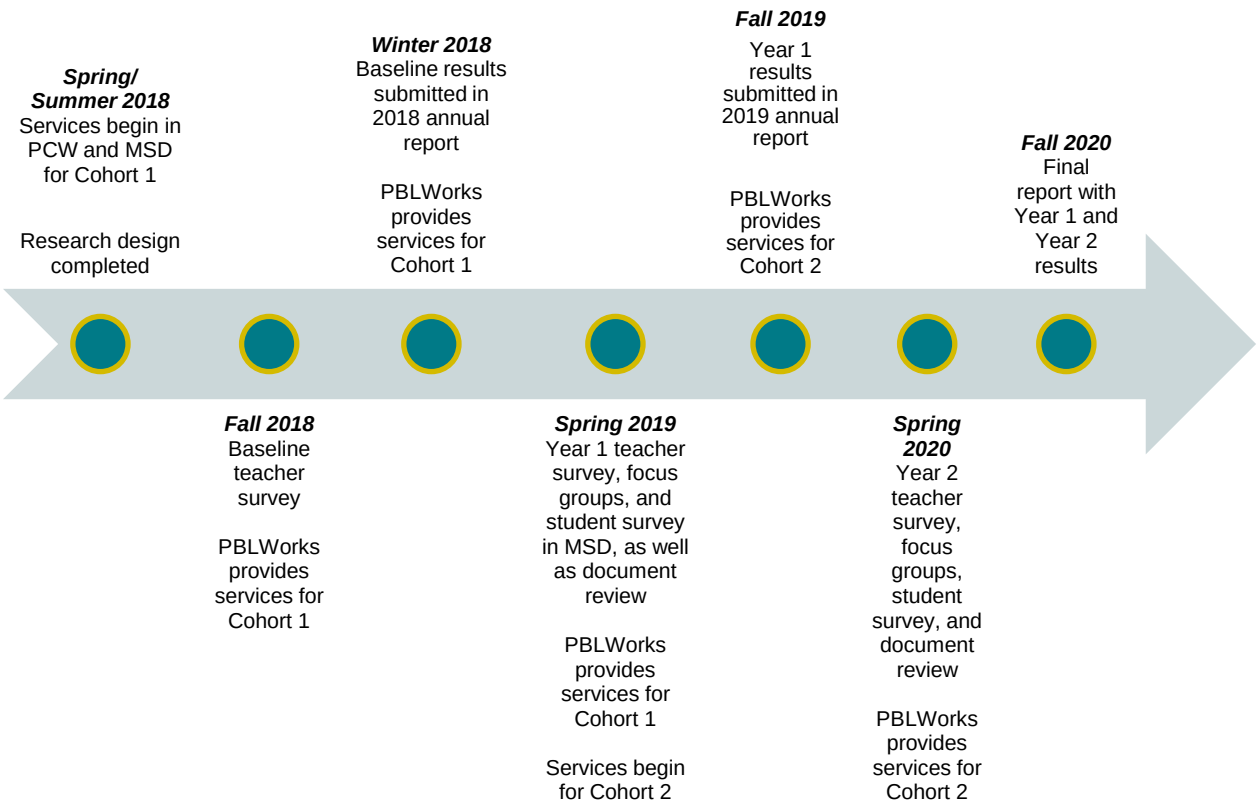
Teachers who participated in PBL 101 were significantly more likely to teach a project, as well as a high-quality project, compared with teachers who did not. In MSD, qualitative data—combined with social network analysis (SNA)—indicate PBL is likely diffusing beyond these trained teachers to others through a combination of informal teacher-to-teacher relationships and support from school leadership teams. In PCW, informal teacher networks do not appear to be a primary driver of scaling. Instead, this occurred through direct participation in training, along with support from school-based instructional coaches and school administrators that included structured opportunities for peer collaboration.

School-level systems conditions are improving for PBL, but access to support is uneven. In MSD, educators at Cohort 2 schools were less likely to report capacity-building support compared with teachers at Cohort 1 schools. In PCW, educators at schools with higher levels of students furthest from opportunity were less likely to report supportive conditions for PBL. To sustain and expand HQPBL, educators in both school systems called for more PBL training, customized and ongoing coaching, increased time for project planning and peer collaboration, and a bank of PBL resources (e.g., sample lesson plans, community partner lists).

School System Context and Implementation

The following is a description of each school system and its implementation of PBL. Figure 2 provides a timeline of implementation and research activities from 2018 to 2020.

Figure 2. Timeline of research and implementation activities, 2018–2020[1]



[1] PBL 101 trainings funded through this project for PCW were scheduled for the spring semester before implementation the following fall. PBL 101 trainings for MSD were conducted in later summer, before the start of the school year.

Manchester School District (MSD)

The largest and most diverse district in New Hampshire, MSD consists of four high schools, four middle schools, and 14 elementary schools (including four community schools and three Southern New Hampshire University laboratory schools). There are also 10 charter schools in the district that were not included in this project.

MSD Students and Teachers

In 2019–20, 13,317 students were enrolled in MSD. Overall, 44 percent of students were people of color, 53 percent qualified for free or reduced-price lunch, 20 percent received special education services, and 17 percent were English learner students.[2] Besides English, the most common languages spoken in MSD are Spanish, Arabic, Swahili, Nepali, and French.[3]

The district employed 970 teachers in 2018–19.[4] Average class size was 22 students, with 90 percent of classes taught by teachers with at least three years of experience and 88 percent of classes taught by certified teachers.[5]

ACADEMIC PROFILE

On 2018–19 statewide assessments, 32 percent of MSD students met proficiency in English language arts, 23 percent met proficiency in math, and 15 percent met proficiency in science. These percentages were 22 to 24 percentage points below the statewide proficiency averages. MSD is using grant funding to improve teaching and learning, address issues of equity, and support postsecondary readiness. Since 2014, MSD has been under review by the U.S. Department of Education's Office for Civil Rights for exclusion of Black and Hispanic students from postsecondary readiness opportunities (OCR Compliance Review No. 01-11-5003).

LEADERSHIP AND POLICY CONTEXT

MSD system leaders are optimistic that PBL may strengthen teaching and learning across the district, especially for students furthest from opportunity. There is strong support for this project from the state education agency, school board, and union. For example, MSD teachers

[2] Data retrieved in October 2020 from https://ireport.education.nh.gov/districts/335/profile.
[3] Data retrieved in October 2020 from http://englishlearners.mansd.org/el-data-languages.
[4] Data retrieved in October 2020 from https://nces.ed.gov/ccd/districtsearch/district_detail.asp?ID2=3304590.
[5] Data retrieved in October 2020 from https://ireport.education.nh.gov/districts/335/profile.

were working without a contract for the first year of the project, and district leaders negotiated with union leaders to make teachers available for training over the summer since MSD has a shortage of substitute teachers. The leader of Manchester Proud, a local collective impact initiative focused on education, is on the project's advisory council—along with a state education agency leader and experts on performance-based assessment, which is an increasingly common practice in New Hampshire.

Coordination of this project is primarily managed though Amy Allen, assistant superintendent for teaching, learning, and leading. Prior to assuming this position, Allen was the principal of an MSD elementary school with a schoolwide focus on PBL.

Multiple types of leadership transitions occurred over the course of the project. In spring 2019, the superintendent left after fewer than two years in the role. During this transition period, Allen took on many responsibilities in the district—in addition to her existing role. In summer 2019, the district hired a new superintendent, who has a strong background in cooperative learning and is viewed as a "PBL believer." A new director was hired to oversee instruction for English learner students, and the position was expanded to include a broader focus on equity. In October 2019, six principals or assistant principals were moved to different schools.

PBL Implementation in MSD

At the start of the project, five schools were identified by MSD system leaders as implementing PBL in at least half of their classrooms. Two of these schools were reportedly implementing PBL schoolwide. This grant marks the first time MSD has partnered with PBLWorks, although two schools sent staff members to PBLWorks trainings four or more years before the start of this project.

Description of the cohorts

Cohort 1 included eight elementary schools, four middle schools, and one high school. Cohort 2 includes six elementary schools and three high schools. All schools in Cohort 1 had at least some teachers who were facilitating PBL before the start of the project, whereas Cohort 2 includes schools with little to no experience with PBL.

The PBL leadership team at each of the MSD schools is typically the existing leadership team for the school and is composed of both teachers and non-teaching staff members. Most schools

have professional learning communities (PLCs) in place that are expected to be a key mechanism for diffusing PBL.

In MSD, implementation of PBL followed the general plan outlined in the proposal, with about half of the teaching workforce—strategically chosen by school leaders for being early adopters of innovation who influence other teachers—participating in PBLWorks training and services. In Year 1, PBLWorks services were provided as planned to 245 teachers and 13 leadership teams from Cohort 1 schools. In Year 2, MSD contracted with PBLWorks to provide additional services beyond what was funded by the Hewlett grant. One example was an extra PBL 101 workshop, which increased the number of teachers who participated in PBL 101 over the course of the project from 490 to 525. MSD also contracted with PBLWorks to provide more support to Cohort 1 principals during summer 2019 beyond the original leadership training series.

Impact of COVID-19 on Year 2 Implementation

Due to COVID-19, Cohort 2 schools did not receive all the PBLWorks services planned for spring 2020, including sustained support visits and key elements of the leadership trainings (such as learning walks). The districtwide presentation of learning was also canceled. MSD encouraged teachers to continue to facilitate projects during remote learning and even offered teachers project ideas grounded in students' personal interests. In interviews district leaders said "rock star" teachers continued to facilitate projects during remote learning and that these projects appeared to be very engaging for students. However, they also said principals and other leaders needed to "shift priorities" from PBL to respond to the pandemic.

School leaders and teachers expressed similar sentiments in focus groups. Most often, educators said they were unable to finish projects due to the transition to remote learning. In addition, they experienced several challenges specific to teaching PBL in a remote learning environment: facilitating student collaboration on group projects, adapting planned presentations of public products, and helping students work from home on complex, multistep projects.

District-level strategy in Year 2

In Year 2, MSD took steps to cultivate a districtwide culture of PBL. This included increased district staff collaboration and capacity, coordinated initiatives, professional development for school-based coaches, and community engagement.

District leaders concentrated their efforts on cultivating a "common understanding" that PBL "is what we do here." As part of this effort, they worked to create a more "unified" approach to

initiatives, such as creating an infographic to help educators understand the connections among key initiatives focused on PBL, competency-based education, equity, and postsecondary readiness.

In addition, the district provided structural support for educators to integrate PBL into existing initiatives. For example, MSD redesigned a districtwide Lego robotics science curriculum for all grade 4 students to include PBL. This strategy is expected to increase motivation and capacity for PBL among teachers by providing them with scaffolding as they learn how to facilitate projects.

"So, it's really been helping the teachers utilize something that they found … value with [like Lego robotics] but also expand it … so, it's not one more thing. It's just something that we already currently do and making it that much more robust and richer."

MSD School System Leader

District leaders also described increased collaboration on PBL across their departments. For example, PBL is now part of ongoing professional development activities to help educators unpack standards, map deeper learning progressions, and use related assessment tools. MSD has also provided coaching to EL teachers for integrating PBL into their practice to support specific standards related to language, as well as complement efforts by general education teachers. The district leadership team meets with school leadership teams monthly to look at formative data related to PBL implementation. For 2019–20, a district-level teacher on special assignment (TOSA) for PBL and equity was hired to increase coaching capacity, as well as support Allen with grant management and logistics.

In Year 2, MSD worked to build the capacity of reading coaches and math interventionists to support PBL aligned to standards as part of their work with elementary school PLCs. The district views these coaches as a critical part of its strategy to sustain support for teachers in developing and refining their PBL practice once this project ends.

To generate further community support for sustaining a focus on PBL, the district conducted deeper learning "work study sessions" with its board to increase members' knowledge of PBL efforts in MSD and the connection with competency-based learning. PBL is also now "embedded" as a key approach in the Manchester Proud strategic plan.

Sustainability plans

MSD sustainability plans focus on increasing the capacity of district leaders and coaches to support PBL. The district plans to soon hire three more staff members with PBL training and experience. In addition, MSD will continue to invest in building the capacity of elementary school reading and math coaches to support PBL by facilitating instructional rounds to further strengthen their coaching skills. MSD is also working with a higher education partner to integrate PBL into pre-service teacher coursework.

Pearl City-Waipahu Complex Area

PCW consists of two high schools, two intermediate schools, and 13 elementary schools. The school system comprises the Pearl City Complex and the Waipahu Complex, which are two adjacent communities. The two complexes share staff members but also operate their own distinct initiatives in response to local priorities.

PCW Students and Teachers

In 2018–19, PCW employed 931 teachers (402 in Pearl City and 529 in Waipahu), about a third of whom had an advanced degree.[6] In 2018–19, 14,518 students were enrolled in the complex area (6,172 in Pearl City and 8,346 in Waipahu).

Overall, 94 percent of PCW students identified as people of color, 46 percent qualified for free or reduced-price lunch, 8 percent received special education services, and 15 percent were English learner students. Compared with Pearl City, Waipahu served a higher percentage of English learner students (22 percent vs. 6 percent) and students eligible for free or reduced-price lunch (54 percent vs. 34 percent). Besides English, the most common languages spoken across PCW are Tagalog, Chuukese, Samoan, Marshallese, and Ilocano.

ACADEMIC PROFILE

On 2018–19 statewide assessments, 57 percent of PCW students met or exceeded proficiency in English language arts, 49 percent met or exceeded proficiency in math, and 47 percent met or exceeded proficiency in science. These percentages were 3 percentage points above the statewide proficiency average in English language arts and 6 percentage points above the

[6] Data provided from PCW via personal communication in October 2020.

statewide proficiency average in math—but 1 percentage point below the statewide proficiency average in science.

Pearl City Complex's percentage of students reaching proficiency was higher than the state average, and Waipahu Complex's percentage was lower. In Pearl City Complex, 69 percent of students were proficient in English language arts, 62 percent were proficient in math, and 61 percent were proficient in science. In Waipahu Complex, 48 percent students were proficient in English language arts, 39 percent were proficient in math, and 36 percent were proficient in science.

LEADERSHIP AND POLICY CONTEXT

In interviews PCW school system leaders said PBL is "a big part of our identity." They also said PCW is getting recognition as a state leader since it is the only complex area implementing PBL in grades K–12 in all schools. There is strong support for this project from the state education agency, which is involved in other partnerships with PBLWorks. A former PCW superintendent remains actively involved in the project through their current position at the Hawaii State Department of Education and participates in the project's advisory council.

Complex area leaders described several other initiatives with the potential to "dovetail" with PBL, such as efforts to strengthen math and literacy instruction, high school academies, and multi-tiered systems of support.

Robust technical assistance for PBL is available to schools from complex area personnel. This consistent support is especially notable given that there have been three superintendents and two grant leads over the course of the grant. Kathleen Burch, school renewal specialist, coordinates implementation and research activities associated with this grant. In addition, a PBL resource teacher (who is now part of the PBLWorks national cadre of trainers) supports implementation by providing PBL coaching to complex area-level instructional coaches and school-level staff members. Both Burch and the PBL resource teacher were brought on board from another complex area by the current superintendent in fall 2018, after the initial set of PBL 101 trainings and implementation was underway.

Implementation of PBL in PCW

This grant marks the first time the complex area has partnered with PBLWorks, although a couple of PCW schools sent staff members to PBLWorks trainings before the start of this project.

Description of the cohorts

Each cohort includes schools with a range of PBL-related experience, with eight schools facilitating some PBL before the start of the project. Cohort 1 included seven elementary schools, two intermediate schools, and one high school, all in the Pearl City Complex. Cohort 2 includes seven elementary schools and one high school, all in the Waipahu Complex. The PBL leadership team at each of the schools is primarily composed of non-teaching staff members, such as curriculum coordinators and administrators.

The implementation strategy in PCW differed from the strategy in MSD, with about 70 percent of teachers receiving direct training from PBLWorks and limited use of scaling maps by schools to select early-adopter influencer teachers for training. The Hewlett grant funded PBL 101 training and sustained support visits for 490 teachers—245 teachers from each Cohort. PCW purchased additional PBLWorks training and services for both cohorts. In Year 1, the complex area purchased two extra PBL 101 trainings for Cohort 1 schools. In Year 2, the complex area purchased four more PBL 101 trainings for Cohort 2 schools. In addition, 13 PCW teachers participated in a PBLWorks summer institute funded by the Hawaii State Department of Education. Therefore, about 713 educators[7] received direct training from PBLWorks—223 more than was planned in the grant. PCW leaders said their goal was for as many elementary school teachers to participate in the training as possible so that K–12 students have at least one teacher trained in PBL each year.

Impact of COVID-19 on Year 2 Implementation

PCW is on an earlier school year and training schedule than MSD, so Cohort 2 schools received most PBLWorks training and coaching as planned, except for the leadership learning walks. The complex area-wide presentation of learning was canceled. In general, PCW teachers did not continue with PBL after the transition to remote learning due to gaps in access to technology. Complex area leaders remain committed to PBL but note the need to "balance recovery and rebuilding" with PBL when students and staff members return to school.

New developments in complex area-level strategy Year 2

During Year 2, complex area leaders continued to support school-level implementation of PBL, enacted strategies to build the capacity of coaches and principals to support teachers with PBL, and developed a sustainability plan. In addition, the complex area-level PBL resource teacher continued to support both Cohort 1 and Cohort 2 schools with implementation. This work

[7] Some support personnel, such as librarians and coaches, may be included in this estimate.

included using PBLWorks reflection protocols and implementation survey results as tools to promote continuous improvement for teachers and school leaders, respectively. Cohort 1 schools also received support for the transition to a new PBL lesson-planning template.

In addition, complex area PBL leaders continued to build the capacity of complex area coaches to help teachers improve and align their PBL practice. This work included regular professional development on general coaching strategies, as well as PBL practices and tools.

"… it's not just supporting and training teachers, but we really need to support and train the coaches because they're in all of those regular daily conversations with every grade level around PBL and what that looks like."

PCW Complex Area Leader

Since principals receive training in PBL leadership but not PBL practice, complex area leaders spent time at every monthly principal meeting on activities to help them understand HQPBL. They took the principals through the process of a project, from identifying a driving question to developing a public product, and introduced them to the PBLWorks protocols that teachers use. The project provided a structured space for principals to have in-depth discussions about PBL, learn from one another, and plan for a complex area-wide presentation.

Sustainability plans

PCW leaders identified several plans for sustaining PBL beyond the grant. First, complex area PBL leaders participated in PBL World, a national conference offered by PBLWorks. Second, they will continue to contract with PBLWorks to offer PBL 101 annually for new teachers, as well as sustained support visits to help trained teachers deepen their practice. Third, they will continue to hold complex area-wide presentations of learning, at least in 2020–21.

Research Design

To investigate the processes by which quality PBL design, facilitation, and student experiences increase across these school systems, this study draws on research regarding diffusion of innovation (Rogers, 2003) and scaling within education (Coburn, 2003). The project is also grounded in frameworks developed by PBLWorks in collaboration with other leaders in the field to understand the quality of PBL.

In addition, PBLWorks provides training for leaders on creating four key systems conditions for PBL: vision, culture, capacity building, and continuous improvement. This study examines all four systems conditions in focus groups and looks specifically at conditions related to culture and capacity in the teacher survey.

Although the study is informed by PBLWorks frameworks (box 1), we were not able to assess each of these elements in depth, as discussed further in the data collection and analysis section below.

This mixed-methods study is guided by two research questions (figure 3).

Box 1. Guiding Frameworks

Gold Standard Project Based Learning refers to the quality of project design and facilitation to promote student learning of key knowledge, understanding, and success skills (Larmer, Mergendoller, & Boss, 2015). A project that meets Gold Standard Design Elements features student learning goals, a challenging problem or question, sustained inquiry, authenticity, student voice and choice, reflection, critique and revision, and public product. This study uses this framework in the design of the teacher survey. It does not examine PBLWorks' Gold Standard Project Based Teaching Practices (Larmer et al., 2015)—only project design.

High-Quality Project Based Learning (HQPBL) refers to the quality of student experience on projects (Mergendoller, 2018). HQPBL comprises six criteria: intellectual challenge and accomplishment, collaboration, authenticity, reflection, project management, and public product. For each of these criteria, A Framework for High Quality Project Based Learning (2018) offers guiding questions to assess the quality of student experience on a given project. This study used this framework in designing questions for the student survey.

Figure 3. Research questions and data sources

1. **To what extent do students, including students furthest from opportunity, experience two high-quality projects each year?**
   a. To what extent are teachers designing, adapting, or adopting Gold Standard PBL?
   b. To what extent do students report deeper learning on projects?

- Teacher survey (matched with student rosters)
- Educator focus groups
- Student survey

2. **How does quality PBL scale and spread in and across schools?**
   a. What are the patterns of diffusion?
   b. What systems conditions enable or constrain teachers and leaders in scaling quality PBL?

- Teacher survey
- Educator focus groups

Data Collection and Analysis

Education Northwest collaborated closely with PBLWorks, MSD, and PCW staff members to design the instruments and plan data collection. Data collection was conducted in spring 2020 to allow adequate time for Cohort 2 participants to implement new practices.

Research Question 1: Project Facilitation, Quality, and Deeper Learning

To address the first research question, we analyzed data from the teacher survey, class rosters, and student survey (described below) to report on teachers' and students' project experiences. When possible, we compared baseline data, Year 1 data, and Year 2 data to understand change over time in teacher practices and disaggregated data by school (e.g., cohort) and teacher

characteristics (e.g., experience with PBL), testing to see whether any differences were statistically significant.[8]

Disaggregating data by teacher characteristics enabled us to investigate whether adoption of quality PBL was diffusing beyond the teachers who participated in PBL 101 or across schools in each cohort. We also disaggregated data by student characteristics (e.g., English learner) to investigate the degree to which students who were furthest from opportunity experienced quality projects and deeper learning outcomes.

In addition to survey data, we analyzed focus group data by identifying common themes on how educators perceive PBL practice and deeper learning outcomes.

Research Question 2: Scaling, Diffusion, and Systems Conditions

To address the second research question, we analyzed data from the teacher survey and focus groups to gain insight from educators about the processes of scaling HQPBL across their school systems. We used SNA of data from the teacher survey to examine whether and how quality PBL may diffuse through teacher relationships. Again, we analyzed change over time when possible and disaggregated data by school and teacher characteristics.

As part of the analysis, we triangulated data across methods (e.g., teacher survey and focus groups) and data sources (e.g., MSD teacher survey and student survey), and we report areas in which findings converge or diverge.

The following is a summary of Year 2 data sources. See appendixes A–C for more detailed descriptions of data collection and analysis.

[8] Statistical significance means the difference between the two groups is real and unlikely to have occurred by chance. A significance level of 5 percent ($p < 0.05$) means that only five times out of 100 a significant difference might occur by chance.

TEACHER SURVEY

To answer both research questions, Education Northwest invited all teachers in MSD and PCW to participate in an online survey about their experience with PBL, the projects they taught, the systems conditions in their school, and their professional social networks. Education Northwest administered the survey to 1,569 teachers across both school systems, with an overall response rate of 40 percent (631 respondents). About 65 percent of these respondents (413) also completed either the baseline survey in fall 2018 or the Year 1 survey in spring 2019, so we can provide information on change over time for these teachers. Across both school systems, response rates were higher for elementary schools than secondary schools (see appendix A).

Teacher project quality score. To answer research question 1, the survey asked teachers to report on project quality for six of eight Gold Standard Design Elements: driving question, sustained inquiry, authenticity, student voice and choice, critique and revision, and public product. The survey did not include questions about student learning goals or reflection due to a need to reduce survey length to ensure a robust response rate.

Project quality is defined as the presence of each Gold Standard Design Element. Using teacher survey item responses, we determined whether each of the six elements was present (according to teachers). When the element was present, we assigned a score of 1 (indicating the project met a minimum threshold for **quality** for that element) and a score of 0 when the element was not present. In consultation with PBLWorks, we created an overall project quality score by adding the assigned values for each element, creating a range of possible scores of 0 to 6. For example, an overall project quality score of 5 means the project included five of the six Gold Standard Design Elements assessed on the teacher survey. To be considered high quality, a project must meet the criteria for all six Gold Standard Design Elements. The overall project quality score facilitates assessment of change over time, as well as triangulation with student survey results. See table A3 in appendix A for the teacher survey items used to calculate project quality scores.

Roster matching to identify students' project experiences. To answer research question 1, we identified students who experienced projects based on matching teachers who reported facilitating projects with students in their school system. We were able to match teachers who responded to the surveys with assigned teachers on student rosters for 87 percent of MSD students (9,003) and 71 percent of PCW students (10,274). Percentages in this report are based on the number of students who could be matched to a teacher survey response. The demographics of this sample are largely representative of the overall student population for each school system, with elementary school students slightly underrepresented in both school

systems. Thus, the roster-matching results should be understood as an approximation of how many students in each of these school systems experienced a project (see appendix A).

Analysis of teacher social networks. To answer research question 2, the survey asked teachers to report whom they go to for advice. We asked teachers in the baseline (2017–18), Year 1 (2018–19), and Year 2 (2019–20) surveys, "Who did you go to most often for advice or with general questions related to content knowledge, your instructional practice, or navigating school systems (i.e., figuring out school management or bureaucracy)?" Their answers to this question were used to identify teachers who shared a relationship, or tie,[9] in the social network. It is through these ties that diffusion of information could occur. Additionally, we calculated "in-degree centrality," or the number of times an individual was identified by a survey respondent as a person to whom they go for advice. Thus, survey respondents identified individuals with high in-degree centrality as opinion leaders in the network (see appendix A).

EDUCATOR FOCUS GROUPS

To answer both research questions, we conducted separate focus groups with administrators, principals, leadership team members, and teachers in each school system. A total of 65 individuals participated in focus groups—42 from MSD and 23 from PCW. In focus groups, administrators and leadership team members reflected on their vision and plan for PBL, effectiveness of scaling strategies, signs of progress related to the diffusion of PBL, and lessons learned. Teachers were also asked to reflect on changes in their school, students, and own practice related to PBL and to provide feedback on the school and district/complex area support they received for PBL (see appendix B).

STUDENT SURVEYS

To answer research question 1b, Education Northwest helped MSD and PCW teachers administer an online survey to students in grades 4–12 upon completion of projects in spring 2020. The survey asked students to report on whether they experienced the elements of HQPBL on the project: intellectual challenge and accomplishment, collaboration, authenticity, reflection, project management, and public product. We also asked students to indicate the degree to which they felt the project increased their mastery of core content, as well as deeper learning skills (such as critical thinking/problem-solving, communication, and collaboration). Students in seven schools completed the survey.

[9] Teachers are "tied" when they identify or were identified by another teacher in the network as a source of advice.

The survey responses were later matched to the student roster using the name provided by the student in the survey to examine the student responses by subgroup. In MSD, 458 students in seven schools completed the survey, with 90 percent of the responses coming from four schools. We received surveys from three high schools, two middle schools, and two elementary schools, with 51 percent of respondents coming from the two middle schools. Most students who took the survey completed it (95 percent) and were matched to the student roster (93 percent). In PCW, 136 students in four elementary schools took the survey, and all of them were complete. Of the students who took the survey, 97 percent were matched to the student rosters (see appendix C).

Student project quality score. To facilitate triangulation with the teacher survey, we collaborated with PBLWorks to crosswalk HQPBL elements with Gold Standard Design Elements to create a student overall project quality score aligned with the teacher survey. We calculated a quality score for each of the six elements in the same manner as described above for the teacher survey. Using student survey item responses, we determined whether each of the six elements was present (according to students). We assigned a score of 1 when the element was present (indicating the project met a minimum threshold for quality for that element) and a score of 0 when the element was not present. In consultation with PBLWorks, we created an overall project quality score by adding the assigned values for each element, creating a range of possible scores of 0 to 6. For example, an overall project quality score of 5 means the project included five of the six Gold Standard Design Elements assessed on the student survey. See table A3 in appendix A for the student survey items used to calculate project quality scores.

LIMITATIONS

Given the broad scope of the RPP, this study is designed to examine issues at scale but not necessarily in depth. Therefore, there are several limitations to note in interpreting the results of this large study. The first is the relatively low response rate for the teacher survey, especially in terms of the number of respondents who took it at baseline, as well as in Years 1 and 2. For the SNA, this small sample size reduced our ability to conduct more fine-grained analyses. To ensure a robust response rate, we kept the teacher survey as short as possible while responding to the request from the research partners to investigate multiple issues of interest. Therefore, we focused on a select set of systems conditions (two of four included in PBLWorks trainings) and Gold Standard Design Elements (six of eight included in PBLWorks trainings). A further limitation of the teacher survey as a source of information about project quality is the potential for response bias in teachers' reports of their own use of quality project design practices.

Roster-matching results are also limited by the teacher survey response rate, which determines the percentage of students exposed to projects and the quality of those projects. It was not possible to match all teachers who completed the survey to student rosters. As a result, some students who did experience projects may have been left out of the analysis. The sample of teachers completing the survey is probably not random—and if the teachers who completed the survey were more likely to teach projects than other teachers in their respective school system, this analysis may overstate the percentage of students exposed to a project. Additionally, the small number of student surveys received in PCW represented only six teachers from three elementary schools; they should not be considered representative of the entire complex area.

Finally, data collection and implementation were both disrupted by the COVID-19 pandemic and the abrupt transition to remote learning. Most of the data collection for this project was scheduled to be conducted in spring 2020 to allow adequate time for implementation. This may have decreased the number of projects teachers facilitated, the number of completed student and teacher surveys we received, and the ability of Cohort 2 school leadership teams to fully implement their strategies. The PCW teacher survey was already underway when schools transitioned to remote learning, but the MSD teacher survey was administered a couple of weeks afterward. Few student surveys were received after the transition to remote learning. All focus groups were conducted virtually after the transition to remote learning.

Chapter 2. Manchester School District Results: 2018–2020

The first section of this chapter discusses results related to project facilitation, quality, and deeper learning. The second part of the chapter presents results related to systems conditions, scaling strategies, and diffusion.

Project Facilitation, Quality, and Deeper Learning

In this section, we present results for MSD related to the first set of research questions:

1. To what extent do students, including students furthest from opportunity, experience two high-quality projects each year?
    a. To what extent are teachers designing, adapting, or adopting Gold Standard PBL?
    b. To what extent do students report deeper learning on projects?

To realize the aim of reaching more students with HQPBL, MSD needed to grow the number of Gold Standard projects designed by teachers. In this section, we first present data on the number of projects designed by teachers, as reported on the teacher survey. Next, we present the number of eight-hour projects experienced by students based on matching the teachers who reported this information on the survey with students on their class rosters. We use the term "eight-hour project" to refer to projects lasting at least eight hours, the threshold for sustained inquiry in Gold Standard Design.

Next, we present more detailed results related to project quality, starting with the number of teachers who report teaching HQPBL and overall trends in project quality reported on the teacher survey. After that, we match teachers who reported this information on the survey with students on their class rosters to estimate how many students experienced a high-quality project facilitated by these teachers. We then present students' perspectives on their experiences of HQPBL, as reported on the grade 4–12 student survey. Finally, we present students'

perspectives on their experiences of deeper learning, along with educators' observations of how PBL supports deeper learning among their students.

Findings Summary

Project facilitation: In Year 2, more teachers taught projects, most of which lasted at least eight hours. Significantly more students experienced at least one eight-hour project, with the biggest increases for elementary and high school students. Trends were similarly positive for students furthest from opportunity, in terms of significant increases in access to projects. However, 35 teachers who planned to teach a project did not due to the COVID-19 pandemic.

Project quality: In Year 2, more teachers reported facilitating HQPBL, especially from Cohort 2 schools, and a higher percentage of student survey respondents reported experiencing HQPBL. A higher percentage of English learner students and students receiving special education services reported experiencing HQPBL compared with Year 1. Teachers continued to rate their own project quality higher than their students did, but scores were more closely aligned in Year 2. Although these trends appeared positive, matching teacher survey results with class rosters suggested little change in the percentage of students overall experiencing two or more high-quality projects, with the largest decrease for middle school students. However, a slightly higher percentage of English learner students experienced two high-quality projects compared with Year 1.

Deeper learning: Most students reported that projects helped them grow their skills related to all four aspects of deeper learning examined in the survey: academic knowledge, critical thinking, communication, and collaboration. English learners and students receiving special education services were more likely than students overall to report gains in some aspects of academics, critical thinking, communication, and collaboration. Students with teachers who took PBL 101 were more likely to report increased academic knowledge through projects . In their open-ended survey responses, students most frequently shared examples of how participating in projects increased their academic knowledge and collaboration skills, as well as descriptions of increased engagement in class. In survey responses, educators most often described increased student engagement and collaboration skills as outcomes, with less discussion of academic progress.

Project Facilitation

PRIMARY DRIVER

Increase the number of Gold Standard projects

Overall, 82 percent of teacher survey[10] respondents reported teaching a project in Year 2 compared with 59 percent in Year 1. Most of these teachers (93 percent) taught at least one eight-hour project. Looking at survey repeaters (n = 77), 16 percent taught one more project in Year 2 compared with Year 1, and 27 percent taught the same number of projects in Year 1 and Year 2. A lower percentage of MSD PBL 101 participants taught a project in Year 2 (83 percent) compared with Year 1 (93 percent).

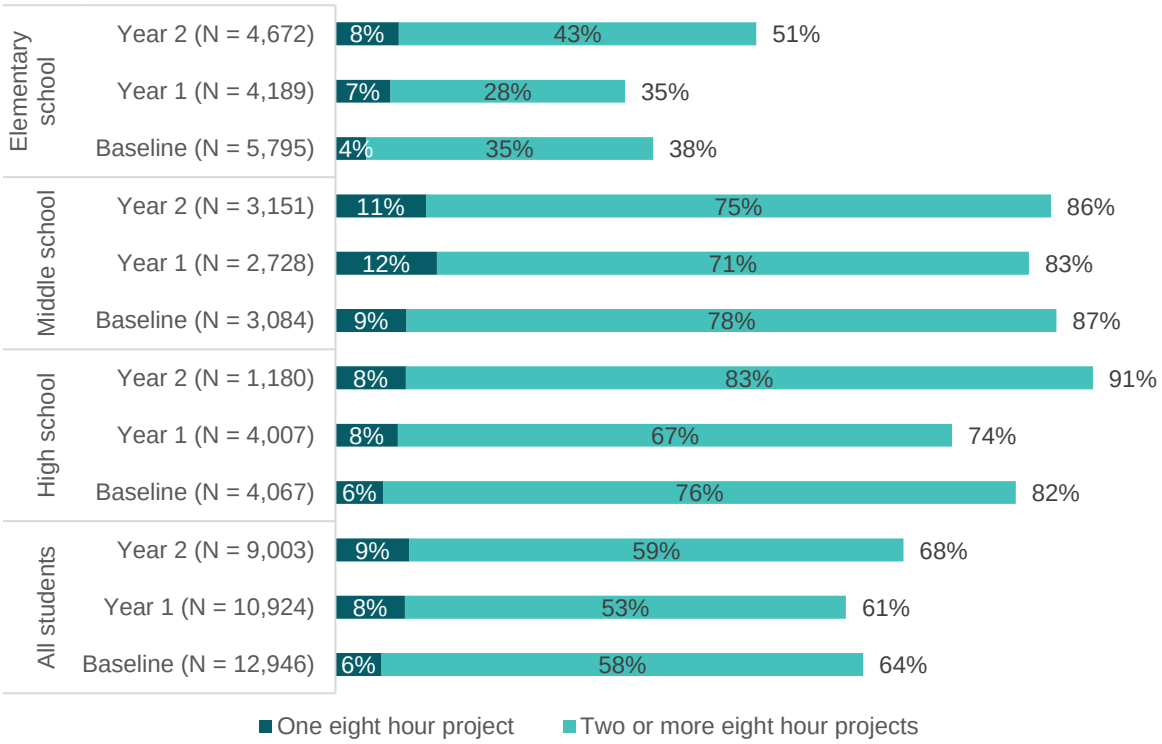
The majority of teachers who did not teach a project had intended to do so, but the COVID-19 pandemic disrupted their plans. MSD transitioned to remote learning a couple of weeks before the administration of the teacher survey, so we were able to add a question about the impact of the pandemic on teaching projects. In response to the COVID-19 pandemic, we asked teacher survey respondents in MSD who did not teach a project in Year 2 if they had planned to facilitate a project before the pandemic-related disruption. Of the 49 individuals who did not complete a project, 35 (71 percent) had planned to teach a project before the pandemic disrupted their plans.

More than two-thirds of all matched[11] MSD *students* experienced at least one eight-hour project in Year 2, a 7-percentage point increase from Year 1 (figure 4). Students in all grade levels saw an increase in the percentage of students who experienced at least one eight-hour project in Year 2 with high school students experiencing a 17 percentage point increase and elementary school students experiencing a 16 percentage point increase (see figure 4). These increases were statistically significant for students overall, elementary school students, and high school students.

[10] The teacher survey response rate (after non-teachers were removed) was 41 percent for MSD, representing 340 teachers from all 22 schools across the district.

[11] Matched students mean the student name on the class roster matched with a teacher survey. For Year 2, we were able to match 87 percent of students to a teacher who completed the survey. As in previous years, the matched students are representative of the district by race, special education status, and English learner status.

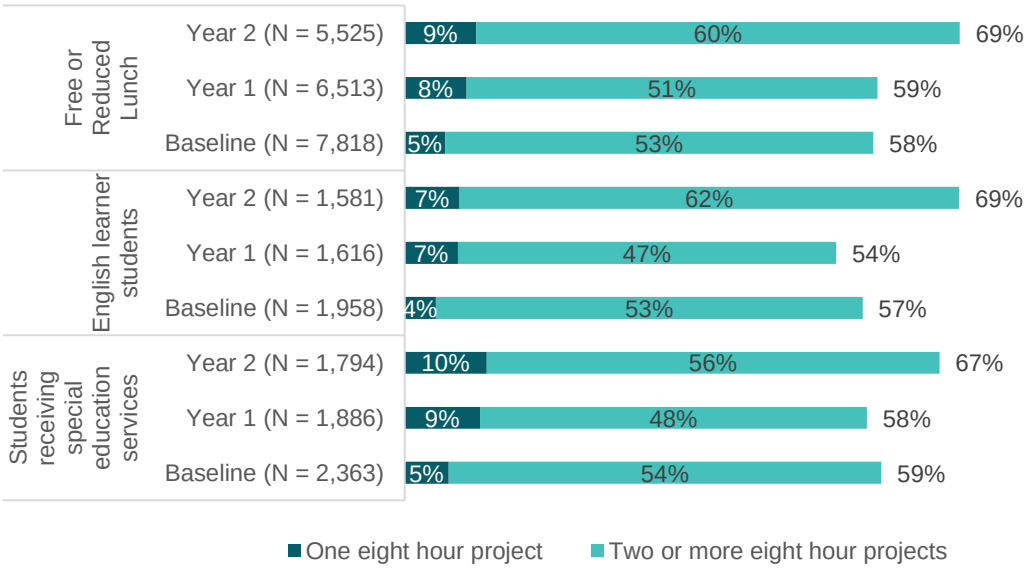
Figure 4. Percentage of matched MSD students who experienced at least one eight-hour project by grade band, baseline through Year 2



Source: Education Northwest analysis of teacher survey data matched to student roster data.

Year 2 trends for MSD students furthest from opportunity follow the trends for the overall student population, with a statistically significant increase in students experiencing at least one eight-hour project from Year 1 (figure 5). The percentage of students in each furthest-from-opportunity category (students eligible for free or reduced-price lunch, students receiving special education services, and English learner students) was within a single percentage point of the overall student population in Year 2. The percentage of students experiencing at least one-eight hour project increased by more than the overall student population between Year 1 and Year 2 for students eligible for free or reduced-price lunch, English learner students, and students receiving special education services, which eliminated much of the gap between these students and the overall student population.

Figure 5. Percentage of matched MSD students eligible for free or reduced-price lunch, English learner students, and students receiving special education services who experienced at least one eight-hour project, baseline through Year 2



Source: Education Northwest analysis of teacher survey data matched to student roster data.

Project Quality

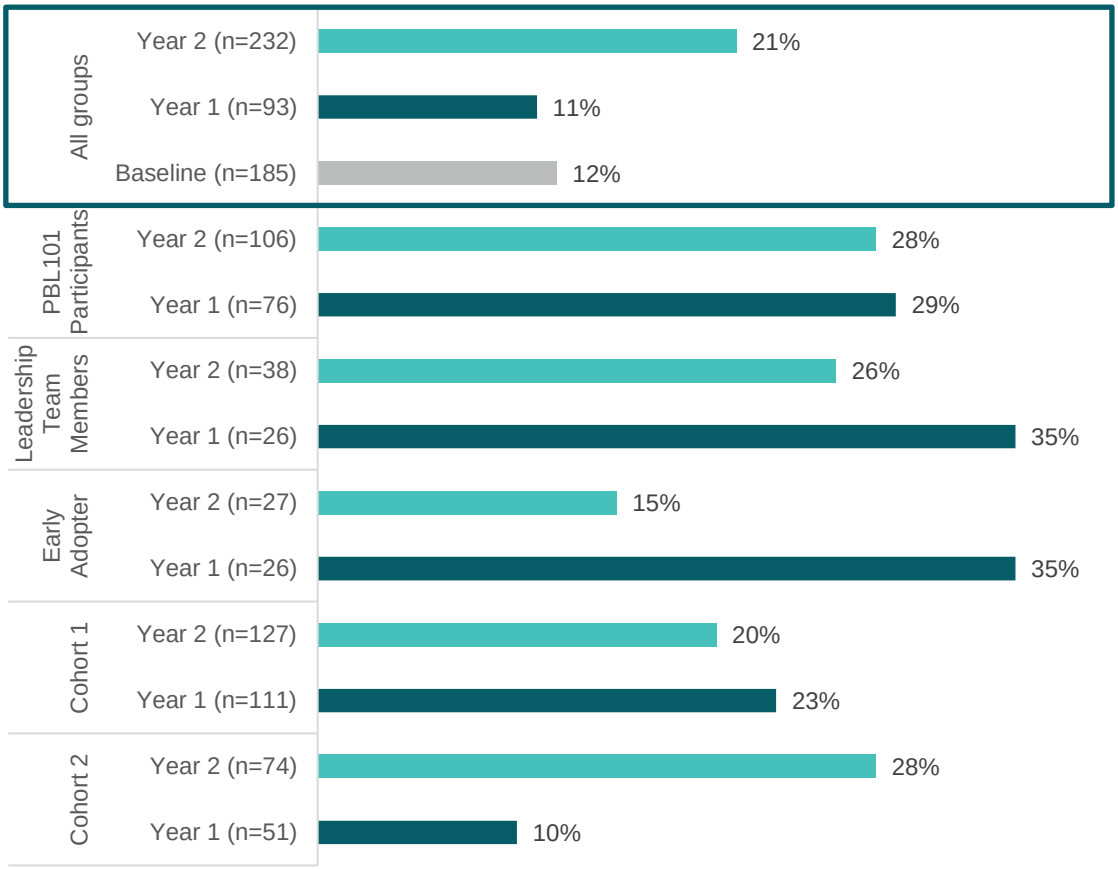
AIM

Increase the number of students engaged in two high-quality projects a year. Specifically, 80 percent of all students, including students furthest from opportunity, experience two high-quality projects each year.

Teacher reports of project quality (teacher survey)

The percentage of MSD *teacher* survey respondents who taught a high-quality project doubled in Year 2 to 21 percent (figure 6). This is attributed mainly to the number of high-quality projects from teachers in Cohort 2 schools, which increased from 10 percent in Year 1 to 28 percent in Year 2.

Figure 6. Percentage of MSD teachers who taught a high-quality project, baseline[12] through Year 2



Source: Education Northwest analysis of teacher survey data.

***Teacher-reported quality* in MSD remained consistently high from Year 1 to Year 2, except for driving question.** Each year of the survey, at least 94 percent of teachers reported that their projects included authenticity, as well as voice and choice. Scores have increased modestly for sustained inquiry (79 percent at baseline and 86 percent in Years 1 and 2), as well as for critique and revision (91 percent at baseline and Year 1 and 95 percent in Year 2). Scores have increased notably for public product (67 percent at baseline and 80 percent in Year 2). Although few teachers reported their projects meeting the threshold for driving question, it did improve (19 percent at baseline, 30 percent in Year 1, and 28 percent in Year 2). These trends were similar for teachers who were survey repeaters.

[12] Baseline applies to only the "All groups" category, as the other categories did not exist before the start of the study.

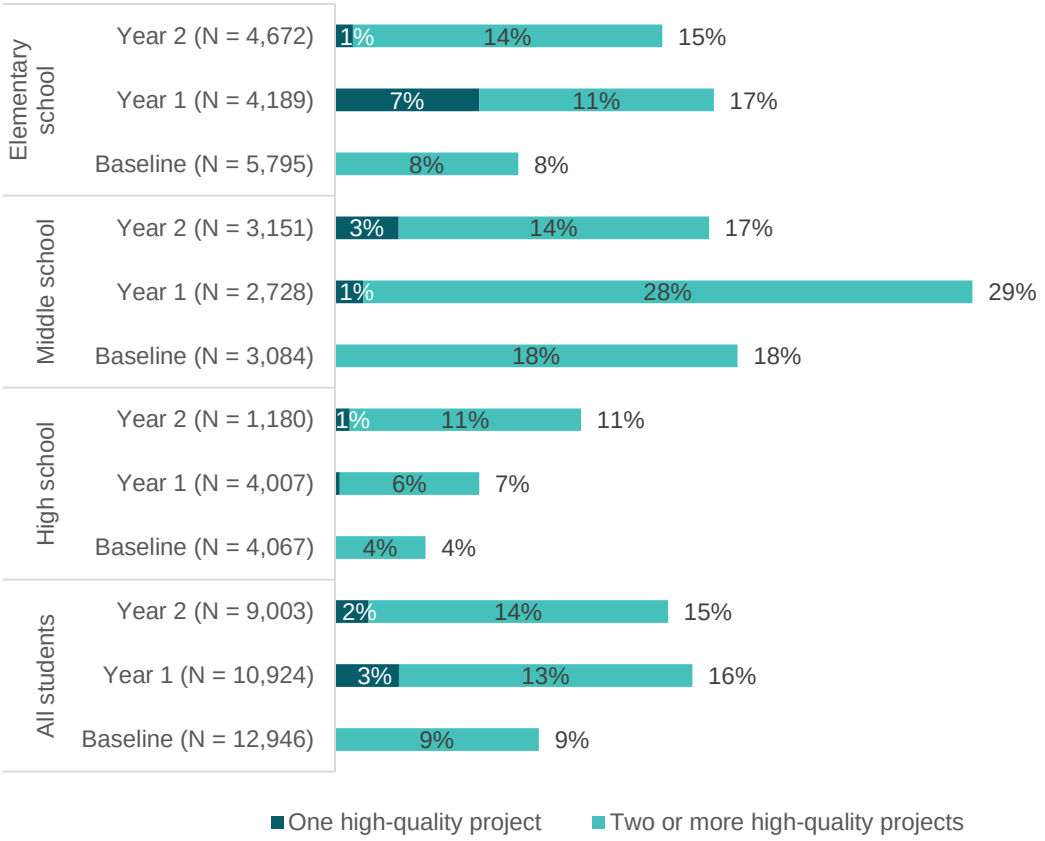
Student exposure to high-quality projects (teacher survey reports of quality matched with class rosters)

According to student rosters matched with teacher survey results, 14 percent of matched MSD *students* experienced two or more high-quality projects in Year 2, a decline of 1 percentage point from Year 1[13] (figure 7). The percentage of elementary and middle school students who experienced two or more high-quality projects decreased from Year 1 to Year 2 by 3 percentage points and 14 percentage points, respectively, representing a statistically significant decrease for middle school students. In contrast, the percentage of high school students who experienced two or more high-quality projects increased from Year 1 to Year 2 by 5 percentage points.

This lack of progress in increasing student exposure to HQPBL may be explained in part by the COVID-19 pandemic, which limited the opportunity to teach a project in the second semester. Further, qualitative data from educators suggests a possible loss of momentum in Cohort 1 schools due to leadership transitions and competing initiatives. This is supported by teacher survey findings; a lower percentage of PBL 101 participants taught projects in Year 2, and fewer early adopters and leadership team members taught high-quality projects.

[13] The percentage of students who experienced two or more high-quality projects is based on the number of students on the course roster who were matched to teacher survey data. If a student did not have a matched teacher, they were not included in the denominator. The numerator was determined by looking at the students who experienced projects that had six Gold Standard Design Elements, as reported by their teacher.

Figure 7. Percentage of MSD students who experienced at least one high-quality project by grade band, baseline through Year 2

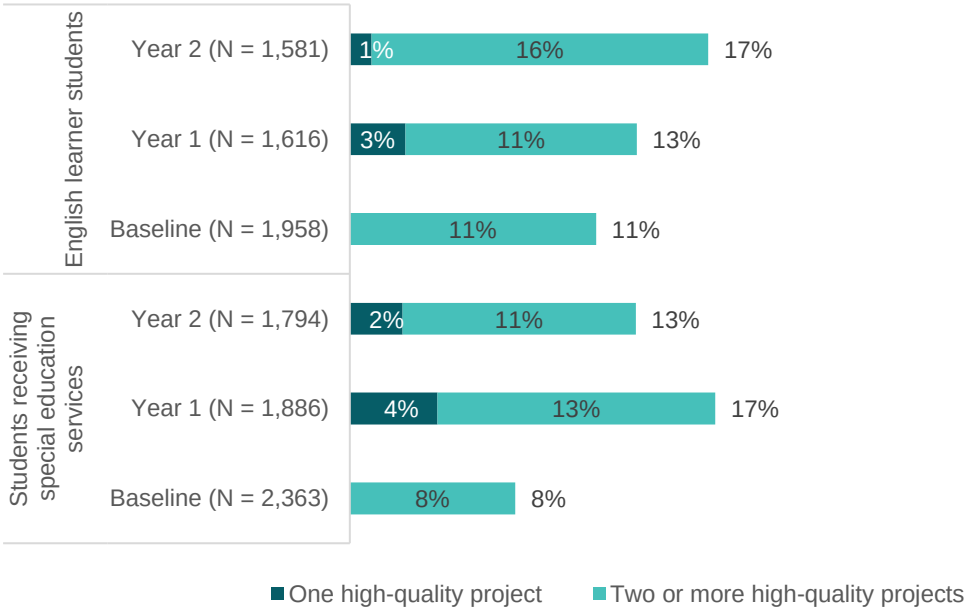


Note: Percentages may not add up to 100 due to rounding.

Source: Education Northwest analysis of student roster data matched to teacher survey data.

A higher percentage of MSD *English learner students* experienced two or more high-quality projects in Year 2 compared with the overall student population (figure 8). This also represents a 5 percentage point increase of English learner students experiencing two or more high-quality projects from Year 1 to Year 2. In addition, 11 percent of students receiving special education services experienced two or more high-quality projects in Year 2, a decrease of 2 percentage points from Year 1. Differences between Year 1 and Year 2 were not statistically significant. Compared with the overall student population, a similar percentage of students eligible for free or reduced-price lunch experienced high-quality projects in Year 2.

Figure 8. Percentage of MSD English learner students and students receiving special education services who experienced at least one high-quality project, baseline through Year 2



Note: Percentages may not add up to 100 due to rounding.

Source: Education Northwest analysis of student roster data matched to teacher survey data.

Student reports of project quality (student survey)[14]

At the end of a project, students in grades 4–12 completed a survey about their experiences of PBL. In addition to close-ended items about their experiences of HQPBL and deeper learning, students were asked to provide written responses to the following questions:

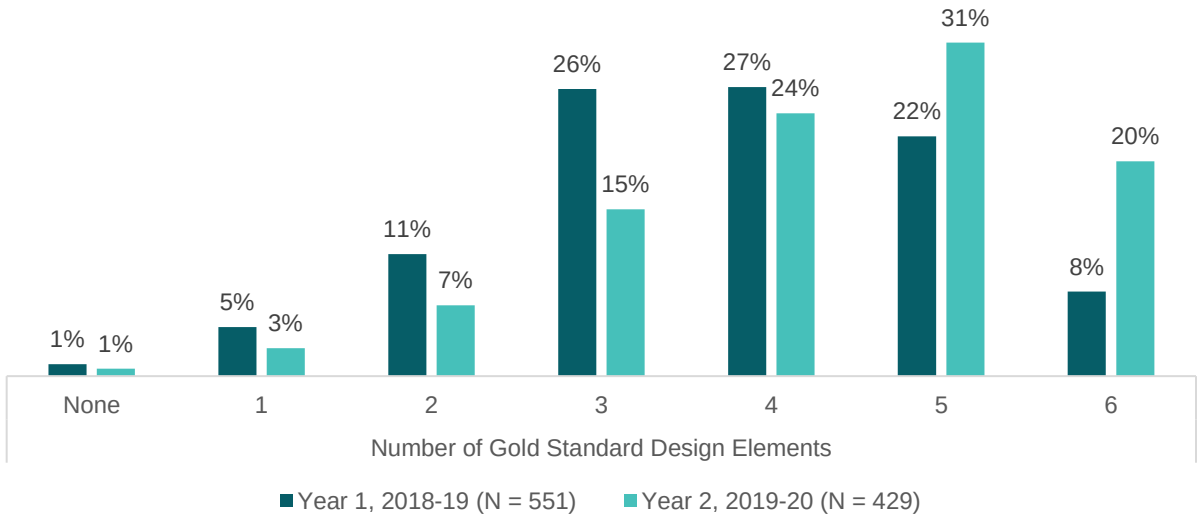
1. How was working on this project different from other learning activities?
2. What is the most important thing you learned in this project?
3. Is there anything else you would like to tell us about the project?

Many students did provide written responses to these questions, and major themes are summarized below.

[14] Since we received student surveys from only six schools (two high schools, two middle schools, and two elementary schools), these data are not expected to be as representative of the entire district as the teacher survey data, which include all 14 schools.

In Year 2, 20 percent of MSD *student survey respondents*[15] reported that they experienced high-quality projects, an increase of 12 percentage points from Year 1 (figure 9). Students also reported higher levels of quality in Year 2 compared with Year 1. Specifically, 75 percent of students reported that their projects involved four or more Gold Standard Design Elements, an increase of 18 percentage points from Year 1.

Figure 9. Percentage of MSD students reporting projects with zero to six Gold Standard Design Elements, Years 1 and 2

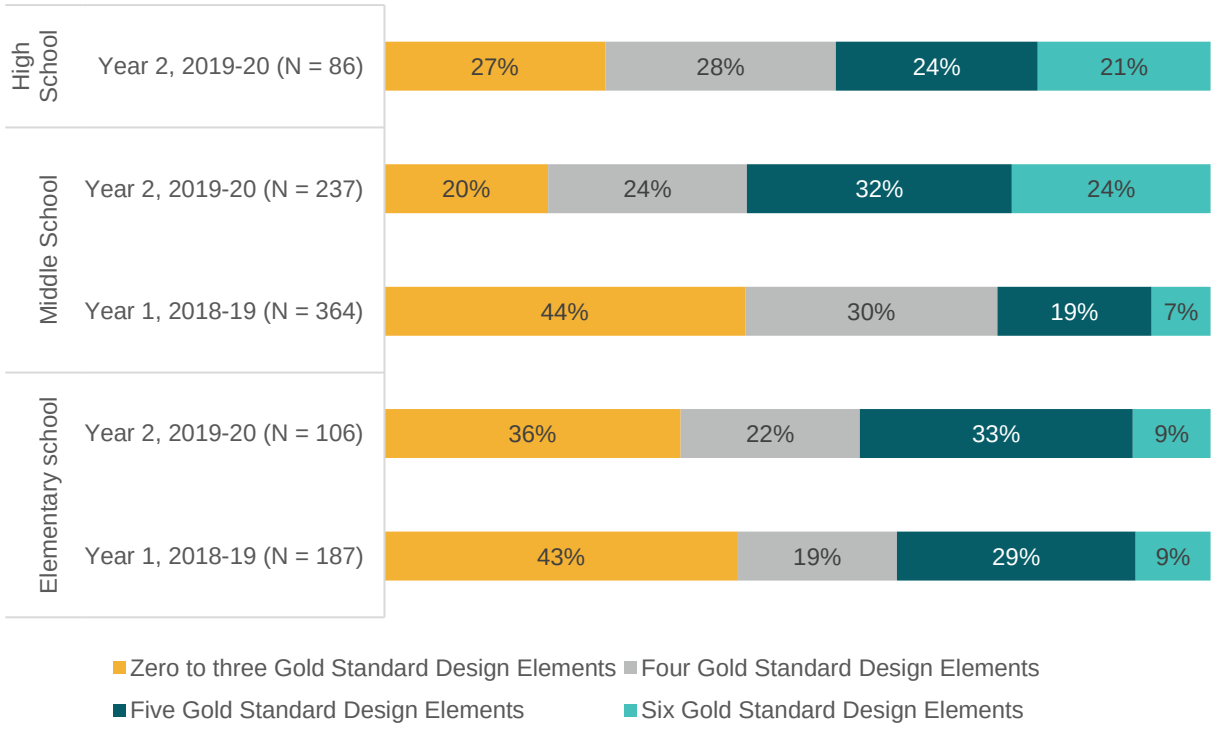


Source: Education Northwest analysis of student survey data.

In Year 2, 24 percent of MSD *middle school students* reported that they experienced high-quality projects, an increase of 17 percentage points from Year 1 (figure 10). The percentage of elementary school students who reported experiencing high-quality projects remained stable. No high school students completed the survey in Year 1.

[15] Only two students filled out the survey for multiple projects in MSD in Year 2, so the percentages by project and student are the same.

Figure 10. Percentage of MSD students in each grade band who reported experiencing projects with zero to six Gold Standard Design Elements, Years 1 and 2

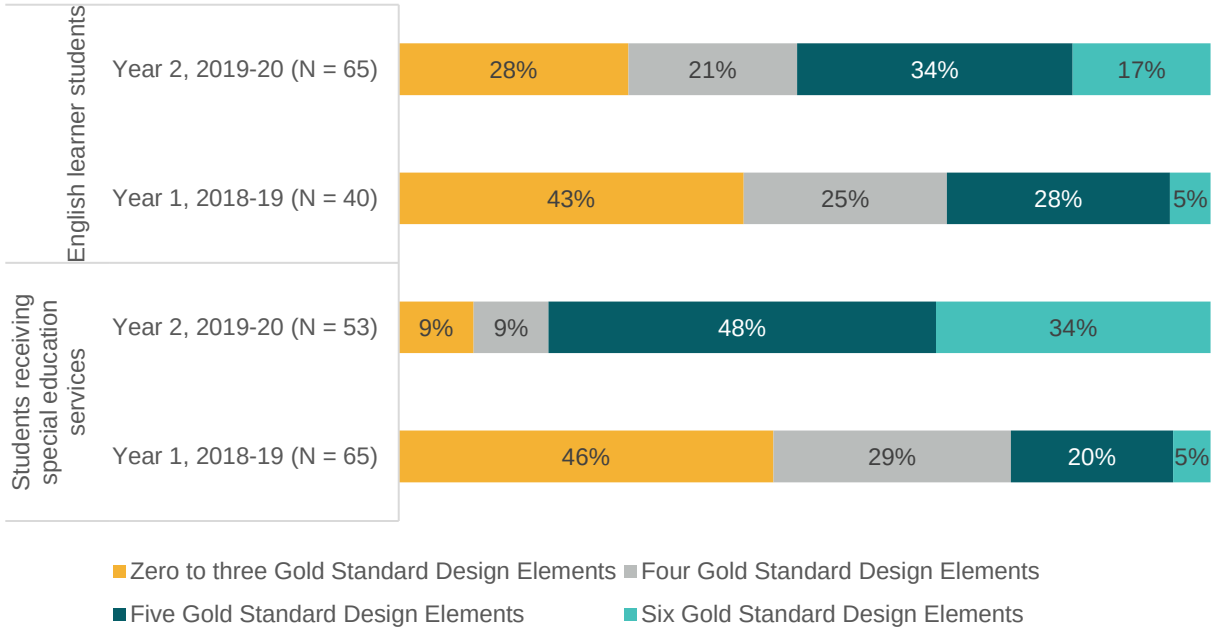


Note: No high school students participated in the student survey in Year 1.

Source: Education Northwest analysis of student survey data.

A higher percentage of MSD *English learner students* and *students receiving special education services* reported experiencing a high-quality project in Year 2 compared with Year 1 (figure 11). In Year 2, compared with the overall average (20 percent), a higher percentage of students receiving special education services (34 percent) experienced a high-quality project, and a slightly lower percentage of English learner students (17 percent) experienced a high-quality project. Students who were eligible to receive free or reduced- price lunch reported experiencing a high-quality project at the same rate as the overall student population (20 percent).

Figure 11. Percentage of English learner students and students receiving special education services who reported experiencing a project with zero to six Gold Standard Design Elements, Years 1 and 2



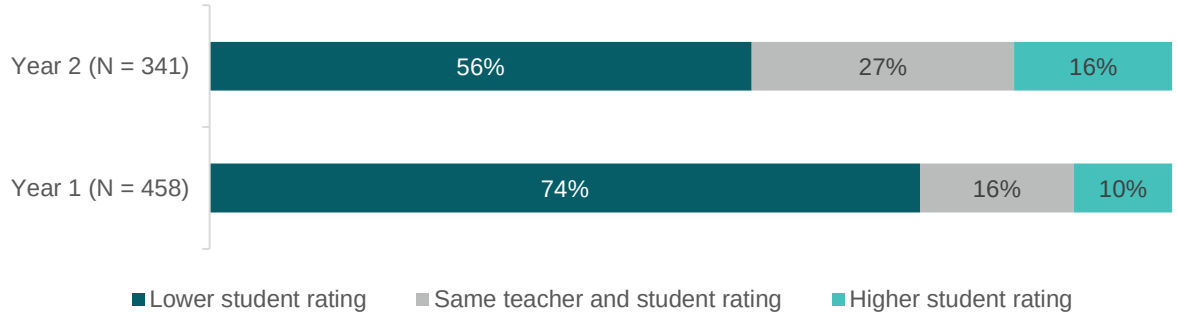
Note: Percentages may not add up to 100 due to rounding.

Source: Education Northwest analysis of student survey data.

Although there was more alignment between student and teacher ratings of project quality in Year 2 compared with Year 1, over half of students continued to rate project quality lower.[16] Comparing Year 2 survey results, students rated their projects as having fewer Gold Standard Design elements than their teachers 56 percent of the time, the same number of design elements 27 percent of the time, and more design elements 16 percent of the time (figure 12).

[16] In Year 2, 74 percent of the students who completed the survey were matched to 43 teacher survey respondents (11 percent) who provided information about project quality.

Figure 12. Difference between student and teacher reports of Gold Standard Design elements by percentage of MSD student survey respondents in Years 1 and 2

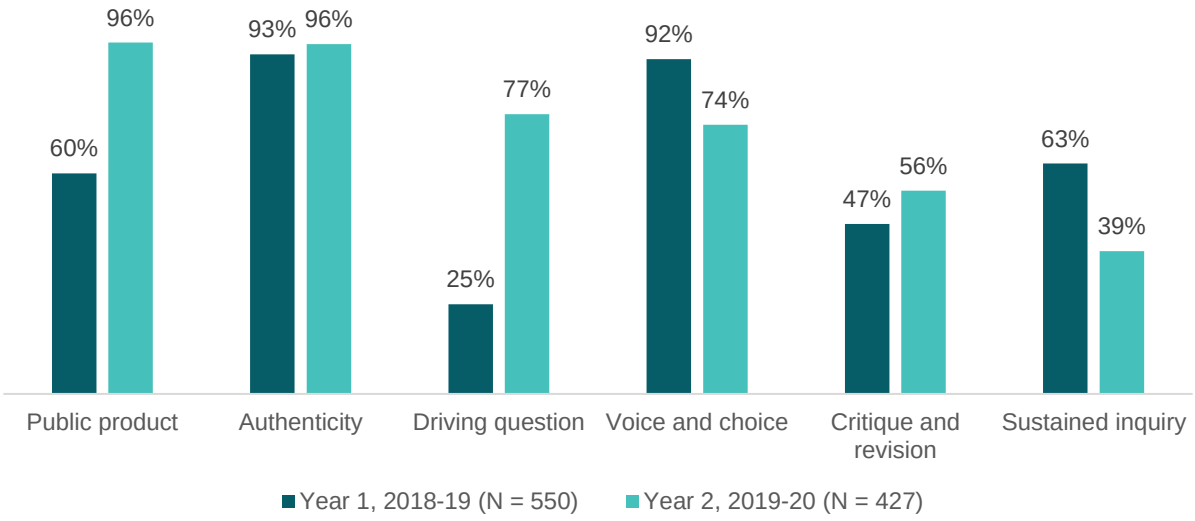


Note: Percentages may not add up to 100 due to rounding.

Source: Education Northwest analysis of student survey data and teacher survey data

Students reported varying levels of quality across the six Gold Standard Design elements measured (figure 13). They most often reported experiencing public product and authenticity, and they least often reported experiencing sustained inquiry, as well as critique and revision. The largest increases from Year 1 in MSD student-reported quality were for driving question and public product, with a decline in reports of sustained inquiry, as well as voice and choice. In open-ended survey responses, students most frequently shared positive experiences of intellectual challenge, collaboration, authenticity, voice, and public product.

Figure 13. Percentage of MSD students reporting each Gold Standard Design Element in Years 1 and 2



Source: Education Northwest analysis of student survey data.

In open-ended comments, 40 percent of MSD student survey respondents described experiences of *intellectual challenge*, often through sustained inquiry related to a driving question. These students most frequently described the increased effort and time required to complete projects. To a lesser degree, students also described experiencing a sense of pride or accomplishment upon completion, and some students said their project helped them understand content better than other assignments.

"I got to work with kids in my class to make a slideshow about our state. We had to find info about my state, like the food, some fun things to do, and where you can stay. I had to make a map [about the state]. My team members had to make a slideshow and a brochure. We did good, and we all put our best foot forward."

MSD student

In addition, 35 percent of all MSD student survey respondents described experiences of *collaboration* with other students through projects. Along those lines, many students reported that peer collaboration was a primary way that PBL differed from other school experiences.

Overall, 30 percent of all MSD student survey respondents shared experiences of *authenticity,* particularly the use of tools, technology, or models in their project. Many students said projects were relevant to their personal interests, and others spoke more generally to the value of experiential learning or contributing service to others.

"[The project to grow an organism] was more 'real,' for lack of better words … There was a lot of trial and error during it, as opposed to following a prewritten set of instructions. The project allowed me to learn through experience rather than just being told about how organisms survive."

MSD Student

About 14 percent of MSD student survey respondents commented specifically on *voice and choice*. Students expressed appreciation for being able to choose a topic of interest, as well as "freedom" and "control" in how they approached their work (in terms of sources, products, and/or roles). They also described

"[The project] was challenging, which isn't too common for other projects. We had to create a website, and we were planning to present it to the superintendent, which added pressure to impress."

MSD Student

experiences of "independent" work and autonomy.

In open-ended responses, 18 percent of MSD student survey respondents described the experience of developing and sharing *public products*, such as a brochure, website, presentation, 3D model, or performance. Students also reported that they enjoyed seeing how their classmates interpreted the assignment.

Deeper Learning

OUTCOME

Improved deeper learning outcomes for students, including students furthest from opportunity.

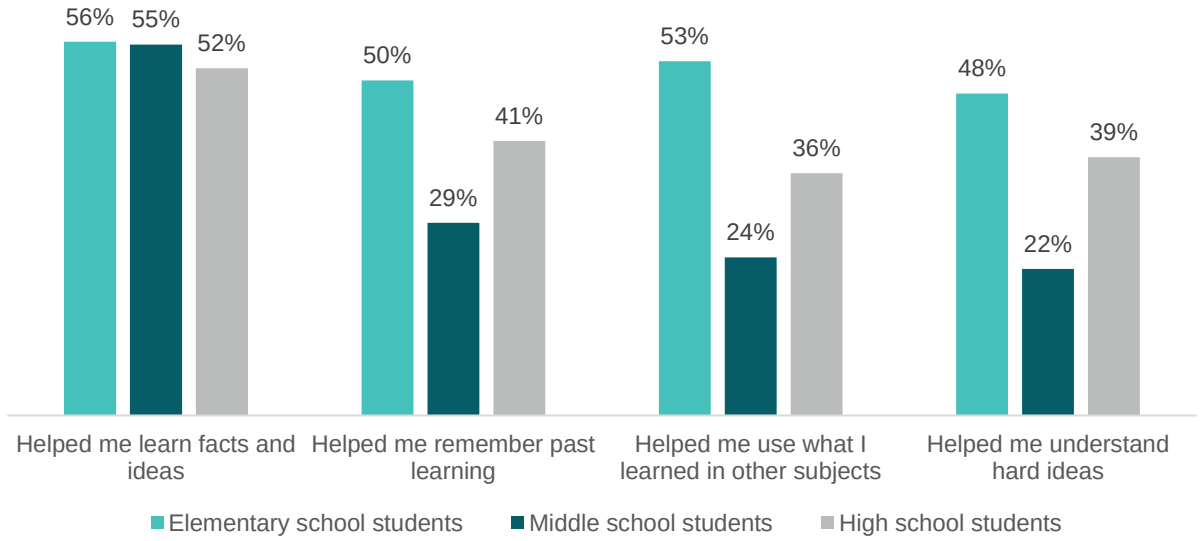
Academic knowledge

Overall, 85 percent of MSD *students* reported that projects increased their knowledge of academic content, especially in learning facts and ideas. Middle school students reported lower levels of learning on most items compared with elementary and high school students (figure 14). Higher levels of learning were reported by English learner students, as well as students receiving special education services. Students with teachers who took PBL 101 also reported slightly higher levels of learning academic content through projects.

"Other learning activities may only focus on one subject, but with the end-of-year field trip project, we could use all of our skills from social studies, math, language arts, and science."

MSD Student

Figure 14. Percentage of MSD students indicating deeper learning of academic content through projects by grade band, Year 2



Source: Education Northwest analysis of student survey data.

In open-ended survey responses, 38 percent of students described how they increased their knowledge of course content or improved their academic skills through a project. Many students also shared specific facts they learned, as well as enthusiasm for the topic they investigated. Some students discussed the interdisciplinary nature of their projects.

"[The Lego robotics project] really helped me with space facts a lot. Now I know about some things about the moon! I would love to learn more … Maybe I could explore [space] and make something for kids to learn about [space] and answer their questions."

MSD Student

Educator perspectives on academic mastery

When asked to describe how PBL supported deeper learning in their schools, MSD educators in three of 10 focus groups offered examples of student mastery of core academic content. They also said PBL supports deeper engagement and retention of knowledge through experiential learning and student-driven topics. A few educators discussed this issue on the teacher survey.

"PBL helps to connect and contextualize content and skills for my English language learners. It also provides them the opportunity to develop voice and communicate their learning in multiple modalities."

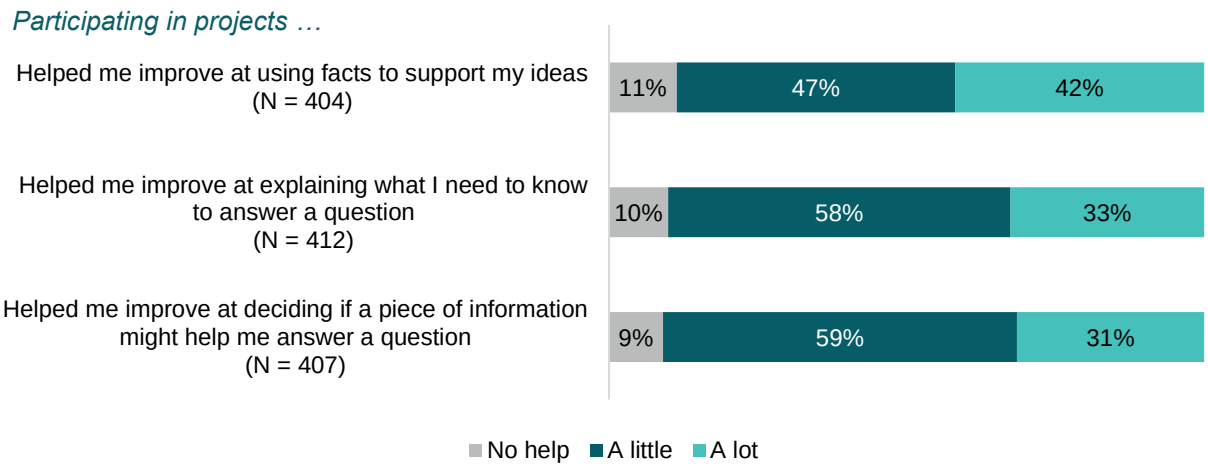
MSD Teacher

Critical thinking skills

Overall, 97 percent of MSD *students* reported increased critical thinking skills through their participation in projects. Most commonly, students reported that participating in a project improved their ability to use facts to support ideas; 42 percent of students reported that a project helped them a lot in this area (figure 15).

Compared with students overall, a higher percentage of *English learner students and students receiving special education services* reported that a project improved their critical thinking skills a lot. The highest percentage of English learner students (45 percent) reported that a project helped them a lot with deciding whether a piece of information might help them answer a question compared with 31 percent of students overall. Students receiving special education services reported that a project especially helped them in using facts to support their ideas (52 percent compared with 42 percent).

Figure 15. Percentage of MSD students indicating greater critical thinking skills by participating in projects, Year 2



Note: Percentages may not add up to 100 due to rounding.

Source: Education Northwest analysis of student survey data.

In open-ended survey responses, 5 percent of students described project-related experiences of critical thinking and problem-solving, primarily in selecting relevant information and using evidence to explain their rationale.

"In this project, we had to show what we learn[ed] not just by telling but by answering questions we did not even have on our slide but should have known [the answer to]."

MSD Student

Educator perspectives on critical thinking

In four of 10 focus groups, MSD educators provided examples of how students developed critical thinking skills through projects. They also said PBL helped students work through problems independently and strategically select sources as evidence to support their claims.

"When they were researching for stuff, I provided certain websites, but I didn't say, 'You have to go to this' … I think that helped with some of the deeper learning stuff too because it wasn't that I was just telling them the information, but they had to take the question and find the information … They had to evaluate whether that [information] made sense for an answer."

MSD Teacher

Communication skills

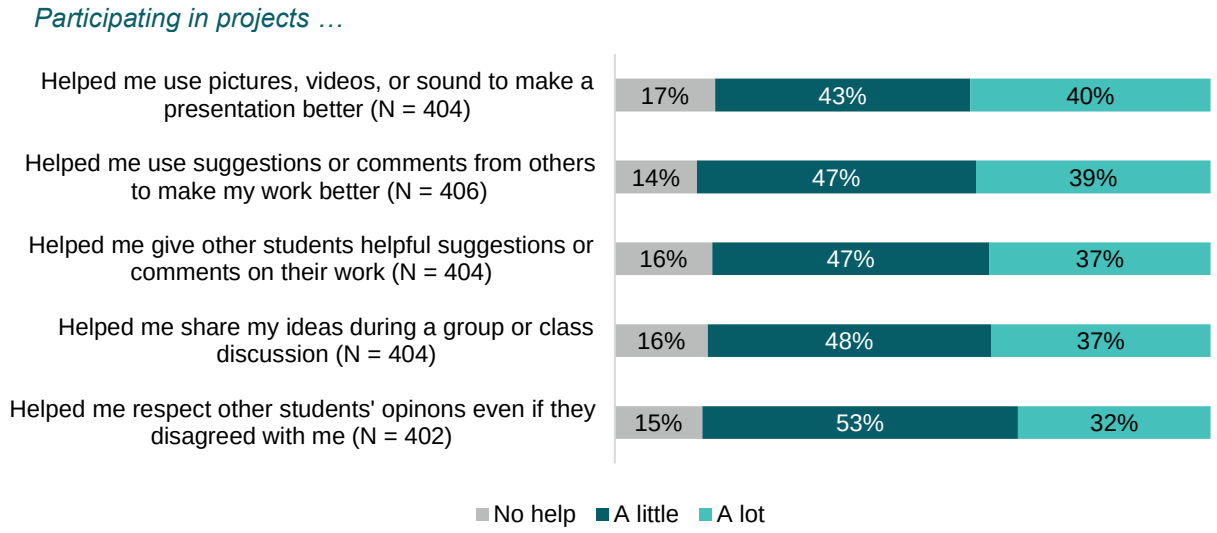
Overall, 98 percent of MSD *students* reported increased communication skills through their participation in projects. The highest percentage (40 percent) of students said a project helped them a lot to use pictures, videos, or sound to improve a presentation (figure 16).

"I enjoyed presenting, and I feel [the project] helped improve my public speaking."

MSD Student

On all survey questions about communication, a higher percentage of *English learner students* and *students receiving special education services* reported that a project helped them a lot compared with students overall. For English learner students, the largest difference was in sharing ideas during a group or class discussion; 48 percent of English learner students said a project helped them a lot in this area compared with 37 percent of students overall. For students receiving special education services, the greatest difference was in the use of pictures, videos, or sound to improve a presentation; 59 percent of students receiving special education services said a project helped them a lot in this area compared with 40 percent of students overall.

Figure 16. Percentage of MSD students indicating greater communication skills by participating in projects, Year 2



Note: Percentages may not add up to 100 due to rounding.

Source: Education Northwest analysis of student survey data.

In open-ended survey responses, 10 percent of MSD students described increasing their communication skills through projects. Like the survey results, most comments focused on presentation skills and talking in front of large groups. Some students also described growth in how they communicated with peers on their project teams, including their ability to give and receive feedback.

"Up until this year, I've always been cautious about students providing other students [with] feedback and never thought that it was that great … And, honestly, having them give more specific, focused feedback … it really changed the quality of their work for many, many students … so that really helps … with our community in our classroom and [becoming] comfortable to go to each other for feedback and for support."

MSD School Leadership Team Member

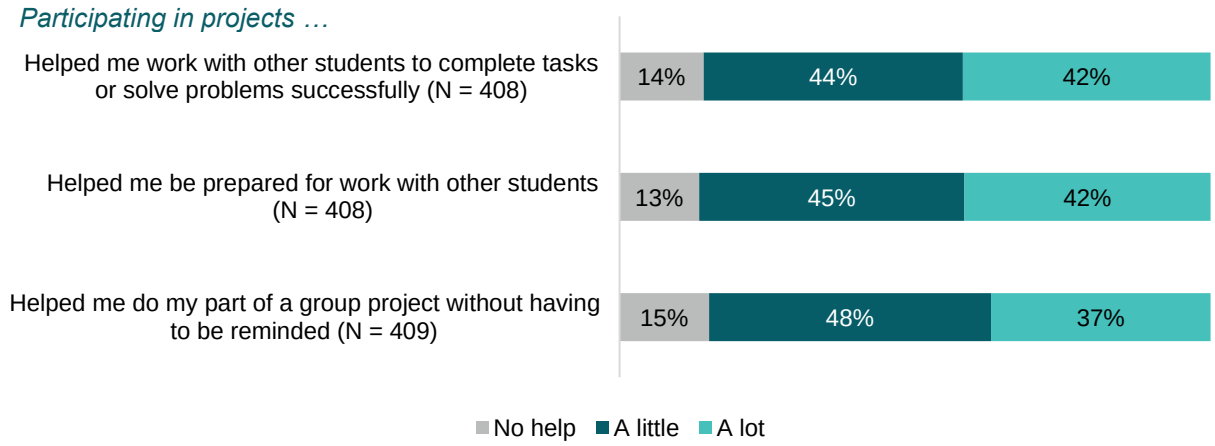
Educator perspectives on communication

MSD educators in six of 10 focus groups said students develop communication skills through projects. Educators also described how students improved in terms of their comfort and skills with public speaking. In addition, they discussed how projects provided students with an opportunity to practice giving and receiving feedback, which was a new experience for both students and teachers.

Collaboration skills

Overall, 94 percent of MSD *students* reported increased collaboration skills through their project participation. Students reported similar levels of learning across all items (figure 17). English learner students and students receiving special education services reported more progress than the overall student population. For English learner students, the largest difference was in working with others to complete tasks and solve problems; 55 percent of English learner students said a project helped them a lot in this area compared with 42 percent of all students. The largest difference for students receiving special education services was in being prepared to work with other students; 63 percent of students receiving special education services said a project helped them a lot with this skill compared with 42 percent of all students.

Figure 17. Percentage of MSD students indicating greater collaboration skills by participating in projects, Year 2



Note: Percentages may not add up to 100 due to rounding.

Source: Education Northwest analysis of student survey data.

In open-ended survey comments, 26 percent of students described how projects strengthened their collaboration skills, such as the negotiation of shared tasks. Many students said the experience also helped them develop a more positive mindset about working with others, selecting partners who would be good teammates, and being open to collaborating with students who were not their close friends.

> *"I learned that everyone around has a different way of looking at things and can give good or even better ideas."*
>
> **MSD Student**

Educator perspectives on collaboration

Development of collaboration skills was a relatively common theme, with educators in six of 10 focus groups offering examples of how PBL supports collaboration. They said that by working in groups, students developed their ability to negotiate and solve problems together. In addition, educators said students improved their collaboration skills with increased practice over time, so they started preparing students to collaborate before the start of the project and provided opportunities for "sustained collaboration" in other contexts.

"I like that [students are] collaborating together, they're making choices together. They're learning … how to compromise too, which is a big thing when they're doing these projects. They have to make decisions that don't always go the way that some want them to go."

MSD Teacher

Teacher survey respondents also frequently offered examples of student collaboration in relation to other deeper learning skills, such as collaborative problem-solving.

Student engagement

In open-ended responses, 28 percent of all student survey respondents wrote about experiences of high levels of engagement on projects. Students said they "enjoyed" PBL and found this form of collaborative and active learning more engaging than other forms of learning (such as independent work or worksheets).

"[The project] helped me learn more about neutrons. It kind of helped me focus more on science because before I used to not pay attention."

MSD Student

"Let's not do plain worksheets anymore! PBL is so much better because it helps me and others learn better and more quickly because it is fun."

MSD Student

Educator perspectives on student engagement

Students' descriptions of increased engagement through PBL aligned with common themes that emerged in the teacher survey and all 10 teacher focus groups. Many educators described increased student interest in the topic or process of PBL, which they said led to increases in students' "motivation" for and "ownership" of learning. Teachers also often said they saw increased

"I really enjoy seeing how interested the students are during PBL. You can tell they are excited to learn and excited to work."

MSD Teacher

engagement from students who struggle with conventional learning activities, as PBL provides them with a chance to learn in different way.

In some schools, student interest was so high that projects created a "buzz," and students are starting to ask teachers to do more projects. Several teachers said the increased student engagement increased their own motivation to teach PBL, despite challenges. Some educators observed improvements in classroom climate, as high levels of student engagement were associated with reductions in the need to discipline students.

"After a couple years of doing [PBL], well, you've got a nucleus of kids who really excel at it, and then they take ownership of it, which is really neat. And when they want to do it … I mean, you can't put a price tag on that. When they're asking for something a little bit more, that's awesome."

MSD School Leadership Team Member

Scaling, Diffusion, and Systems Conditions

In this section, we draw on educator focus group and teacher survey data to present results related to the second set of research questions:

- How does quality PBL scale and spread in and across schools?
    - What are the patterns of diffusion?
      What systems conditions enable or constrain teachers and leaders in scaling quality PBL?

Educator focus group data provide insight into diffusion process outcomes, including secondary drivers (such as increased educator motivation, demand, and capacity for PBL), and SNA of teacher survey data provides information about the role of teacher-to-teacher social networks in the diffusion of PBL throughout the system. Teacher survey data, combined with educator focus group data, provide information about changes over time in leadership capacity to create the systems conditions for PBL. Finally, focus group data provide insight into the tertiary drivers, in terms of perceived effectiveness of the intentional scaling strategies school and district leaders use.

Findings Summary

Scaling strategies: Training and coaching, observation, and messaging were the primary scaling strategies that school leadership teams used.

Diffusion of HQPBL: MSD educators offered many signs that HQPBL is starting to scale and spread throughout their schools and district. Interim outcomes include increasing comfort with PBL, teacher adoption of new practices and mindsets, and new connections in and across schools. Teachers who participated in PBL 101 were significantly more likely to teach a project and to teach a high-quality project compared with teachers who did not participate in this training. SNA indicates PBL is likely diffusing beyond these trained teachers to others through a combination of support from school leadership teams and informal teacher-to-teacher relationships. Individuals connected to an early adopter opinion leader in the social network were more likely to teach a project in Year 2.

Systems conditions: School leadership teams are putting in place conditions to support a culture of PBL, with leaders messaging their support and providing opportunities for peer collaboration. Although training and coaching are the primary capacity-building supports available, access to them and quality of implementation may be uneven between the two cohorts of schools. To sustain and expand HQPBL, MSD educators call for more PBL training, customized and ongoing coaching, and increased time for project planning and peer collaboration.

Scaling strategies

TERTIARY DRIVERS

Use and effectiveness of key scaling strategies (e.g., training, observation)

Across all ten MSD focus groups, educators offered examples of scaling strategies related to **training and coaching.** MSD educators found PBLWorks' training to be important for connecting with teachers from other schools, as well as for working together as a team to prepare for project rollout. In addition, they said school-based coaches from the leadership team provided PBL strategies and fostered a sense of community through professional development, participation in a PLC, or informal interactions.

"We have had lots of discussion with our teachers and our teams of teachers to validate the work that they already do with those design elements and those principles. And then to show them sometimes when they are doing those things, and they might not realize it."

MSD School Leadership Team Member

Observation was also an important strategy in MSD for supporting implementation, according to many focus group participants. Observation mostly occurred through formal professional development and informal interactions in hallways, although a few participants were able to dedicate time to observe other teachers in their classrooms.

"I think it was good for me to visit the other schools and see what they were doing and to get some feedback from others as to what their challenges were so that we don't feel like we're the only ones in that particular boat."

MSD School Leadership Team Member

Principals particularly noted the value of leadership learning walks in other schools and wanted to create those opportunities for their teachers. When focus group participants were asked what strategies worked better for teachers (both those who were willing and those who were more hesitant), exposure to others' projects was identified as a key strategy.

School-based leadership team members also said they focused on building educators' growth mindset in their **messaging** to teachers about PBL. For instance, they said they encouraged teachers to try out projects, even smaller ones, and iterate. Teachers often said they felt supported by school leaders to take risks and try new practices. Additionally, MSD district and school leaders encouraged teachers to integrate PBL into the work they're already doing rather

than seeing it as "something extra." A few district administrators also described promoting the work of "superstar" teachers as part of their messaging strategy.

Diffusion

SECONDARY DRIVERS

Increased teacher motivation, demand, and capacity for PBL through teacher-to-teacher connections

MSD leaders and teachers emphasized in all focus groups[17] that **educators' comfort and engagement with PBL is increasing.** This was supported by survey results; 80 percent of survey respondents said they facilitated at least one project in 2019–20. In contrast, 51 percent of survey respondents reported facilitating a project in the baseline school year (2017–18), and 59 percent reported doing so in 2018–19. In open-ended responses, about 10 percent of survey respondents emphasized their increased engagement in PBL, often describing it as "good teaching."

"It was very unusual that we didn't have any pushback with people not wanting to participate [in PBL]. Usually, when we roll out a new initiative, you're lucky if you get 80 percent of the people buying in, but we didn't get one person not wanting to do something with PBL this year."

MSD School Leadership Team Member

In most focus groups, MSD educators described integrating **new teaching practices** (such as performance-based assessments and purposeful group work) into their instruction. Educators especially noted the increased opportunities for student voice and choice. This was supported by survey results; 98 percent of respondents reported including student voice and choice in their projects.

"PBL has changed my entire teaching … Having gone through PBL projects and realizing the benefits of voice and choice, I feel like I do a much better job because I've seen the benefit of it in providing voice and choice in many areas, not just when it comes to the project itself."

MSD Teacher

[17] In MSD, 10 focus groups were conducted with 42 participants (19 teachers, 14 leadership team members, six Cohort 2 principals, and three district staff members).

To a lesser degree, some MSD educators also described **shifts in teacher mindset** that included high expectations for all students to thrive in a PBL environment. Some teachers noted a shift in mindset that included integrating PBL into existing teaching, as opposed to seeing it as an extra activity.

Across all focus groups, MSD leaders and teachers commonly discussed **building new connections** through PBL. Most frequently, they described the value of networking with educators from other schools through PBLWorks trainings. Educators also said connections between grades or disciplines were forming due to PBL. Connections with teachers in their own school were regularly identified as especially useful for teachers who were hesitant to implement PBL.

> *"I loved collaborating with other people that I normally wouldn't collaborate with [at PBL 101 trainings]."*
>
> **MSD Leadership Team Member**

Patterns of diffusion

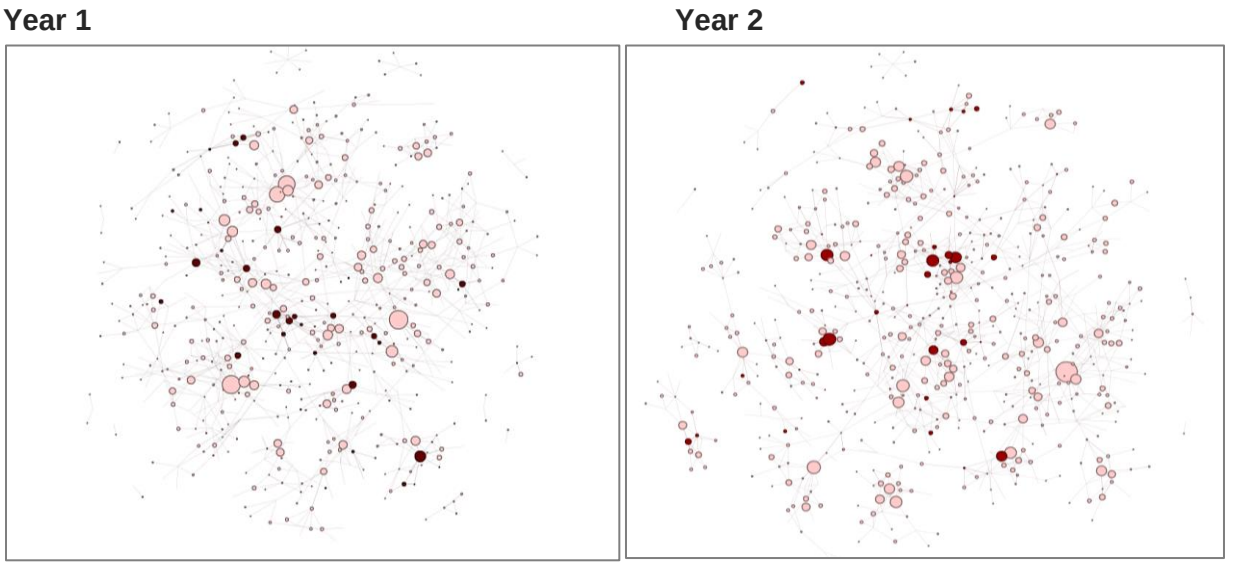
As discussed previously, in selecting teachers to participate in the PBL 101 training and related services, schools were encouraged to include teachers who were both early adopters of innovation and opinion leaders ("early adopter opinion leaders") within their schools. Beyond that criteria, qualitative data suggests that schools varied in terms of how they selected teachers for training. Some schools focused on specific grades or subject areas while others sent a broadly representative team.

Results indicate that teachers who participated in PBL 101 were significantly more likely to have taught a project and for that project to be higher quality than teachers who did not directly participate in PBLWorks training and services. In this section we examine the role of teacher networks in diffusing PBL beyond these trained teachers to other teachers and demonstrate the importance of early adopter opinion leaders in diffusing PBL across MSD.

Teachers identified as PBL early adopter opinion leaders by school leaders at baseline were important to the diffusion of PBL. First, we found that early adopter opinion leaders were, in fact, PBL early adopters; they were more likely to report teaching a project (100 percent in Years 1 and 2) than other teachers (55 percent in Year 1 and 81 percent in Year 2). Early adopter opinion leaders also had higher-quality projects with more Gold Standard Design Elements (5.16 in Year 1 and 4.85 in Year 2) than other teachers (4.65 in Year 1 and 4.64 in Year 2). Second, we found that these individuals were, in fact, regarded as opinion leaders based on multiple

sources of data; teacher survey respondents were significantly more likely to go to PBL early adopter opinion leaders for advice or with questions than other educators. Figure 18 represents the network for MSD survey respondents, where the size of the dot indicates how often an individual was chosen in the survey. PBL early adopter opinion leaders (dark red dots) appear prominently on the network map, given that PBL early adopter opinion leaders comprise only a small portion of the overall network. Overall, 69 percent of early adopter opinion leaders (33 of 48) were identified by other teachers in the network as individuals to whom they go for advice or with questions, which reinforces that they are opinion leaders in the district.

Figure 18. MSD survey respondents more often chose PBL early adopter opinion leaders as people to whom they go for advice or with questions



- Individuals who were identified as a PBL early adopter opinion leader at baseline (Year 1 N = 41) (Year 2 N = 36)
- Individuals who were not identified as a PBL early adopter opinion leader at baseline (Year 1 N = 692) (Year 2 N = 702)

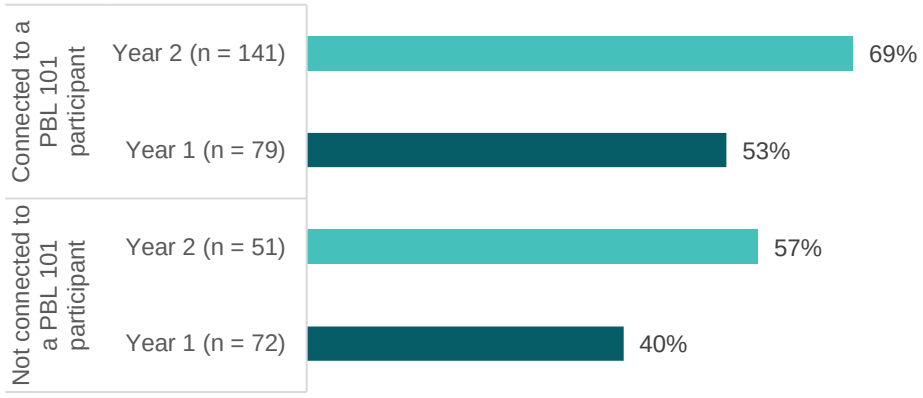
Source: Education Northwest analysis of teacher survey data.

Teachers connected to an early adopter opinion leader were more likely to teach a project in Year 2. Individuals connected to an early adopter in the social network were more likely to teach a project in Year 2 than teachers who were not connected to an early adopter opinion leader (88 percent compared with 78 percent). Teachers connected to an early adopter opinion

leader also had slightly higher-quality projects with more Gold Standard Design Elements compared with teachers who were not connected (4.8 compared with 4.56). Although these findings are not statistically significant, they do indicate that early adopters may play a role in diffusion of PBL in the district.

The percentage of teachers in MSD who taught a project increased in Year 2, regardless of whether they identified a PBL 101 participant as part of their network (figure 19). Although a higher percentage of teachers connected to PBL 101 participants completed projects compared with teachers who were not, there were increases for both groups. However, being connected to a PBL 101 participant did not make teachers significantly more likely to teach a project. This finding indicates that diffusion of PBL knowledge and practice is likely occurring through schoolwide initiatives to create supportive conditions for PBL in addition to the one-on-one relationships represented in educators' social networks.

Figure 19. Percentage of MSD teachers without PBL 101 training who taught a project by connection to PBL 101 participant, Year 2

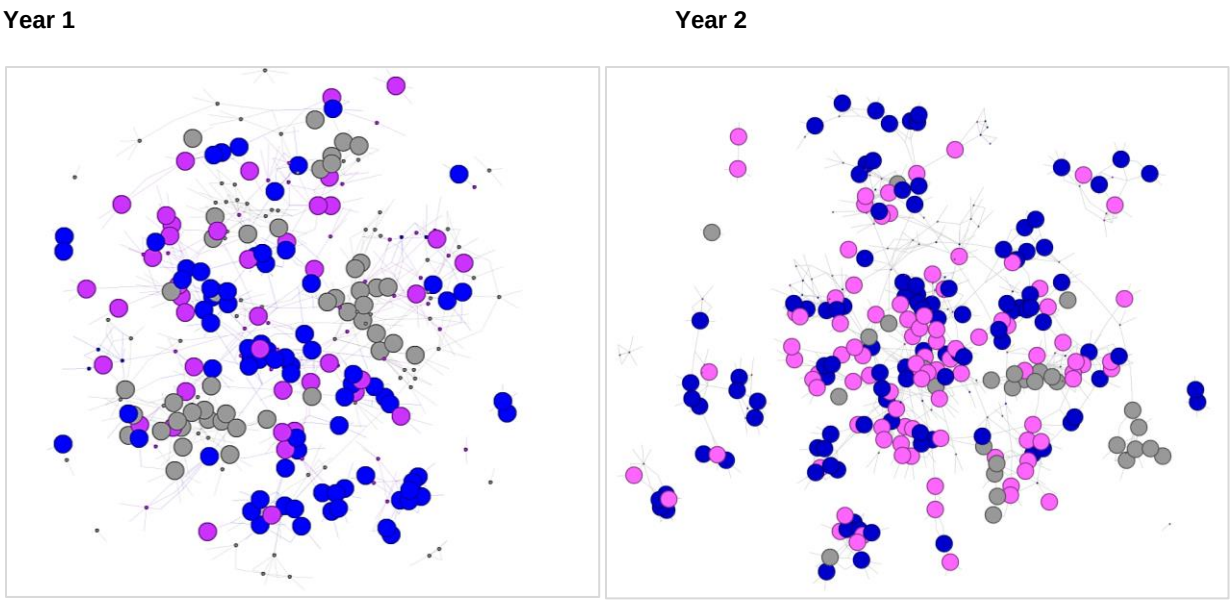


Source: Education Northwest analysis of teacher survey data.

In Year 2, more teachers were connected through social networks with PBL 101 participants, and a larger percentage of these teachers facilitated projects. Figure 20 shows maps of MSD educators by their connection to a PBL 101 participant, sized by whether they completed a project in Year 1 or Year 2. Purple dots—which represent individuals who are connected to a PBL 101 participant—are more prevalent and more often large in Year 2 than Year 1 (38 percent of these educators did a project in Year 1 compared with 59 percent in Year 2). Gray dots—which represent individuals who are not connected to a PBL 101 participant—are also more often large in Year 2 than Year 1 (30 percent of these educators did a project in Year 1 compared with 39 percent in Year 2), although the overall number of individuals not connected to a PBL

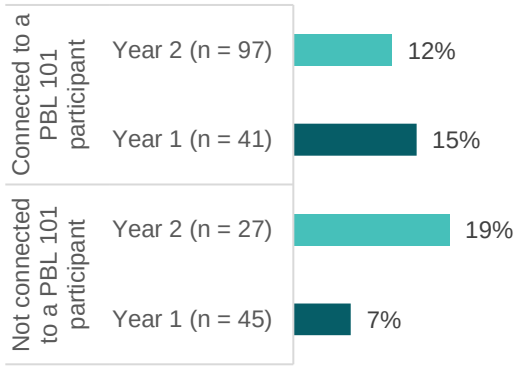
101 participant decreased by over half. Blue dots—which represent educators who have participated in PBL 101—are mostly large for both years (80 percent of these educators did a project in Year 1 compared with 93 percent in Year 2).

Figure 20. MSD project facilitation by connection to PBL 101 participants



The percentage of teachers in MSD who taught a high-quality project in Year 2 increased for those who did not identify a PBL 101 participant as part of their network but declined slightly for those who were connected to a PBL 101 participant (figure 21).

Figure 21. Percentage of MSD teachers without PBL 101 training whose projects met all six criteria for Gold Standard design, by connection to a PBL 101 participant



Source: Education Northwest analysis of teacher survey data.

Systems conditions

SECONDARY DRIVER

Increased district and school leadership capacity to support and scale Gold Standard PBL

In this section, we present reports from teachers regarding school-level culture and capacity to support teachers with PBL, as well as general systems conditions at their school. Although they reported progress in key areas, MSD survey respondents rated culture and capacity measures for PBL significantly lower than for general systems conditions. Cohort 1 participants reported higher levels of support for PBL on some measures compared with Cohort 2, especially related to school culture. There were no consistent, significant differences between schools' reported PBL culture or capacity based on their proportion of English learner students, students receiving special education services, or students eligible for free or reduced-price lunch.

Culture

Schools continue to improve the culture of collaboration and leadership support for PBL. In open-ended survey responses and focus groups, MSD educators most frequently cited peer collaboration, leadership support, and a schoolwide culture of PBL as the most useful supports for quality implementation. These findings are in line with survey results, which

"The most useful supports included teachers sharing PBL projects and links and collaborating on how to fit them into an already tight schedule."

MSD Teacher

indicate steady progress in each of these areas since baseline.

The value of having time to collaborate and plan PBL were strong themes in both the survey and focus groups, and many teachers expressed appreciation for any extra time provided by school leaders, when available. Peer collaboration included mutual learning and support during PLC meetings, as well as general sharing of ideas, models, and feedback. On the survey, educators often described learning from "peer experts" who were available to share resources and answer questions as needed.

Many educators participated in formal collaborations to co-design and/or co-teach projects, such as gradewide or schoolwide projects. As one focus group participant said, "There's no failure" when you try new things as a group.

In both the survey and focus groups, MSD educators credited school leaders for encouraging teachers to participate in the trainings, showing up for projects, and generally demonstrating that they "have our back." At some schools, all of this culminated in a schoolwide culture of PBL, which was characterized by "excitement" among both students and staff members, with projects taking place across the school.

"I definitely think having support from our coaches and from admin helped because we felt safe to try something and for it to fail and know that it was going to be OK and that we were going to have that support behind us."

MSD School Leadership Team Member

Although MSD teachers reported a stronger overall school culture in Year 2, survey results suggest a slight decline in time for planning and teaching PBL. MSD teachers rated general systems conditions related to culture higher in Year 2 than in prior years (figure 22). However, the percentage of teachers who positively rated conditions related to culture for PBL declined slightly from Year 1 to Year 2 for planning time and teaching time (figure 22).

"We have coaches, and we are encouraged to participate in PBL, but we are not given time to plan or collaborate with our PBL partners."

MSD Teacher

"There are those few individuals who still see the value in PBL. Other situations have taken precedence and PBL is no longer a priority. Change in administration, poor directives, inadequate time all dictated that PBL would be the first initiative to be eliminated."

MSD Teacher

The qualitative data support these results; on the survey and in focus groups, teachers said they need more time for planning and collaboration. They also noted concerns about finding time to teach PBL, due to the demands of state testing and meeting the diverse needs of large classes in which many students need additional support to get up to grade level on basic skills. In addition, some educators suggested a loss of focus on PBL in Year 2 due to leadership transitions and competing priorities, such as i-Ready.

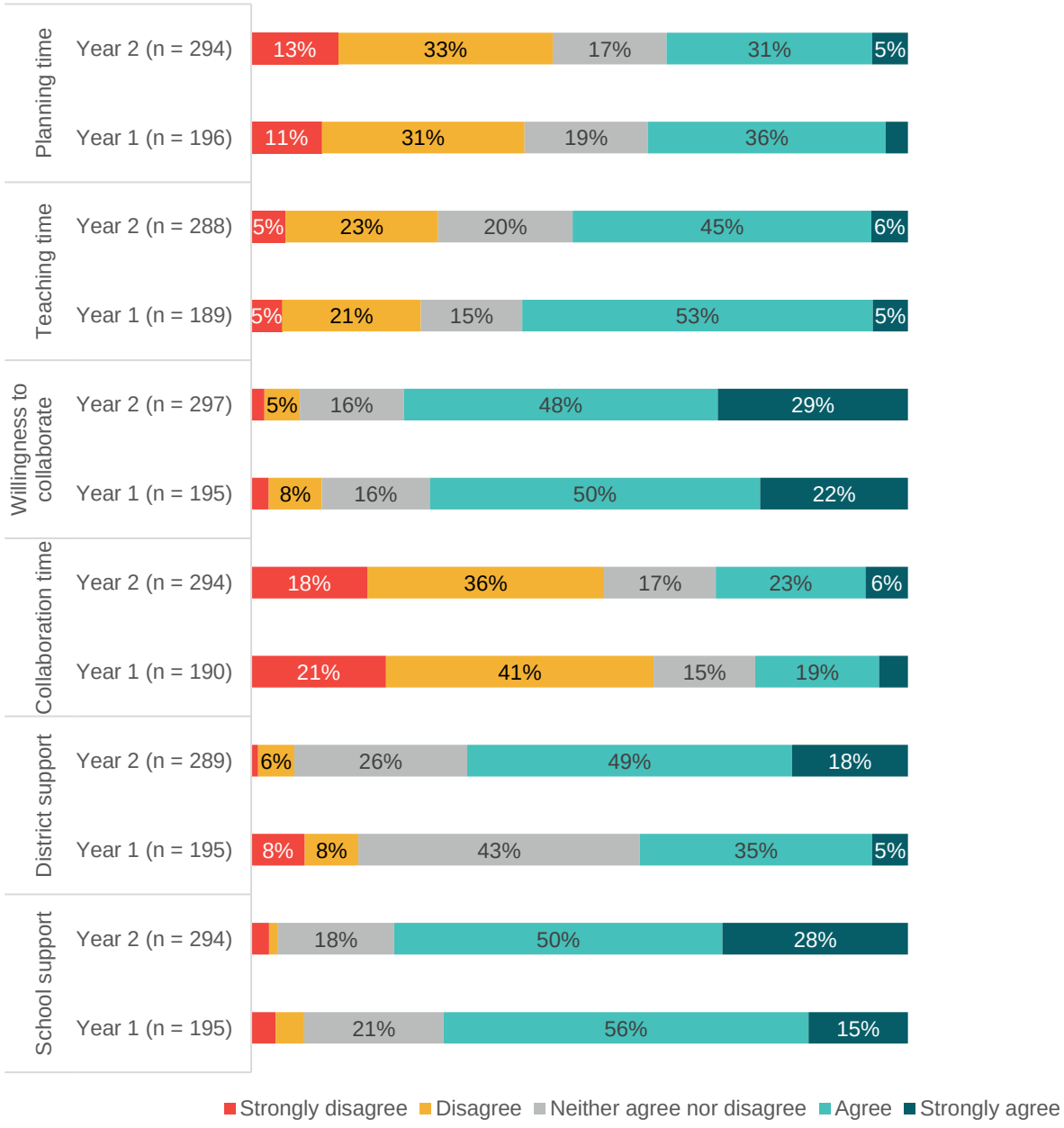
"We're going to focus really heavily on… raising our i-Ready scores... even though that's important, it took the wind out of our PBL sails, I think a little bit, because now we're giving up a class time for i-Ready… how are we going to fit in this PBL? And a lot of our professional development got moved into i-Ready time and we had a very difficult time meeting as coaches and as a PBL team."

MSD School Leadership Team Member

Looking at variation among schools, Cohort 1 teachers reported having significantly more planning and collaboration time for PBL than Cohort 2 teachers, as well as more school support. However, there was no significant differences between Cohort 1 and Cohort 2 in whether teachers taught a project. This may indicate that it takes time for leadership teams to put the systems conditions in place to support HQPBL. We may expect an immediate uptick in projects, as teachers are expected to facilitate projects as soon as they finish their training. Structural changes, such as increase in designated time for planning and collaboration, may be easier to implement in the year following the leadership training series.

Teacher reports of district support have steadily grown over the course of the project. More teachers report district support for PBL (67 percent in Year 2 compared with 40 percent in Year 1) and overall (63 percent in Year 2 compared with 40 percent in Year 1 and 37 percent at baseline).

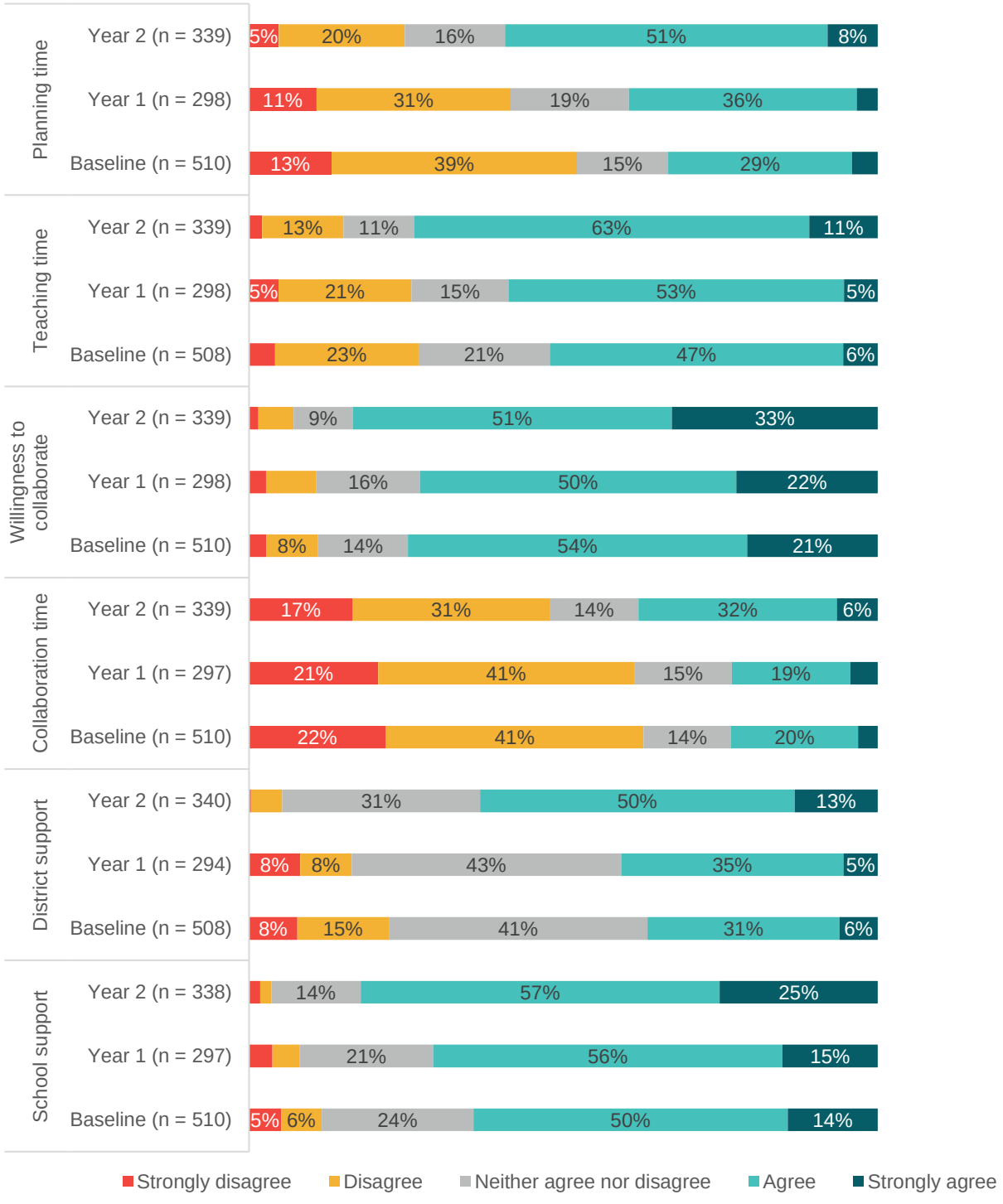
Figure 22. MSD systems conditions related to PBL culture, Years 1 and 2



Note: Some percentages may not total 100 due to rounding. Items with less than 5 percent are unlabeled for clarity.

Source: Education Northwest analysis of teacher survey data.

Figure 23. MSD general systems conditions related to culture, Years 1 and 2



Note: Some percentages may not total 100 due to rounding. Items with less than 5 percent are unlabeled for clarity.

Source: Education Northwest analysis of teacher survey data.

Capacity building

In Year 2 schools made some improvements in capacity building for PBL, especially in terms of resources and the quality of professional development. As with culture, in Year 2, MSD teachers gave higher ratings to all general systems conditions related to capacity building compared with support for PBL (figure 24). However, in Year 2, they gave higher ratings to most systems conditions related to capacity building for PBL compared with prior years (figure 25).

Focus group participants said PBL 101 provided "structure," clarity," and "momentum" for PBL. They also said they appreciated the opportunity to work on their project in teams and use feedback to refine it. In addition, educators said they appreciated receiving coaching from leadership team members, in terms of modeling PBL, as well as assistance with planning and debriefing projects.

"Experienced teachers offered to meet with us and discuss PBL ideas. One teacher also took the time to present her PBL project and how it worked in their class."

MSD Teacher

There is room to improve school-level coaching and feedback. Teacher ratings for ongoing coaching and feedback related to PBL declined slightly from Year 1 to Year 2. Survey and focus group findings support this. In open-ended survey comments, teachers most frequently cited a need to improve systems conditions related to capacity building and continuous improvement at their schools. Although teachers said coaches were a critical resource for PBL implementation, they also most frequently cited challenges related to capacity building. For instance, educators requested more direct and customized support for quality implementation, especially for teachers who did not participate in PBL 101 training. A couple educators said that having a coach in each grade level would help build—and sustain—enthusiasm for and skills related to PBL.

"I think PBL is a good approach to teaching. However, there is little support after the workshops and little direction or feedback in between them … We may have questions (even the leadership team) but don't know where to go to address them, as we feel we are all still working as through a fog. Because of it, I feel we don't have a strong grasp of the initiative and are just 'going through the motions' to look like we know what is going on."

MSD Teacher

There were also concerns that leadership team members did not yet have sufficient capacity to coach their colleagues. Educators suggested a need to ensure school-based coaches (especially teachers) have time away from their other responsibilities to coach their colleagues. Some teachers said their leadership team stopped coaching once new leaders came into the building in Year 2.

On the survey, some teachers said this lack of support resulted in major challenges with the quality of implementation (for example, with students spending a lot of time on laptops during PBL time rather than engaging in active collaborative inquiry). Six teachers said they received no support for PBL at their school.

In the survey and focus groups, teachers who were already trained suggested a need to train more teachers at their school to facilitate collaboration and improve project quality. There were also requests in the survey for specific training topics, such as facilitating PBL during remote learning, with PBL pre-school students, and with students who were chronically absent.

"I think we can help implement, we can coach, we can offer suggestions, but we really can't do the trimming that PBLWorks did for the teachers who missed it [PBL 101]. So it's hard when there's a directive that says do PBL, but then a lot of people aren't trained in PBL. So I think there's some people who have been kind of left behind in that aspect as far as training and what they need."

MSD School Leadership Team Member

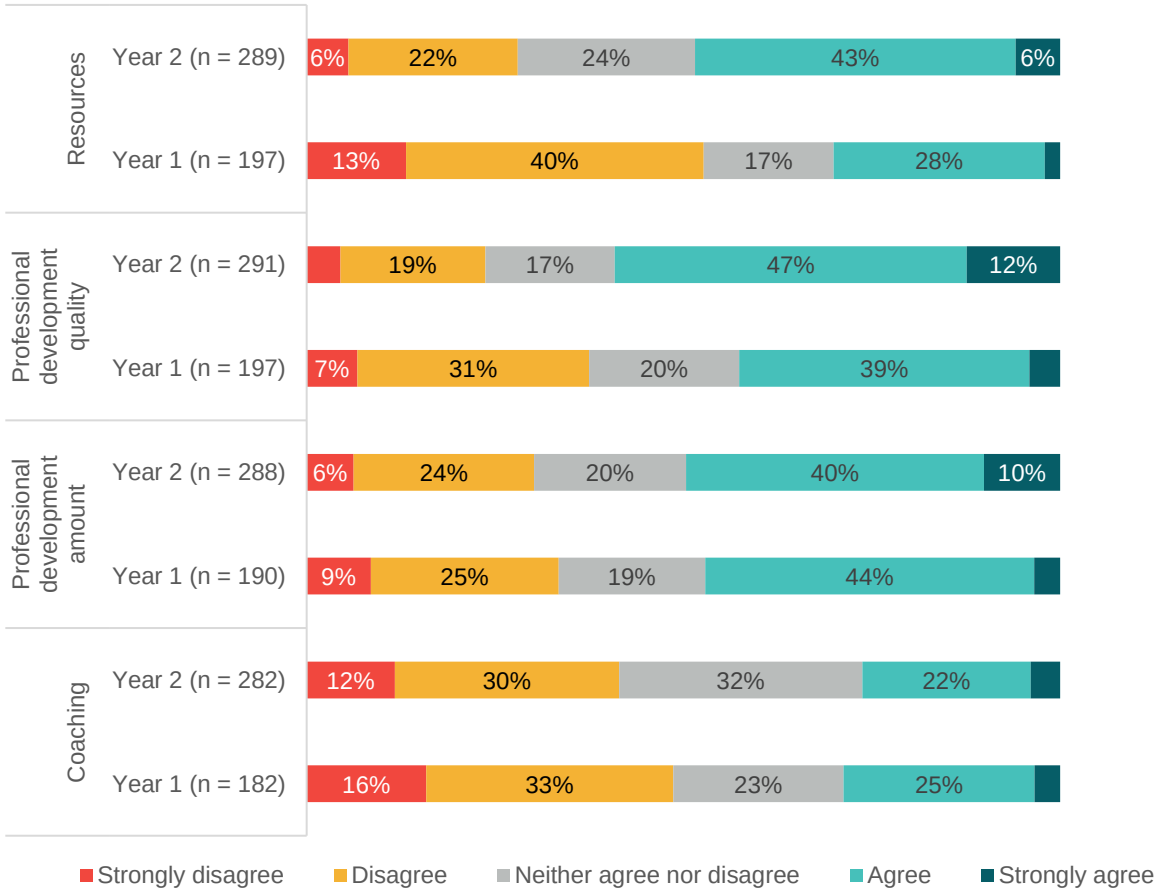
Indeed, analysis indicates differences in the levels of support experienced by respondents who participated in training compared with those who only received coaching. PBL 101 participants reported significantly more access to PBL resources, higher-quality professional development and adequate professional development compared with teachers who did not participate in PBL 101.

Additionally, Cohort 1 teachers reported having significantly more PBL resources, which may be due in part to the pandemic-related disruption to school leadership team efforts in Cohort 2 schools and having an extra year in the project to build up school-based resources. However, there was no difference in reported access to coaching and feedback between cohorts.

Educators have ideas for how districts can help schools further build capacity for PBL. Most frequently, educators asked for more districtwide professional development days. Many requested a "resource bank" of local project ideas, organized by grade band and content, that could be adapted. Educators also requested more guidance on how to find funding and

partners for projects. Another idea was districtwide PBL coaches to sustain learning and collaboration across schools—and to communicate that PBL is still a priority for the district.

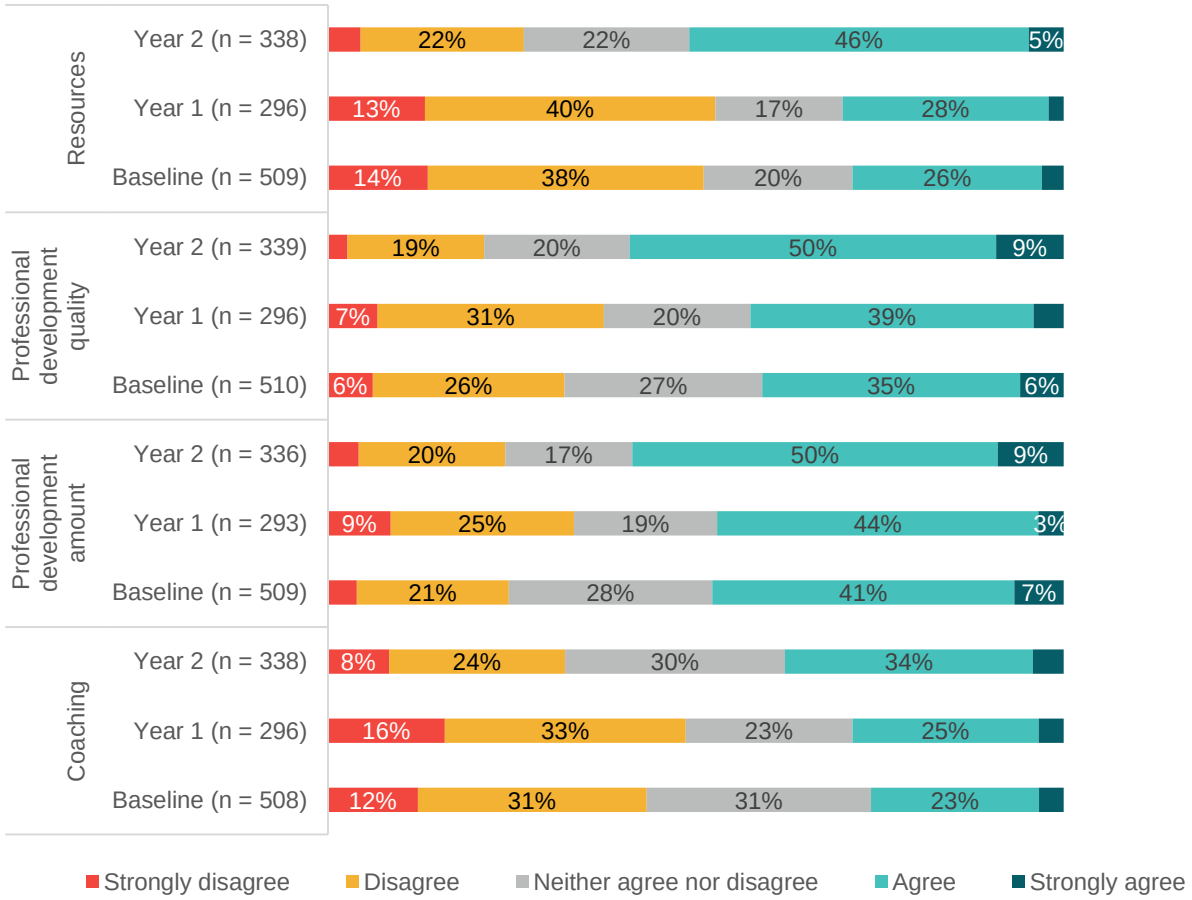
Figure 24. MSD systems conditions related to PBL capacity building, Years 1 and 2



Note: Some percentages may not total 100 due to rounding. Items with less than 5 percent are unlabeled for clarity.

Source: Education Northwest analysis of teacher survey data.

Figure 25. MSD general systems conditions related to capacity building, baseline through Year 2



Note: Some percentages may not total 100 due to rounding. Items with less than 5 percent are unlabeled for clarity.

Source: Education Northwest analysis of teacher survey data.

Next, we present vignettes describing how two Cohort 1 schools approached the process of scaling PBL.

School Profile

- Middle school
- Cohort 1
- Pockets of PBL before 2018
- Above district average in:
  - Students receiving special education services
- Below district average in:
  - Students of color
  - Students who qualify for free or reduced-price lunch
  - English learner students

TEACHERS LEAD SCALING EFFORTS

At this middle school, the leadership team (composed primarily of teachers) played a vital role in building awareness of and engagement in PBL. Teachers described the leadership team as key supports for integrating PBL into their classrooms, whether by being available to answer questions, guiding teachers to resources, or demonstrating PBL in their own work. In its messaging, the leadership team encouraged teachers to start small, integrate PBL into existing curricula or practices, and allow space for failure and growth. The leadership team also led professional development activities that showcased projects happening in the school. In surveys, 92 percent of teachers at the school said they have administrative support to try new practices compared with 78 percent of teachers districtwide.

Student and teacher engagement in PBL is growing

In 2019–20, 75 percent of surveyed teachers taught a project. Educators said PBL was increasing student engagement by providing opportunities for all students to participate in class and contribute their unique skills. On the survey, 83 percent of students reported collaborating with classmates, and 62 percent received feedback from classmates. In open-ended survey responses, students often described teamwork as the most important thing they learned from their projects.

"The most important thing that I learned during this project is that doing your part and working together is crucial to everyone's success."

MSD Student

Time for peer coaching and collaboration is a challenge

After a big push for PBL in Year 1, some participants felt that the school's focus shifted to other priorities during Year 2 (such as the i-Ready program). This was reflected in teacher survey results; only 24 percent of teachers reported that they had ongoing coaching and feedback related to PBL in Year 2, down from 56 percent in Year 1. Additionally, only 19 percent of teachers at the school felt they had adequate time for collaboration for PBL compared with 38 percent districtwide. Despite these challenges, teacher- leaders continue to promote PBL at the school.

"There's never enough time in the day … we always meet as a team, and I feel like we do it as consistently and often as we can, but there's just so many areas to address when we do meet … to fit [PBL] into that, as well—it's always a challenge …"

MSD Teacher

School Profile

- Elementary school
- Cohort 1
- Pockets of PBL before 2018
- Above district average in:
  - Students receiving special education services
  - Students who qualify for free or reduced-price lunch
  - English learner students
- Below district average in:
  - Students of color

LEADERS BUILD A COLLABORATIVE CULTURE OF PBL

A schoolwide culture of PBL has been critical to the success of PBL implementation in this elementary school, where teachers have consistent time for planning and collaboration through PLCs. This was reflected in surveys; most teachers at this school reported adequate time for planning (75 percent) and collaboration (83 percent) related to PBL compared with 38 percent and 29 percent, respectively, districtwide. This collaborative planning time generated grade-level projects that also included unified arts and support staff members.

Leadership team members fostered visibility of PBL through a shared Google Drive and a "focus wall" of projects. In terms of messaging, they let teachers see how PBL works for others. This observation generated excitement for PBL. In addition, the leadership team did not mandate the use of PBL.

Educators are adopting new PBL practices

Leadership team members and teachers felt that teachers in the school were trying new projects, having deeper conversations about PBL, and listening to students' voice and choice to build authentic projects with "real problems to be solved." Project facilitation is widespread, with 91 percent of teachers implementing a project in 2019–20.

Teachers request more intensive coaching

Some leadership team members joined PLCs to support PBL implementation and help align PBL with existing standards and initiatives in the school, but teachers said they would have liked coaches with more availability. Teachers and leaders both suggested having a coach in every grade level. This was reflected in surveys; only 27 percent of teacher survey respondents felt they received ongoing coaching and feedback for PBL.

"We feel [PBL] kind of brings us together more because we are collaborating more and not just within our grade level but inter-grade level, as well … so there's more of a fluid conversation between the grade levels."

MSD Teacher

"Having gone through PBL projects and realizing the benefits of voice and choice, I feel like I do a much better job because I've seen the benefit of it in providing voice and choice in many areas, not just when it comes to the project itself."

MSD Teacher

Chapter 3. Pearl City-Waipahu Complex Area Results: 2018–2020

The first section of this chapter discusses results related to project facilitation, quality, and deeper learning. The second part presents results related to systems conditions, scaling strategies, and diffusion.

Project Facilitation, Quality, and Deeper Learning

In this section, we present results related to the first set of research questions:

- To what extent do students, including students furthest from opportunity, experience two high-quality projects each year?
    - To what extent are teachers designing, adapting, or adopting Gold Standard PBL?
    - To what extent do students report deeper learning on projects?

To achieve the goal of reaching more students with HQPBL, PCW needed to grow the number of Gold Standard projects designed by teachers. In this section, we first present data on the number of projects designed by teachers, as reported on the teacher survey. Next, we present the number of eight-hour projects experienced by students based on matching teachers who reported this information on the survey with students on their class rosters. We use the term "eight-hour project" to refer to projects lasting at least eight hours, the threshold for sustained inquiry in Gold Standard Design.

Next, we present more detailed results related to project quality, starting with the number of teachers who reported teaching HQPBL and overall trends in project quality, as reported on the teacher survey. After that, we match teachers who reported this information on the survey with students on their class rosters to estimate how many students experienced a high-quality project facilitated by these teachers. We then present students' perspectives on their experiences of HQPBL, as reported on the grade 4–12 student survey. Finally, we present students'

perspectives on their experiences of deeper learning, along with educators' observations of how PBL supports deeper learning among their students.

Findings Summary

Project facilitation: Teacher survey results indicate a continued increase in the percentage of teachers who are teaching projects, especially among teachers from Cohort 2 schools. Although there was a slight decline since Year 1 in the overall number of students experiencing at least one eight-hour project, high school students were more likely to experience a project in Year 2. Since baseline, there are have been steady increases in the percentage of English learner students and students receiving special education services experiencing at least one eight-hour project, with a slight decline among students eligible for free or reduced-price lunch.

Project quality: Looking at trends across these data sources, roster matching suggests progress since baseline in the percentage of students who experienced two or more high-quality projects. In Year 2, there was a significant increase in the percentage of students overall who experienced two or more high-quality projects compared with Year 1, including students receiving special education services, English learner students, and students eligible for free or reduced-price lunch. This finding is related to increases in the percentage of teachers reporting that they facilitate high-quality projects.

Deeper learning: Most students reported that projects helped them grow their skills related to all four aspects of deeper learning examined in the survey: academic knowledge, critical thinking, communication, and collaboration. Students receiving special education services were more likely to report gains on some of the academic and critical thinking items, and students eligible for free or reduced-price lunch were more likely to report gains on some critical thinking, communication, and collaboration items. In their open-ended survey responses, students most frequently chose to share examples of increased academic knowledge and collaboration skills through projects, as well as descriptions of increased engagement in class. Educators most often described increased overall student engagement and communication skills as outcomes, with less discussion of academic progress.

Project Facilitation

PRIMARY DRIVER

Increase the number of Gold Standard projects

Overall, 80 percent of *teacher survey respondents*[18] reported teaching a project in Year 2 compared with 53 percent in Year 1. Further, 94 percent of these teachers taught at least one eight-hour project. Looking at survey repeaters (n = 59), 9 percent taught one more project in

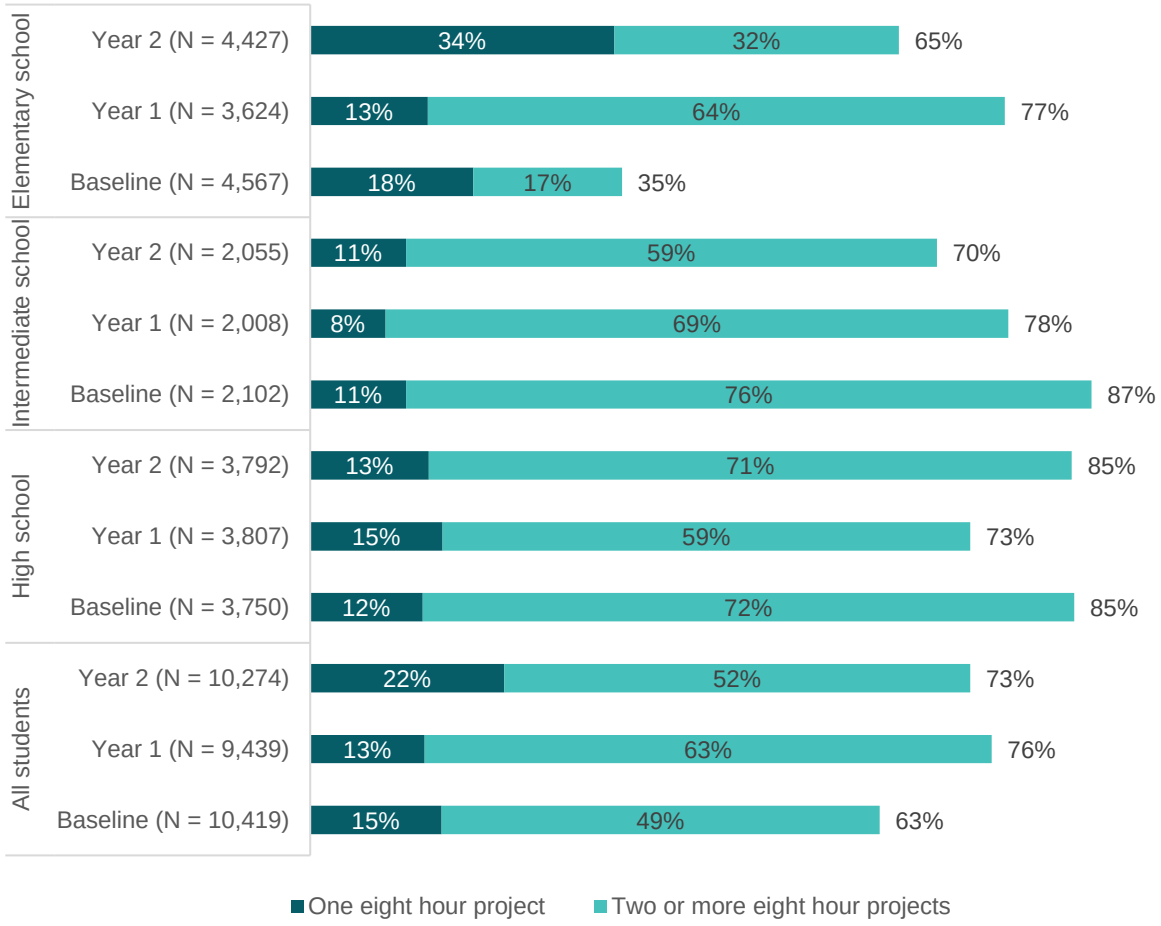
[18] The teacher survey response rate (after non-teachers were removed) was 40 percent for PCW, representing 291 teachers from all 16 schools across the complex area.

Year 2 compared with Year 1, and 54 percent taught the same number of projects in Years 1 and 2. Although 89 percent of teachers who took PBL 101 also taught a project, this is a 4 percentage point decline from Year 1. Teachers from Cohort 2 schools were significantly more likely to have taught a project in Year 2 than teachers from Cohort 1 schools (89 percent compared with 71 percent), and teachers were more likely to have taught a project if they had attended PBL 101 than if they had not (88 percent compared with 56 percent).

Overall, 73 percent of all matched[19] PCW *students* experienced at least one eight-hour project in Year 2 (a slight decline from Year 1), and the percentage of students experiencing two or more eight-hour projects decreased 11 percentage points (figure 26). Looking at results by grade, a bright spot is a significant 12 percentage point increase in the percentage of high school students experiencing eight-hour projects in Year 2. Patterns were similar in the percentage of students who experienced two or more eight-hour projects; there were increases for high school students and declines for intermediate school students and elementary school students. The greatest decline was a significant decrease of 12 percentage points for elementary school students.

[19] For Year 2, we were able to match 71 percent of students to teachers who completed the survey. As in previous years, the matched students are representative of the complex area by race, special education status, and English learner status.

Figure 26. Percentage of matched PCW students who experienced at least one eight-hour project by grade band, baseline through Year 2



Note: Percentages may not add up to 100 due to rounding.

Source: Education Northwest analysis of student roster data matched to teacher survey data.

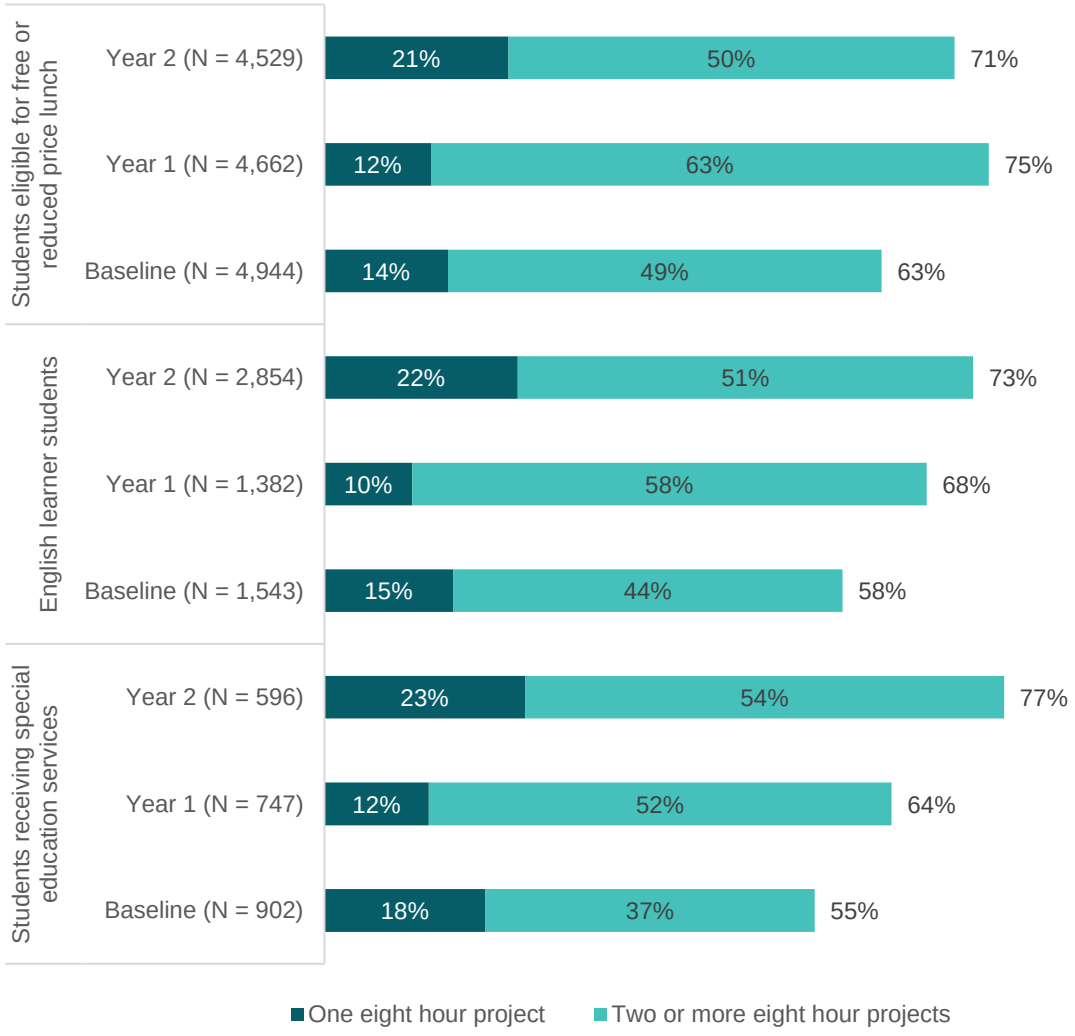
The percentage of *English learner students* experiencing at least one eight-hour project increased by 5 percentage points to 73 percent in Year 2 (figure 27). That increase was due to a 12 percentage point increase in the percentage of English learner students exposed to a single eight-hour project, which made up for a 7 percentage point decrease in the percentage of English learner students who experienced two or more eight-hour projects between Year 1 (58 percent) and Year 2 (51 percent).

More *students receiving special education services* experienced at least one eight-hour project. In Year 2, the percentage of students receiving special education services who experienced two or more eight-hour projects increased by 2 percentage points (54 percent), and the percentage who

experienced a single eight-hour project increased by 11 percentage points (23 percent). The difference between Year 1 and Year 2 was statistically significant.

The percentage of *students eligible for free or reduced-price lunch* who experienced at least one eight-hour project decreased by 4 percentage points to 71 percent in Year 2. There was a larger decrease in the number of students eligible for free or reduced-price lunch who experienced two or more eight-hour projects—a 13 percentage point decrease from Year 1 (63 percent) to Year 2 (50 percent).

Figure 27. Percentage of matched PCW students eligible for free or reduced-price lunch, English learner students, or students receiving special education services who experienced at least one eight-hour project, baseline through Year 2



Note: Percentages may not add up to 100 due to rounding.

Source: Education Northwest analysis of student roster data matched to teacher survey data.

Project Quality

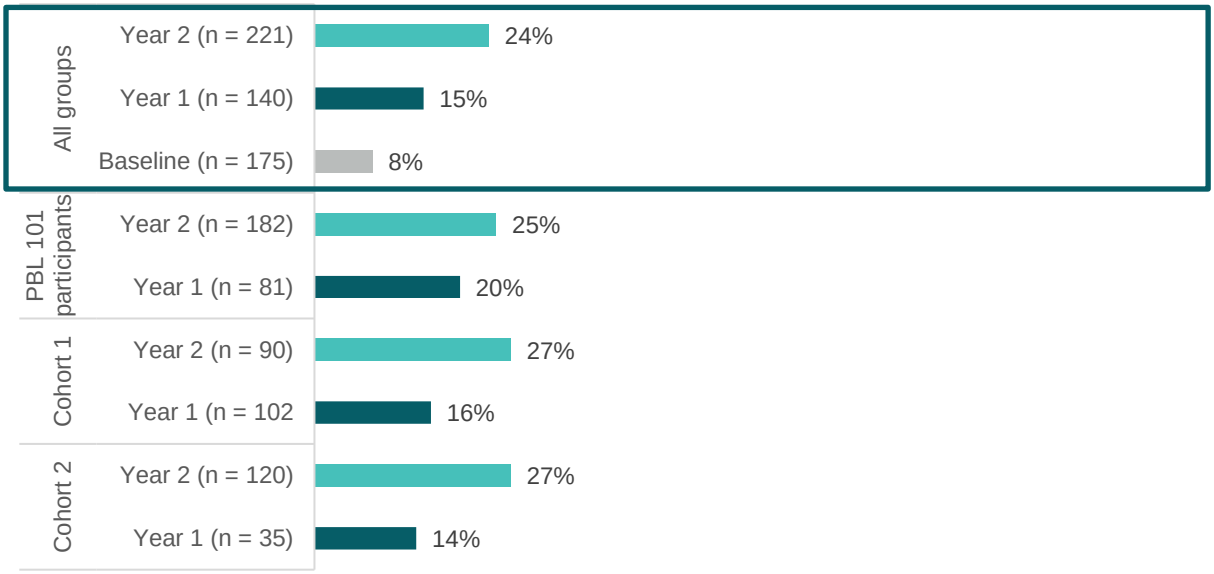
AIM

Increase the number of students engaged in two high-quality[20] projects a year. Specifically, 80 percent of all students, including students furthest from opportunity, experience two high-quality projects each year.

Teacher reports of project quality (teacher survey)

The percentage of PCW *teachers* who taught a high-quality project increased by 9 percentage points since Year 1 (figure 28). There were increases in high-quality projects for PBL 101 participants, as well as individuals from both Cohort 1 and Cohort 2 schools.

Figure 28. Percentage of PCW teachers whose projects included all six Gold Standard Design Elements, baseline through Year 2



Note: Leadership team members and early adopters were not reported on due to having fewer than 10 respondents who reported project quality.

Source: Education Northwest analysis of teacher survey data.

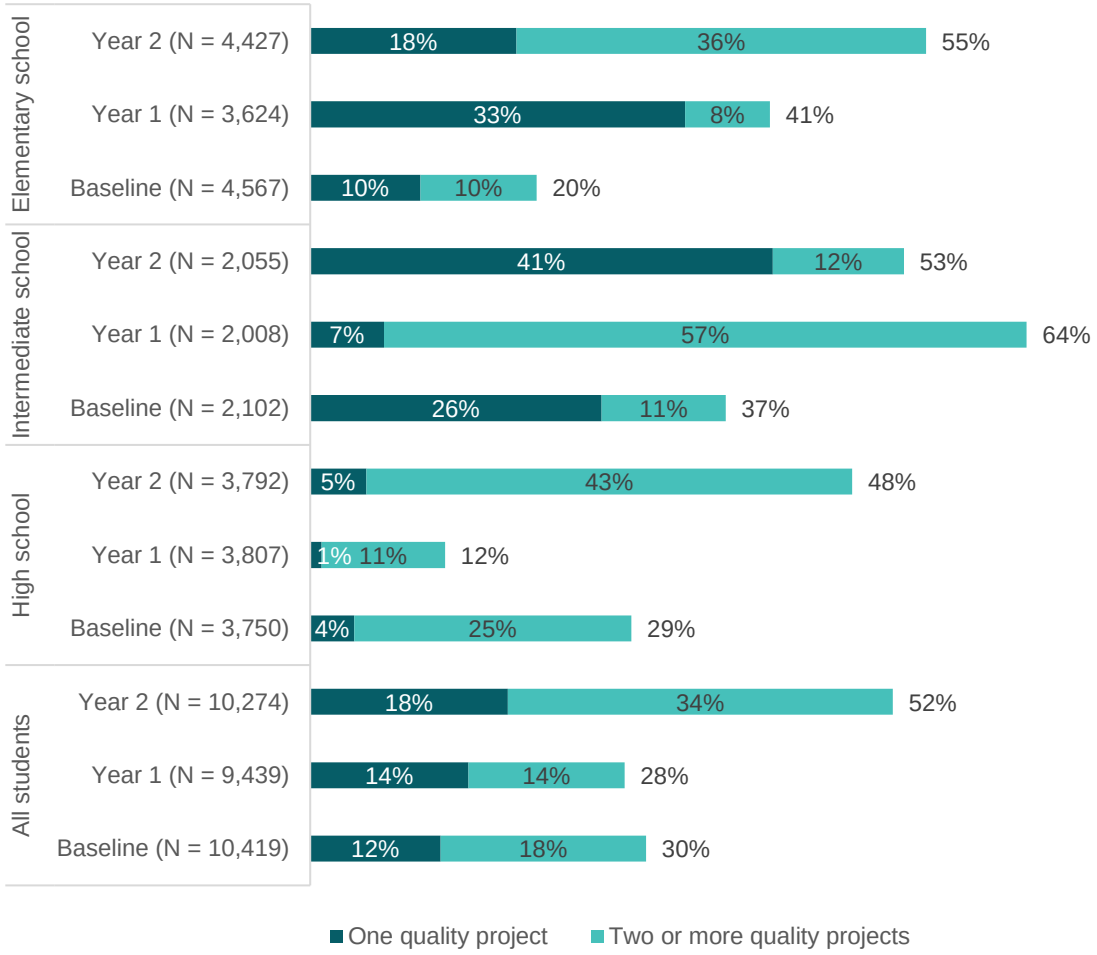
[20] For the purposes of this report, high-quality projects were those that included all six Gold Standard Design Elements measured on the teacher survey.

Teacher-reported quality remained consistently high from Year 1 to Year 2 in PCW. In comparing the overall sample across years, at least 94 percent of teachers reported that their projects met the threshold for authenticity, as well as voice and choice. There was an increase in teachers reporting that their projects included sustained inquiry (86 percent at baseline, 96 percent in Year 1, and 98 percent in Year 2). Additionally, 99 percent of teachers in Year 2 reported that their projects included critique and revision, an increase of 9 percentage points from Year 1. Projects included public product to a lesser extent, with 79 percent of teachers reporting that their projects met the threshold for public product in Year 2, a decline of 5 percentage points from Year 1. Few teachers reported that their projects met the threshold for driving question, although the rate did increase from Year 1 (23 percent) to Year 2 (34 percent). These percentages were similar for teachers who were survey repeaters.

Student exposure to high-quality projects (teacher survey reports of quality matched with class rosters)

In Year 2, the percentage of PCW *students* who experienced two or more high-quality projects increased significantly by 20 percentage points to 34 percent (figure 29). Between Years 1 and 2, the percentage of students who experienced two or more high-quality projects increased significantly for elementary school students (by 28 percentage points) and high school students (by 32 percentage points), but it decreased significantly for intermediate school students (by 45 percentage points).

Figure 29. Percentage of PCW students who experienced at least one high-quality project, disaggregated by grade band, baseline to Year 2

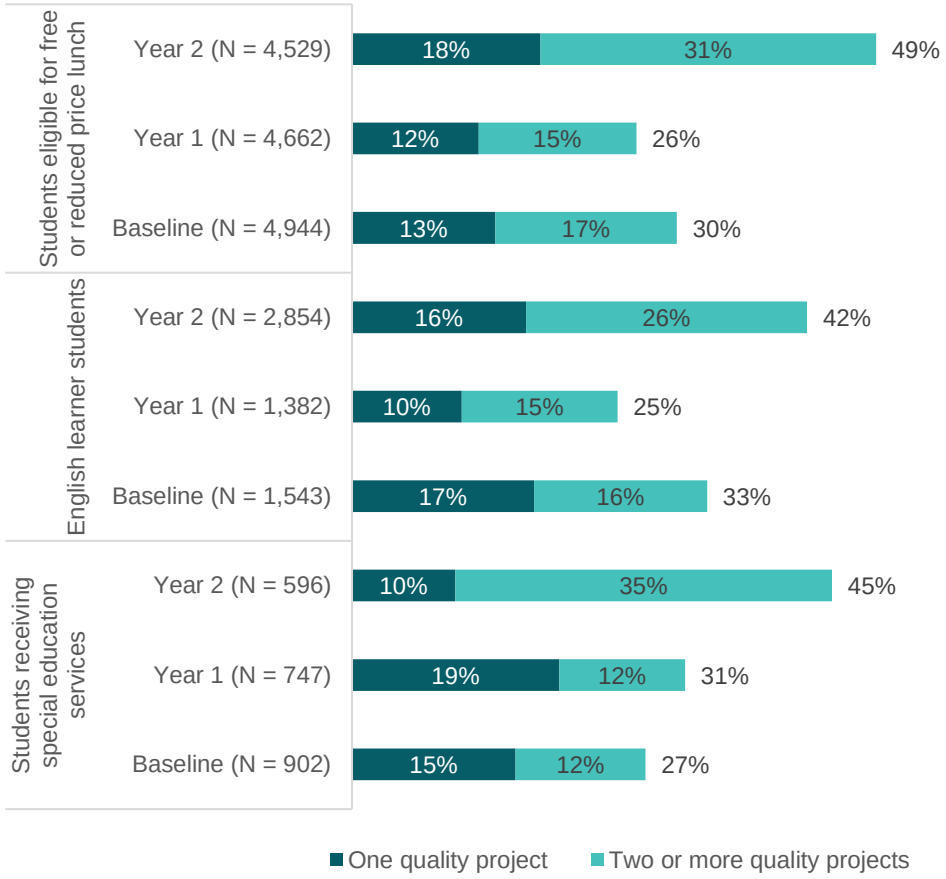


Note: Percentages may not add up to 100 due to rounding.

Source: Education Northwest analysis of student roster data matched to teacher survey data.

A significantly higher proportion of *students furthest from opportunity* experienced two or more high-quality projects in Year 2 compared with Year 1 (figure 30). The largest increase was among students receiving special education services (23 percentage points). Students eligible for free or reduced-price lunch saw an increase of 16 percentage points, and English learner students saw an increase of 11 percentage points.

Figure 30. Percentage of PCW students eligible for free or reduced-price lunch, English learner students, and students receiving special education services who experienced at least one high-quality project, baseline through Year 2



Note: Percentages may not add up to 100 due to rounding.

Source: Education Northwest analysis of student roster data matched to teacher survey data.

Student reports of project quality (student survey)

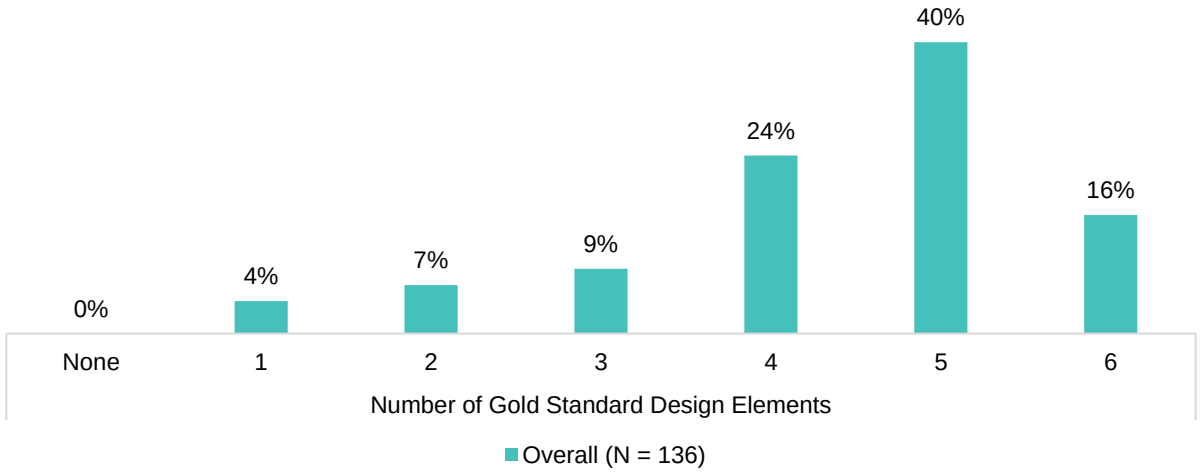
At the end of a project, students in grades 4–12 completed a survey about their experiences of PBL. In addition to close-ended items about their experiences of HQPBL and deeper learning, students were asked to provide written responses to the following questions:

1. How was working on this project different from other learning activities?
2. What is the most important thing you learned in this project?
3. Is there anything else you would like to tell us about the project?

Many students did provide written responses to these questions, and major themes are summarized below. PCW did not have student survey data in Year 1, so we did not report on changes from Year 1 to Year 2.

Overall, 16 percent of PCW *student survey respondents*[21] reported that they experienced high-quality projects in Year 2 (figure 31). Overall, 80 percent of students reported that their projects involved four or more Gold Standard Design Elements.

Figure 31. Percentage of PCW students reporting projects with zero to six Gold Standard Design Elements, Year 2

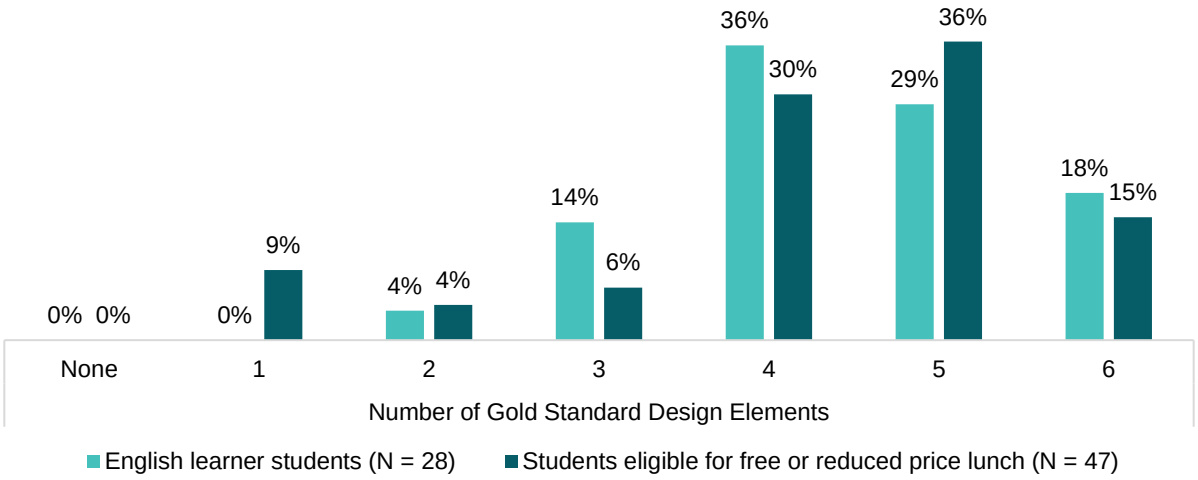


Source: Education Northwest analysis of student survey data.

[21] Student surveys were received from three elementary schools for students in grades 4 to 6. Fewer than 10 students receiving special education services completed the survey. Therefore, these data are not reported here to protect student privacy. The percentage of English learner students in the survey population was 6 percentage points lower than the overall student population in PCW, and the percentage of students eligible for free or reduced-price lunch was 9 percentage points lower.

Patterns were similar for English learner students and students eligible for free or reduced-price lunch (figure 32). There was little difference in student reports of quality by teacher cohort.

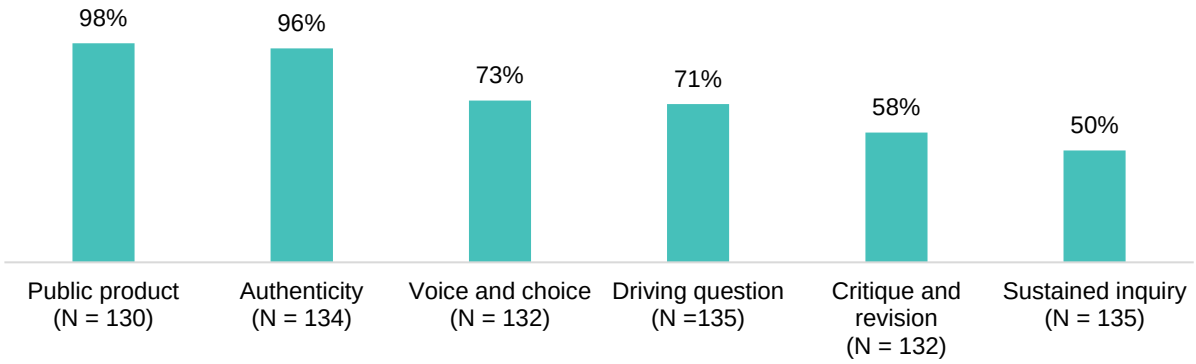
Figure 32. Percentage of PCW English learner students and students eligible for free or reduced-price lunch reporting projects with zero to six Gold Standard Design Elements, Year 2



Source: Education Northwest analysis of student survey data.

Students reported varying levels of quality across the six Gold Standard Design elements measured (figure 33). They most often reported experiencing public product and authenticity, and they least often reported experiencing sustained inquiry, as well as critique and revision. This pattern is mainly reflected in open-ended survey responses; in their comments, students most often described experiences of intellectual challenge (including sustained inquiry), collaboration, and authenticity. In total, 91 percent of students eligible for free or reduced-price lunch reported experiences of authenticity compared with 96 percent of students overall.

Figure 33. Percentage of PCW students who reported experiencing each Gold Standard Design Element in Year 2



Source: Education Northwest analysis of student survey data.

In open-ended survey responses, 38 percent of students described experiences of authenticity, most often in terms of the use of tools, technology, and models. They expressed appreciation for the chance to engage in hands-on learning on relevant issues. Some students wrote about the importance of their project in terms of making a positive contribution to their school, community, or the environment. A few students described their personal interest in the topic they explored.

"It was fun creating sunscreen and testing it so [that] it is safe for the coral reef. I loved that the people in my group were passionate about what we were creating."

PCW Student

About 20 percent of students chose to write about developing or presenting a public product, typically a presentation to their classmates and/or teachers, their families, or community experts. Some students described developing other types of products, such as a model, video, or social media post.

"I also had to present the project with details to an engineer, which I thought was fun."

PCW Student

Close to three-quarters of *students* reported that they experienced a driving question, as well as voice and choice.

In open-ended survey responses, 43 percent of students wrote about experiences of intellectual challenge related to a topic of interest. Most often, these students described how much effort was required by their group to answer the question. Students frequently said they experienced a sense of pride or accomplishment after completing the project.

"[The most important thing I learned in this project] was when we put in a lot of effort into the project, then we were proud of each other of how all the hard work we did to make us win, but actually, winning doesn't matter, effort does."

PCW Student

Fewer students (12 percent) chose to write about experiences of voice and choice. Students described choosing their project topics, doing their own research, or proposing their own solutions to driving questions. Students also described experiences of "freedom" and "independence" in making "student-led" decisions about their project topics and approach. One student wrote that when they are doing a project, "my teacher is not teaching me," which illustrates the sense of independence many students felt when participating in PBL.

"[This project] was different because we got to research something that we chose but off the same topic. We also didn't have to go off a paper or a site that a teacher chose; it was all free will."

PCW Student

About half of *students* reported that they experienced critique and revision or sustained inquiry. In total, 65 percent of English learner students reported experiences of critique and revision compared with 58 percent of students overall. In open-ended survey responses, few students overall (8 percent) discussed critique and revision. These students mainly described using feedback from peers or community members, such as engineers, to improve a project over time.

"[This project was different because we can improve it after a presentation by using feedback. Instead of the final product going on your grade, you can improve for another one."

PCW Student

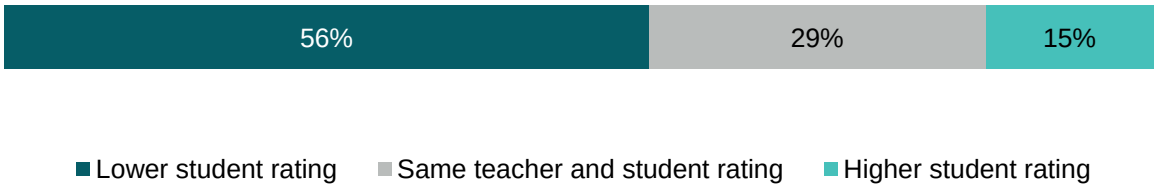
In terms of sustained inquiry, as noted above, many students wrote about investing effort into a project they could improve over time as part of the intellectual challenge. Several students described the project as "big," and a few students specifically noted that the project took more time than they were accustomed to spending on a learning activity.

"[Projects] take more time, and when I do it, then there some hard things, but my friends help me. And when they do, they explain, and there [are] some things I do want to learn about."

PCW Student

Over half of surveyed PCW students rated project quality lower than their teachers did. Specifically, students reported a lower number of Gold Standard Design elements than their teachers 56 percent of the time, the same number of Gold Standard Design elements 29 percent of the time, and more Gold Standard Design elements 15 percent of the time (figure 34).[22]

Figure 34. Difference between student and teacher reports of Gold Standard Design Elements by percentage of PCW student survey respondents in Year 2



Source: Education Northwest analysis of student survey and teacher survey data.

Deeper Learning

OUTCOME

Improved deeper learning outcomes for students, including students furthest from opportunity

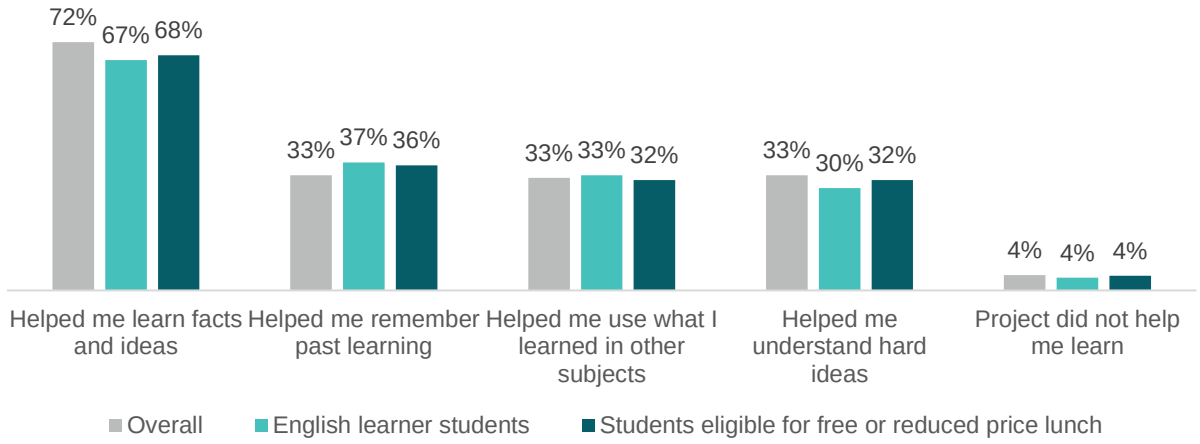
Academic knowledge

Overall, 93 percent of PCW *student survey respondents* reported that participating in projects increased their knowledge of academic content, especially in learning new facts and ideas (figure 35). Compared with the overall student population, English learner students and

[22] When matching student survey responses to teacher survey responses, 61 percent of the students who completed the survey were matched to six teachers (3 percent of teachers completing the survey) with a quality score.

students eligible for free or reduced-price lunch more often reported that participating in projects helped them remember past learning.

Figure 35. Percentage of PCW English learner students and students eligible for free or reduced-price lunch who reported deeper learning of academic content through project participation, Year 2



Source: Education Northwest analysis of student survey data.

In open-ended survey responses, 46 percent of students wrote about how they increased their knowledge of course content or improved their academic skills by participating in projects. Many students shared specific facts they had learned. Students also described projects focused on various topics, such as natural hazards, coral reefs, school climate, and healthy lunches. Given the practical nature of these topics, students often shared examples of knowledge that was relevant for everyday life.

"I learned that you always have to be prepared [for natural hazards] by packing food or water … I also learned that you have to get to high ground, like a mountain and a tall valley. You will be safe from the tsunami if you are on high ground."

PCW Student

Educator perspectives on academic mastery

Academic mastery was a less frequent theme in focus groups, with a few school leaders wondering how their staff could translate high levels of student engagement in PBL into high levels of academic learning.

"It's just amazing when [students] have an audience, and they're talking up front, and they're pointing to parts of their project and speaking like experts themselves. And they're using scientific language, and then you really see the learning come out when they talk about speed and friction and how it works and everything."

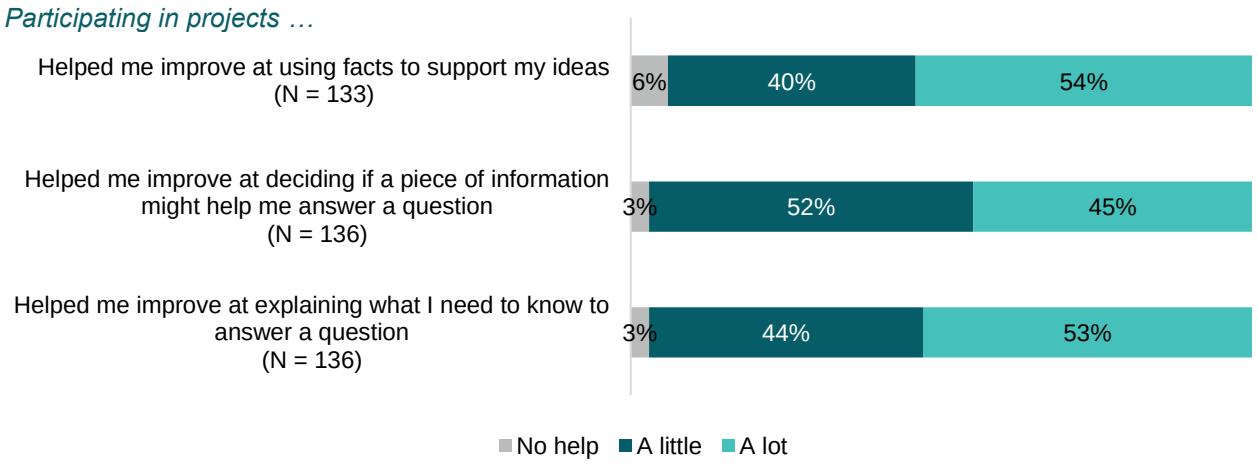
PCW Teacher

In three of six focus groups, educators described how PBL supports academic progress, mainly in terms of better retention of knowledge through experiential learning and student-driven topics. Some educators said public products provided an opportunity for students to display their learning in new ways.

Critical thinking skills

Overall, 99 percent of PCW *students* reported that they increased their critical thinking skills by participating in projects (figure 36). For the skill of explaining what they need to know to answer a question, 60 percent of students eligible free or reduced-price lunch and 61 percent of students who receive special education services reported that participating in projects helped them a lot (compared with 53 percent of students overall).

Figure 36. Percentage of PCW students indicating greater critical thinking skills by participating in projects, Year 2



Source: Education Northwest analysis of student survey data.

In open-ended survey responses, 9 percent of students offered examples of this skill, mainly in terms of using evidence to refine their project through multiple rounds of testing and/or to explain the rationale for their response to the driving question.

"The most important thing I learned during this project is giving details on why our meal was a balanced lunch and why … other students and people [should] pick our meal."

PCW Student

Educator perspectives on critical thinking

In two of six focus groups, a few educators offered examples of how students developed critical-thinking skills through projects. They said students articulate ideas better, propose multiple solutions to a problem, and can work through problems independently or as a group. One educator said PBL prepared students for the independent thinking and work necessary for remote learning due to the pandemic.

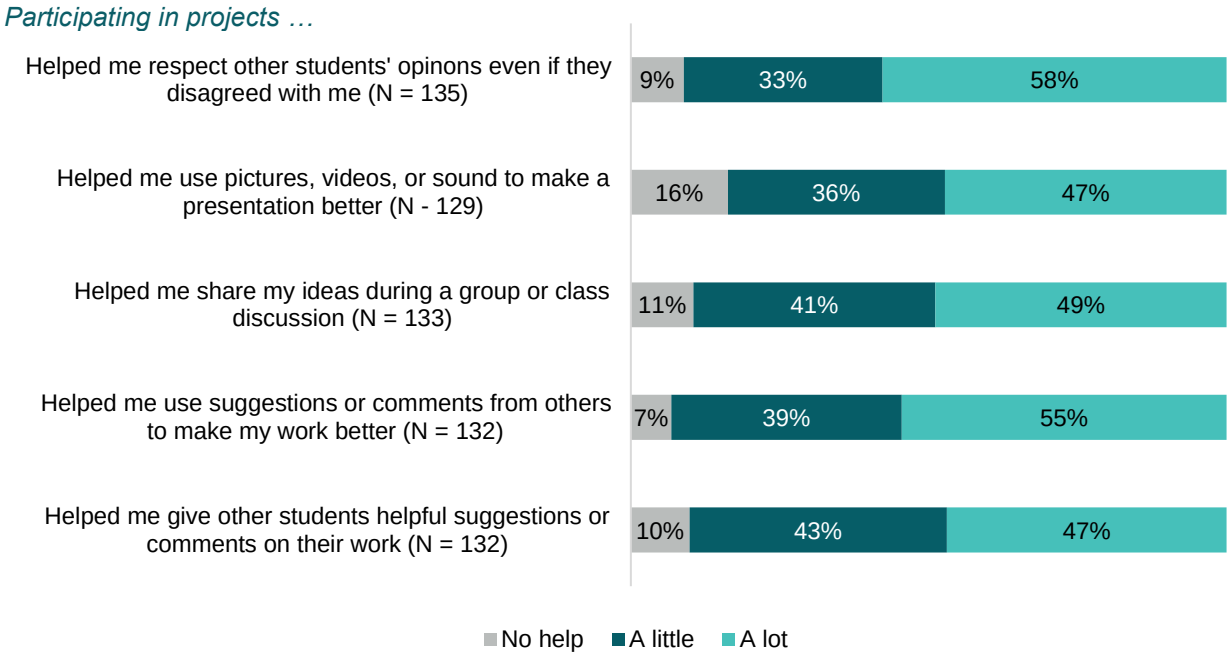
"Even with kindergartners … after we went through how to talk about your project … I noticed that they're able to articulate their ideas a little better … 'I think this didn't work because of xyz,' and being able to explain what they could do better for the next time."

PCW Teacher

Communication skills

Overall, 99 percent of PCW *students* reported increased communication skills through their participation in projects, especially related to discussing ideas and feedback with other students. Compared with the overall student population, a higher percentage of students eligible for free or reduced-price lunch said participating in projects helped them "respect other students' opinions" and "use suggestions or comments from others to make work better."

Figure 37. Percentage of PCW students indicating greater communication skills by participating in projects, Year 2



Source: Education Northwest analysis of student survey data.

In open-ended survey responses, 12 percent of students described learning communication skills, particularly those related to presentations and team discussions. Some students spoke specifically of skills associated with giving and receiving feedback.

"We worked on focusing and listening because we had to focus on our project, or we would not have gotten it done. And we had to listen to other people, which was hard at times, but my teacher and partners helped … This project helped me grow and improve."

PCW Student

Educator perspectives on communication

In four of six educator focus groups, a common theme was the development of communication skills through PBL. Most comments focused on presentation skills
and the use of academic language. Several educators said public presentations were especially significant for their English learner students because they gave them frequent opportunities to practice oral communication and increase their comfort, as well as their skills. Educators also described students' increased ability to communicate ideas and give feedback to other students.

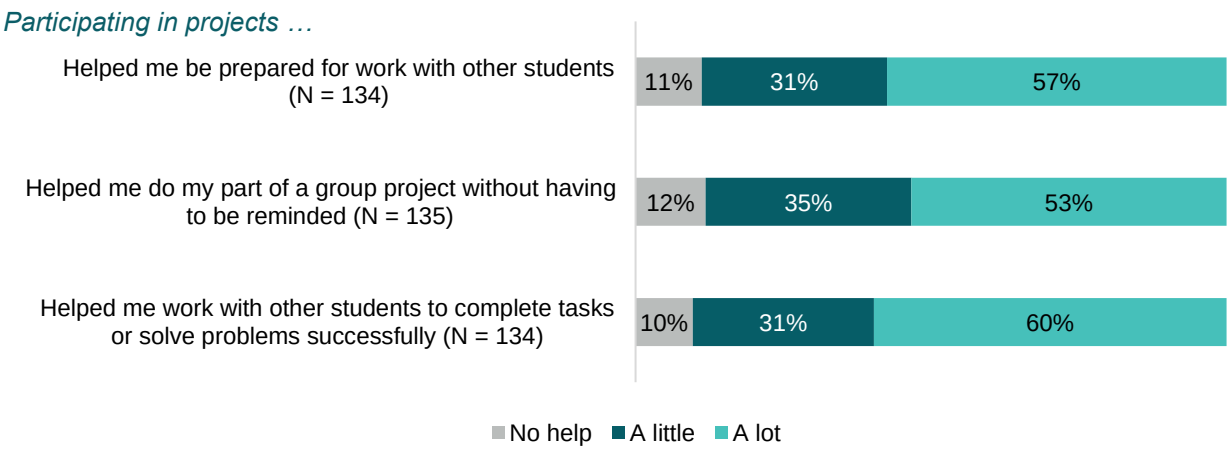
"I know, for us, we as a school wanted to work on improving our students' oral communication and speaking skills. So, when they would present or share in class, I think that was already for us … a big sigh of relief that we do see some of our students now participating a lot more. Culturally, our students are not necessarily brought up to speak their mind … we have to teach them the skills to advocate for themselves, to share what they're thinking, to reflect, and to provide input."

PCW School Leadership Team Member

Collaboration skills

Overall, 95 percent of PCW *students* reported increased collaboration skills by participating in projects. Compared with the overall student population, students who were eligible for free or reduced-price lunch more frequently reported that participating in projects helping them a lot regarding collaboration. Similarly, 69 percent of students who were eligible for free or reduced-price lunch reported that participating in projects helped them a lot in being prepared to work with other students (compared with 57 percent of the overall student population).

Figure 38. Percentage of PCW students indicating greater collaboration skills through participating in projects, Year 2



Source: Education Northwest analysis of student survey data.

In open-ended survey responses, close to a third of PCW students described how much PBL taught them about working in groups. Most students focused on the skills they had learned about how to work as a team, such as respecting others' ideas and how to negotiate tasks. Some students also adopted a new mindset about the value of teamwork.

"The most important thing I learned from this project is you have to work well with others. Be a community contributor. Listen. Learn. Share."

PCW Student

Educator perspectives on collaboration

Educators in three of six focus groups said PBL improved their students' collaboration skills. For example, they described student progress in developing general teamwork and relationship-building skills. They also said the more practice students have across classrooms and grade levels, the more they will increase their skills and comfort level.

"I think that's the most important part that they need—to just know how to work together and with different people. And that helps also when we're trying to work on a project with them. They know that process, so it's not where you kind of have to force them to work together. And then, eventually, they learn how to pick their groups. And then, it's intentional how they pick their partners rather than 'I just want to be with my friends.'"

PCW School Leadership Team Member

Student engagement

In opened-ended responses, 21 percent of all student survey respondents said they had experienced high levels of engagement on projects. Most frequently, students described projects as "fun" (especially group work). Others said the topic was "interesting" and that they were motivated to do well.

"The project was really fun, and it was cool seeing other students' projects. I could see how my classmates envisioned each cell part."

PCW Student

Educator perspectives on student engagement

In the survey and focus groups, many educators described increased interest, motivation, and engagement as the primary way their students benefited from PBL.

"…just hearing the students talk about their experience and that [PBL has] transformed learning, it engages them more, it's interest - I think it's everything that we want to hear. It's really amazing."

PCW Complex Area Leader

On the survey and across all focus groups, educators commonly portrayed student engagement in learning as a foundational outcome of PBL. They said students displayed a lot of interest in topics, and one teacher said they were surprised at how "attached" students were to a project focused on addressing community hunger. Another teacher said students frequently discussed the project with their families because they were so excited about what they were learning.

"Students do enjoy learning through PBL, and I find PBL makes learning much more interesting and applicable to real-life learning. The students and I are always so surprised how time flies when we are working on our PBL."

PCW Teacher

Educators also said PBL gives students who may not display interest and learning in conventional lessons with the opportunity to do so. A few educators said PBL helps support a sense of community and sense of belonging among students, both in terms of connection to school and the larger community.

"The kids get to actually witness each other's projects just by walking past the classroom, or you'll see them outside. So, it's kind of like the excitement is in the air.

Like, I know when fourth grade is doing their project because my classroom is right next to theirs. So, our students will share the excitement, and they'll say, 'Are they working on their PBL project?' I'll say, 'Probably!' And then I'll send a couple students to … walk past and see what they're doing ...

So, it's definitely like the excitement is in the air, and the kids know already that it's part of the culture of the school."

PCW Teacher

Scaling, Diffusion, and Systems Conditions

In this section, we draw on educator focus group and teacher survey data to present results related to the second set of research questions:

- How does quality PBL scale and spread in and across schools?
    - What are the patterns of diffusion?
    - What systems conditions enable or constrain teachers and leaders in scaling quality PBL?

Educator focus group data provide insight into diffusion process outcomes, including secondary drivers (such as increased educator motivation, demand, and capacity for PBL), and SNA of teacher survey data provides information about the role of teacher-to-teacher social networks in the diffusion of PBL throughout the system. Teacher survey data, combined with educator focus group data, provide information about changes over time in leadership capacity to create the systems conditions for PBL. Finally, focus group data provide insight into the tertiary drivers, in terms of perceived effectiveness of the intentional scaling strategies school and district leaders use.

Findings Summary

Scaling strategies: Observation, messaging, and coaching were the primary scaling strategies that school leadership teams used.

Diffusion of HQPBL: PCW educators said PBL is starting to take hold in their schools. They most often cited new connections among educators, shifts in teacher practice, and widespread educator engagement as signs of implementation progress. Due to the widespread training of teachers in PCW, there were very few teachers who did not receive training or have a connection with a PBL 101 participant, making it difficult to discern the role of teacher-to-teacher social networks in diffusion. Further, survey results indicate that the teachers selected for training were not early adopters of PBL or considered opinion leaders by their peers. Qualitative data indicate that direct participation in training, along with support from coaches and school administrators, played an important role in promoting project facilitation and quality. These supports were reinforced by opportunities for teacher-to-teacher collaboration and learning—although they were not the primary drivers of scaling.

Systems conditions for HQPBL: Schools remained consistent on most measures of PBL culture and capacity. However, less than half of teachers reported adequate time for planning, collaboration, and teaching PBL. Results also indicate room to improve instructional resources and curricula for PBL. Further, access to these supports may not be equitable across PCW, as schools with higher proportions of students furthest from opportunity were less likely to report supportive school conditions for PBL.

Scaling strategies

TERTIARY DRIVERS

Use and effectiveness of key scaling strategies (e.g., training, observation)

Across all PCW focus groups, educators offered examples of scaling strategies related to **observation.** In PCW, observation primarily occurred through presentations of learning and other schoolwide or systemwide professional development opportunities.

School leadership teams encourage teachers to model PBL in team meetings. Teachers also invite administrators to observe PBL in action in their classroom, which gives administrators an opportunity to communicate to students that they support their efforts. When asked which strategies were most important in helping hesitant teachers implement PBL, a few educators said observation.

"You've got to be real explicit to your teachers about what [PBL] is and how it fits and why. Then I think they're going to be way more into it than just, 'Hey, we're going to do PBL. We're just doing it because kids will be engaged.' I think that's really disingenuous to teachers because kids are engaged anyway—but they're engaged in a different way because of PBL."

PCW School Leadership Team Member

School and complex area leaders described **messaging** PBL to teachers as flexible, allowing them to see where it fits into their work. They also highlighted the importance of clearly communicating how PBL relates to other school and complex area initiatives, that is, how PBL will reinforce or strengthen existing efforts.

Participants in several focus groups described the key role of **coaching** in providing ongoing feedback, professional development, and encouragement to teachers as they implement PBL. Over the course of the study, PCW system leaders invested in building the capacity of school-based instructional coaches to integrate PBL support into their everyday work with teachers through PLCs and other

"To help teachers with PBL in articulation, we utilize some of the tools that PBL has to offer to help the teachers self-reflect … When we were going through the rubric, some people were, like, 'We didn't do this, we didn't do this.' We were, like, 'You know what? Let's just go through it and then pick one thing. Don't focus on everything. Don't worry about it. We're only going to take baby steps.' That was actually a theme [during] last year and has continued this year: Baby steps—take baby steps."

PCW School Leadership Team Member

mechanisms. These coaches participated in school leadership teams and received direct support from complex area staff members on how to coach teachers with PBL. Teachers and leadership team members provided examples of using **tools,** such as PBL rubrics and templates, as a support for scaling high-quality practice. Instructional coaches and school administrators also provided support to teachers in using these tools.

Diffusion

SECONDARY DRIVERS

Increased teacher motivation, demand, and capacity for PBL through teacher-to-teacher connections

PCW educators in all focus groups offered examples of **new connections** forged through PBL that increased their capacity for quality practice. They often described new connections between grade levels, in terms of articulation of learning goals, collaborative feedback, and joint projects.

"Something we did different this year in terms of support was … grade levels supported each other too because there were parts of our planning … we were able to share that focus with either a grade level above or a grade level below. And they provided us feedback too … It helped us clarify our focus."

PCW Teacher

Some of the projects that students and teachers shared involved community collaboration or community service. Although PCW educators said they and their students became more deeply connected with community members through their projects, they also said scheduling community participation was a challenge.

Most focus groups included examples of changes in **teacher practice**, especially in terms of creating opportunities for student voice and choice—which educators described as a significant shift that aligns with work PCW is doing more broadly as a school system. This finding is supported by survey results; 99 percent of respondents reported including student voice and choice in their projects.

Teachers also mentioned the following new practices: co-creating a rubric with their students, coaching students in the process of collaborative inquiry, and fostering a learning mindset among students. A couple of educators described changes in teacher mindset, such as seeing themselves as facilitators and having high expectations for all students.

"As a teacher doing this, talking and trusting the students that they can figure things out on their own and just kind of [seeing] myself as just stepping back. I had to learn how to just step back, be quiet, and just let them learn and teach each other and share their thinking processes. And it was kind of like a learning process for me."

PCW Teacher

Regarding changes in **educator engagement** in PBL, some PCW school-level leaders discussed the lack of pushback they have experienced compared with other initiatives. However, they also said there is still work to do to engage more educators in PBL and to make sure facilitation is high quality.

"You know, we can still improve on the execution, [but] … normally, there's a lot of pushback with stuff, but this wasn't one of the things that I got a lot of pushback on."

PCW School Leadership Team Member

Patterns of diffusion

As discussed previously, in selecting teachers to participate in the PBL 101 training and related services, schools were encouraged to use scaling maps to identify teachers who were both early adopters of PBL and opinion leaders in their schools. Some schools selected teachers from specific grades or subject areas, and other schools opted to send a more representative team.

Results indicate that teachers who participated in PBL 101 were significantly more likely to have taught a project and for that project to be high quality than teachers who did not directly participate in PBLWorks training and services. However, results do not suggest that teacher networks played a role in diffusing PBL beyond these trained teachers to other teachers. Direct participation in training—combined with support from school leadership teams (including instructional coaches)—may have been more important to scaling, as discussed in the next section.

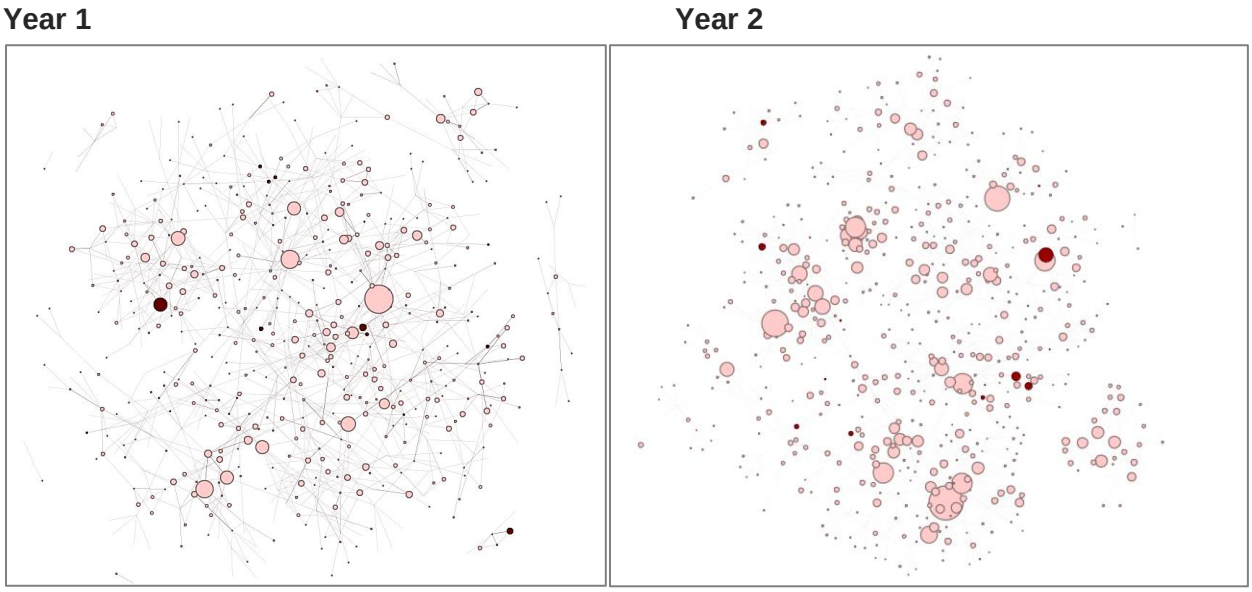
PBL early adopter opinion leaders identified by school leaders were not identified as opinion leaders by the survey, nor were they more likely to teach a project. The teachers

identified as early adopter opinion leaders who responded to the survey were significantly less likely than other teachers to teach a project in Year 2 (Year 1: 56 percent vs. 53 percent; Year 2: 64 percent vs. 81 percent). These results indicate that the teachers selected by school leaders to participate in PBL 101 were neither early adopters of PBL (as they were less likely to teach a project this year), nor were they considered opinion leaders by their peers (as evidenced by the fact that they were chosen by their peers less often than others). Too few early adopter opinion leaders provided information about their projects to understand differences in project quality (Year 1: N = 5; Year 2: N = 6).

To illustrate how the teachers identified as early adopter opinion leaders are situated in the network, figure 39 represents the network for PCW survey respondents, where the size of the dot indicates how often an individual was chosen in the survey. Dark red dots represent individuals who were identified as PBL early adopter opinion leaders, and the light red dots represent individuals who were not.

Although a few PBL early adopter opinion leaders are visible on the map as individuals chosen in the survey, they are underrepresented as a proportion of their presence in the overall network. This means they were not considered as opinion leaders among the survey respondents. Overall, 10 of 32 of the people identified as early adopter opinion leaders were identified by other teachers in the survey.

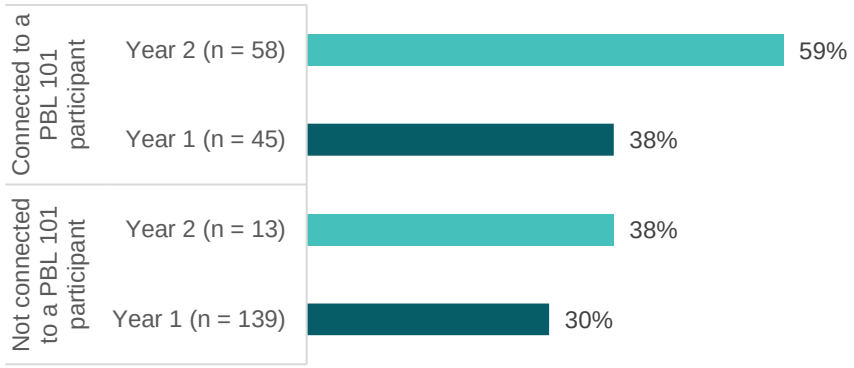
Figure 39. PCW survey respondents selected early adopter option leaders as people to whom they go for advice or with questions at similar rates as other teachers



Source: Education Northwest analysis of teacher survey data.

The percentage of teachers in PCW who taught a project in Year 2 increased, regardless of whether they identified a PBL 101 participant as part of their network (figure 40). However, few individuals who answered this portion of the survey were not tied to a PBL 101 participant (n = 13). Because most teachers who participated in the survey received PBL 101 training (75 percent), it is unsurprising that most teachers were connected to at least one PBL 101 participant in their social network.

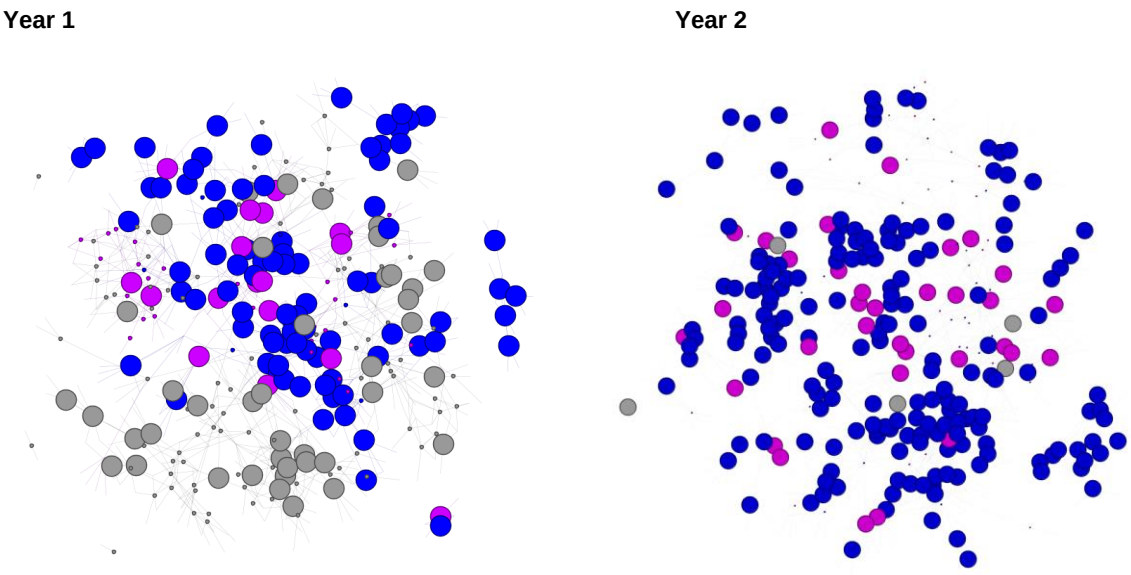
Figure 40. Percentage of PCW teachers without PBL 101 training who taught a project by connection to a PBL 101 participant



Source: Education Northwest analysis of teacher survey data.

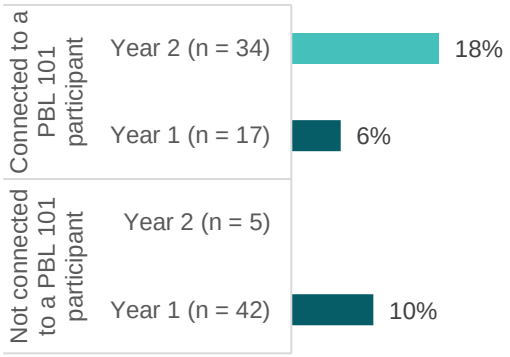
In Year 2, more teachers were connected to PBL 101 participants—and a larger percentage of these teachers facilitated projects—compared with Year 1. The number of PBL 101 participants also grew, and the percentage of PBL 101 participants who facilitated projects remained stable. Figure 39 shows maps of PCW educators by their connection to a PBL 101 participant, sized by whether they completed a project in Year 1 or Year 2. Blue dots—which represent individuals who have participated in PBL 101—increased from Year 1 to Year 2. This is because the number of PBL 101 participants more than doubled, and the rate at which they facilitated a project remained fairly consistent (93 percent for Year 1 vs. 89 percent for Year 2). Purple dots—which represent individuals who are connected to a PBL 101 participant—are more often large in Year 2 than Year 1 (38 percent did a project in Year 1, and 59 percent did so in Year 2). Gray dots—which represent individuals who are not connected to a PBL 101 participant—were substantially fewer in Year 2, and therefore appear less often in the network.

Figure 41. PCW project facilitation by connection to PBL 101 participants



The percentage of PCW teachers who taught a high-quality project in Year 2 increased for those who identified a PBL 101 participant as part of their network. There were too few PCW respondents to the quality design section of the survey who did not have a tie to a PBL 101 participant to report results for the purpose of comparison.

Figure 42. Percentage of PCW teachers without PBL 101 training whose projects met all six Gold Standard Design Elements, by connection to a PBL 101 participant



Source: Education Northwest analysis of teacher survey data.

Systems conditions

SECONDARY DRIVER

Increased district and school leadership capacity to support and scale PBL

In this section, we present reports from teachers regarding school-level culture and capacity to support teachers with PBL, as well as general systems conditions at their school. Overall, PCW survey respondents rated culture and capacity measures for PBL significantly lower than for general systems conditions, with little change compared with Year 1.

Culture

In Year 2, school conditions remained consistent on most measures of culture related to PBL, but access to this support does not appear to be equally available across PCW. Overall, teachers highly rated colleagues' willingness to collaborate on PBL (85 percent, with more teachers strongly agreeing in Year 2) and school administrative support for PBL (80 percent). However, PCW schools with higher proportions of students of color and students receiving special education services scored the culture related to PBL significantly lower than schools with below-average proportions of these student groups.

These findings align with open-ended survey responses and focus group data, in which PCW educators cited peer collaboration, a schoolwide/gradewide approach, and leadership support as the most useful cultural conditions in place at their schools to support PBL.

In the survey and focus groups, PCW educators most frequently discussed peer collaboration. For example, they described the value collaborating to develop gradewide projects and partnering with special education specialists. They also said teachers served as a "support system" for project ideas, questions, and feedback.

"The most useful supports that my school provided was time to plan and collaborate with our grade level. This helped to keep us all on the same pace and was very encouraging."

PCW Teacher

To a lesser degree, educators discussed leaders' efforts to create a schoolwide culture of PBL by bringing teachers together across grades or content area and connecting PBL with the schoolwide vision and goals. Teachers also said school leaders encouraged them to participate in training and coaching activities with a "go-for-it attitude." In addition, teachers said school leaders "showed up" for projects and provided additional resources (e.g., supplies, materials) when requested. Schoolwide projects, cross-grade collaboration, and the visibility of class projects in common spaces helped generate enthusiasm, along with a sense of a shared mission, among both teachers and students.

"Although we developed and implemented two [projects] last year, it was difficult for us to do the same this year because of the new things that were set in place at our school. Also, our grade level needed time to plan and collaborate to make our unit effective and meaningful."

PCW Teacher

PCW educators also commonly cited increased time to plan and collaborate as a useful support for PBL. However, not every teacher said they have enough time to plan, collaborate, and teach PBL. Although teachers increased their ratings from Year 1 to Year 2 on these measures, just over half reported adequate time for planning (42 percent compared with 51 percent) and collaboration (45 percent compared with 55 percent). Additionally, fewer than half of teachers reported adequate time for teaching PBL (41 percent). However, PBL 101 participants reported significantly more PBL planning time than teachers who did not participate in PBL 101.

These findings were reflected in open-ended survey responses and focus groups. The main cultural challenges PCW educators discussed were time to teach PBL, time to plan PBL, and competing priorities. Teachers often said projects took considerably longer to implement than planned and that they struggled to find time for PBL, given other competing priorities and initiatives. They also said planning took longer for PBL, especially finding time to connect with community partners.

"PBL is very time-consuming and although core curriculum can be integrated in the projects, it can only be integrated to a certain degree. Since PBL usually has a finished project at the end, time toward PBL always takes priority over the general teaching, which means those general skills get pushed back, and completion of covering all standards is condensed to meet deadlines before SBA testing. We had two projects this year, and it took four to six weeks to complete. Each quarter is nine weeks."

PCW Teacher

Teachers commonly experienced challenges related to finding time to teach both content and skills in the context of a project, especially for students who need additional support to reach grade-level basic skills. Teachers often expressed concern about the limitations of meeting standards through projects.

"The connection to standards and stuff like that is where the teachers want to see improvement, especially because there's so much time put into these projects. A lot of the projects—they're planned for one quarter and then they end up lasting a semester. Because of that, they want to see more standards integrated and purposely integrated."

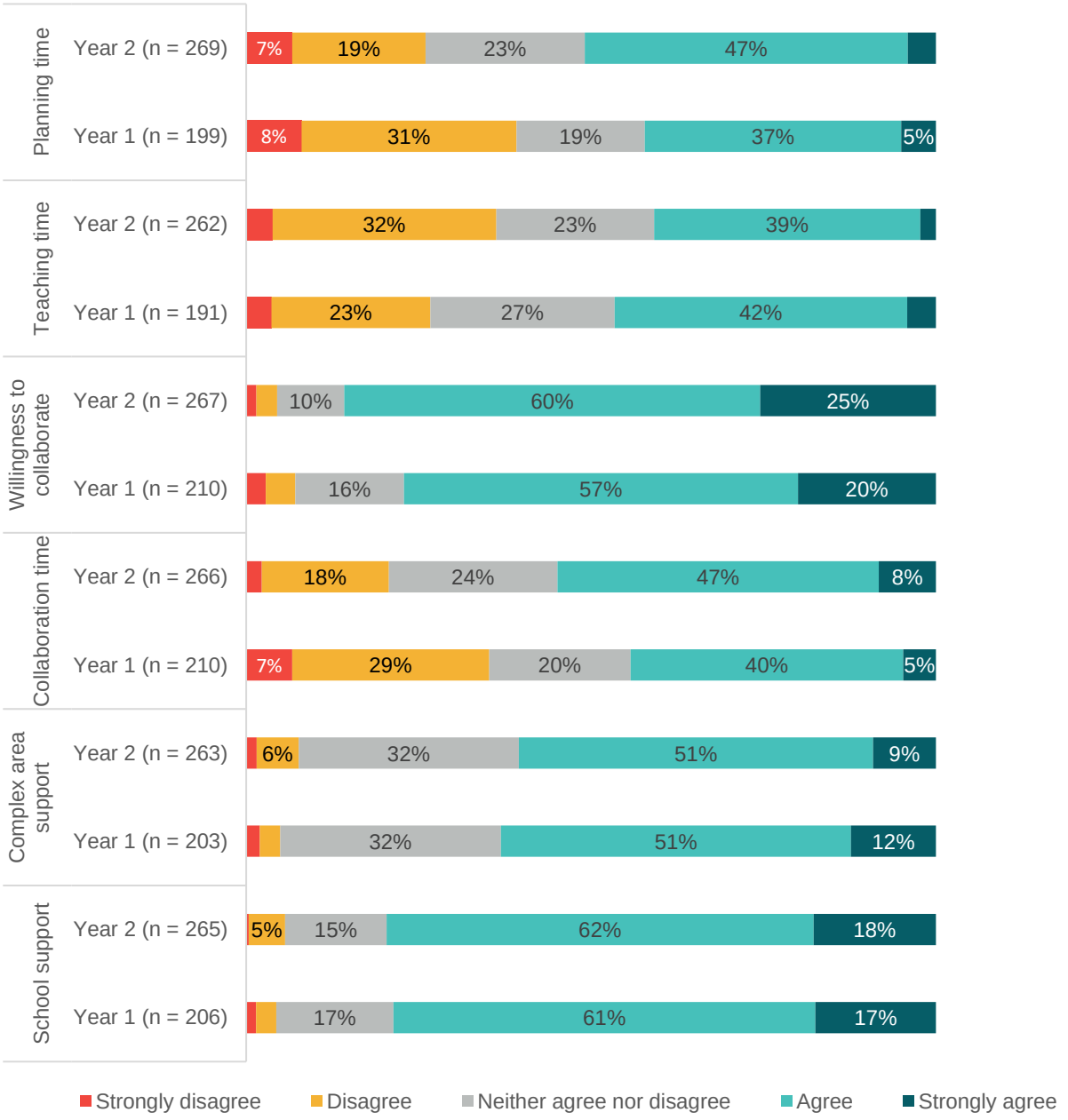
PCW School Leadership Team Member

School-based focus group participants emphasized that they needed to find time to "front-load" information and skills that students need to have voice and choice on projects. Otherwise, teachers felt like they needed to "stop" the project and teach foundational skills.

"… the day we were supposed to do this certain aspect of the project, we have to stop and teach this specific skill. And then the next day, we have to follow up with that skill. And then, by the second week, our whole plans were out the door because we felt like we had to keep stopping to teach these other aspects, like how to work together, how to ask questions, how to merge ideas with another person's ideas. So, I think that was the biggest thing that I didn't realize I would have an issue with."

PCW Teacher

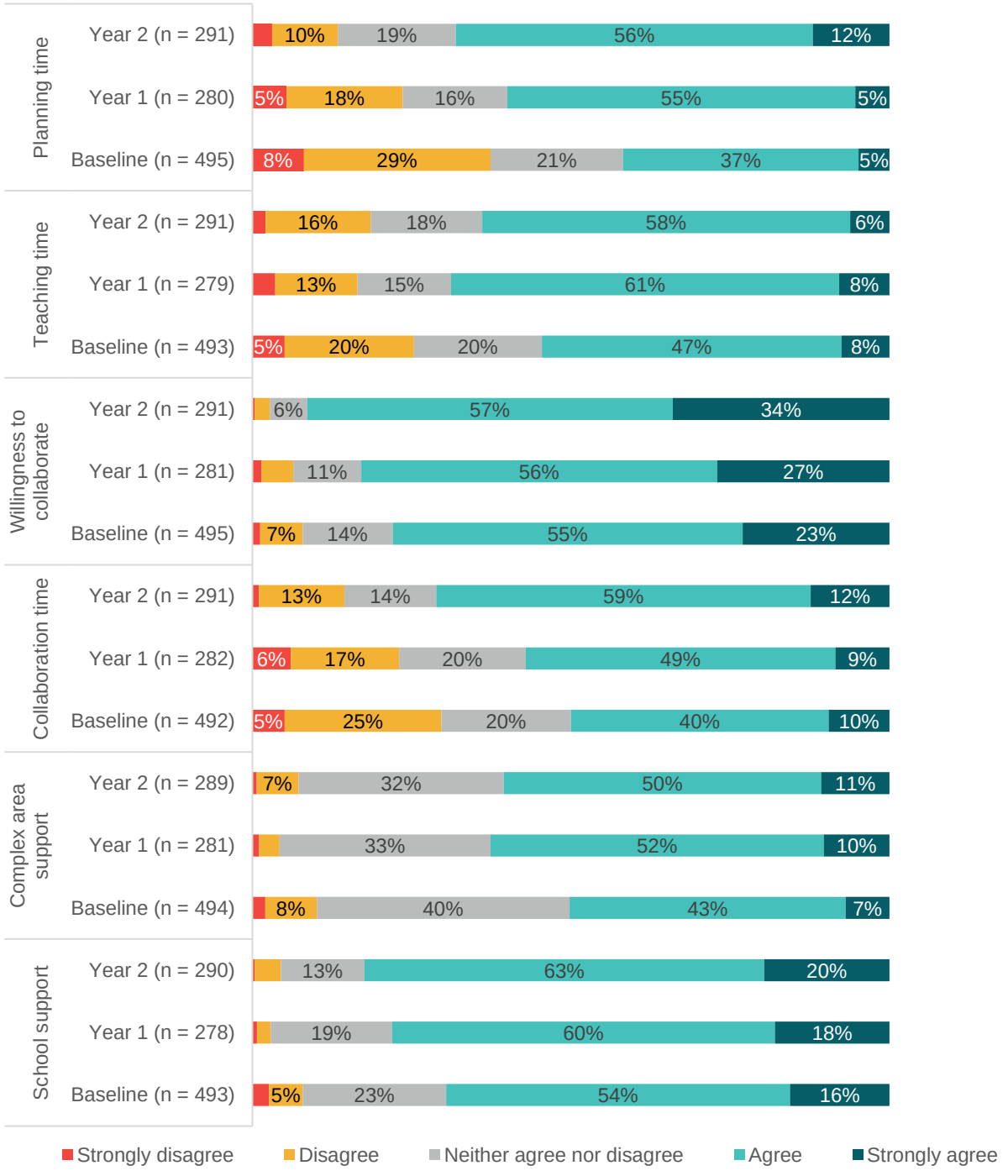
Figure 43. PCW systems conditions related to PBL culture, Years 1 and 2



Note: Some percentages may not total 100 due to rounding. Items with less than 5 percent are unlabeled for clarity.

Source: Education Northwest analysis of teacher survey data.

Figure 44. PCW general systems conditions related to culture, baseline through Year 2



Note: Some percentages may not total 100 due to rounding. Items with less than 5 percent are unlabeled for clarity.

Source: Education Northwest analysis of teacher survey data.

Capacity building

From Year 1 to Year 2, there was little change in the level of capacity-building support for PBL, with professional development being the strongest area of support. However, access to this support does not appear to be equally available across the complex area. Teachers from Cohort 1 schools reported having significantly more PBL professional development than teachers from Cohort 2 schools. In addition, PCW schools with higher proportions of English learner students, students qualifying for free or reduced-price lunch, and students of color reported significantly lower overall capacity for PBL than schools with below-average proportions of these student groups. Finally, PBL 101 participants were significantly more likely than individuals who did not participate in PBL 101 to report receiving quality and adequate PBL professional development.

"There are three main areas where I experienced useful supports for igniting PBL-based learning opportunities:

1) Complex area training that was really good

2) [School] administrative support from academy VPs, principal, and colleagues

3) ELA colleagues who collaborated during PD time to share the importance of and successes with PBL so far at [our school]."

PCW Teacher

In open-ended survey responses and focus groups, participants most frequently described coaching from their leadership team as a useful support for implementation. They said leadership team members reached out to offer customized coaching for teachers and that they felt they could go to the leadership team as a "sounding board" for projects. In some schools, leadership teams had a clear coaching plan and a set of shared priorities for improvement (in terms of Gold Standard Design Elements that data suggested needed to be strengthened) and offered "refresher" trainings to help teachers improve practice in these key areas.

However, educators also commonly identified ways to improve this coaching, such as ensuring leadership team members have the time and skills to provide coaching to more teachers—especially those most hesitant to try PBL. They said they would also like PCW to offer a "project hub" where they could access sample tools and projects and connect with teachers working with similar grades and content areas at other schools. In addition,

"We all would benefit from more PD and from having an expert in PBL actually sit down and look at our project and offer advice. That has never happened with any of our projects. We are given tips and theory, but no one checks to see if we are actually producing a high-quality PBL."

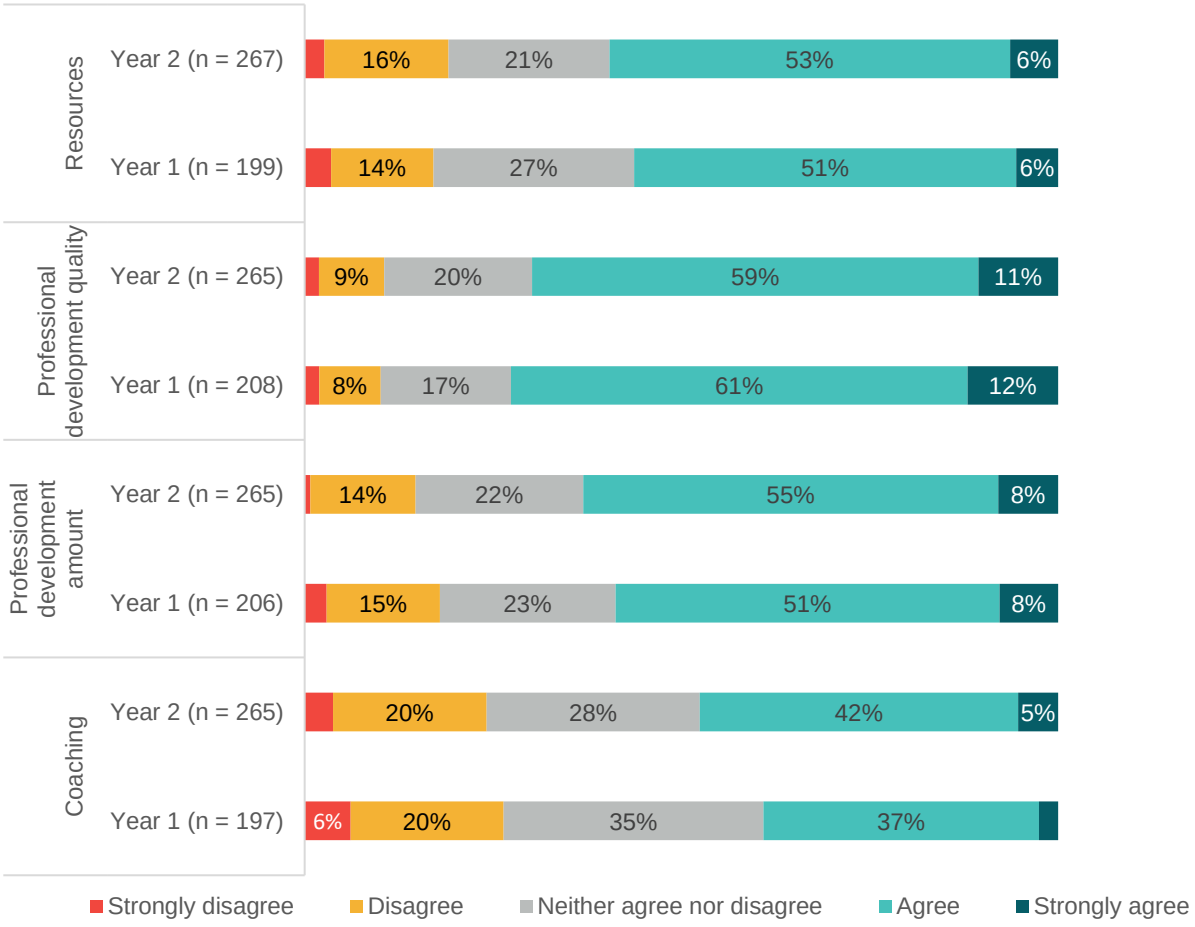
PCW Teacher

teachers identified specific skills they would like more coaching on, such as alignment to standards and assessment.

Further, school leaders expressed a need for more opportunities to observe teachers in the process of facilitating projects and provide feedback. They also said they were concerned about how well they are reaching out to engage "sleeper" teachers who don't voluntary ask for help. A couple school leaders expressed concerns about the usefulness of the self-assessment rubrics, saying that teachers may be rating their implementation quality too high.

Teachers rated their access to instructional resources and curricula lower for PBL than for general systems conditions (59 percent compared with 77 percent). Although participants described the use of PBL tools and templates less often than other supports, some focus group participants described using these resources to plan and refine their instruction. There was some discussion about frustrations associated with the transition to a new PBL planner template midway through the initiative.

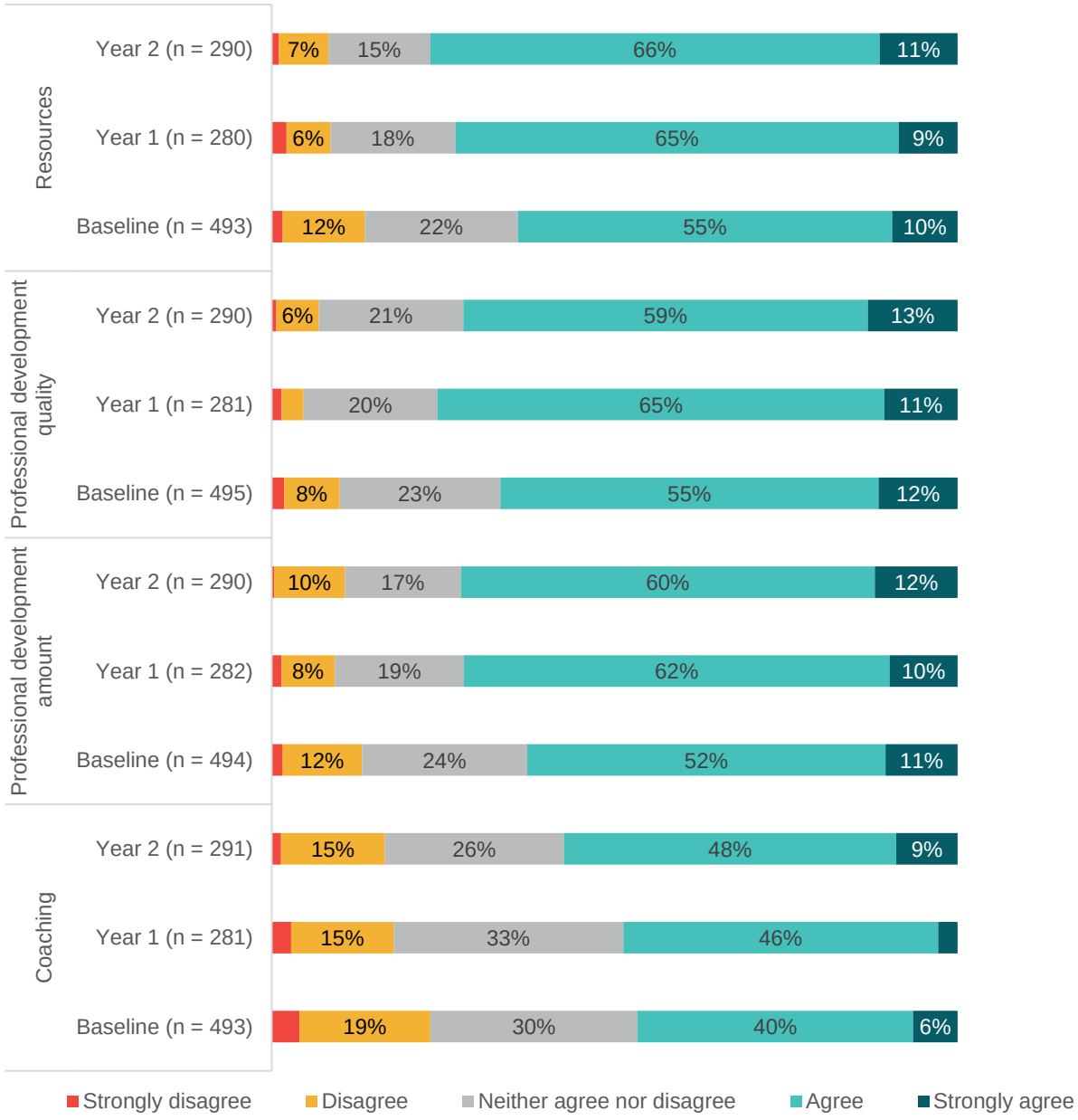
Figure 45. PCW systems conditions related to PBL capacity building, Years 1 and 2



Note: Some percentages may not total 100 due to rounding. Items with less than 5 percent are unlabeled for clarity.

Source: Education Northwest analysis of teacher survey data.

Figure 46. PCW general systems conditions related to capacity building, baseline through Year 2



Note: Some percentages may not total 100 due to rounding. Items with less than 5 percent are unlabeled for clarity.

Source: Education Northwest analysis of teacher survey data.

Next, we present vignettes describing how two Cohort 1 schools approached the process of scaling PBL.

School Profile

- Elementary school
- Cohort 1
- No PBL before 2018
  - Above complex area average in:
    - Students of color
    - Students who qualify for free or reduced-price lunch
  - Below complex area average in:
    - English learner students
    - Students receiving special education services

LEADERS MODEL CONTINUOUS LEARNING

School leaders guided teacher collaboration through a multiphase plan that included the regular use feedback processes and reflection tools to promote continuous improvement on specific Gold Standard Design Elements. Teachers were encouraged to integrate subject areas and learn from one another through "purposeful" collaboration in and across grades. On the survey, all teachers at the school reported administrator support for PBL, and only 11 percent felt they did not have time to collaborate for PBL compared with 21 percent districtwide.

PBL is a common practice schoolwide

Leaders promoted PBL schoolwide as "just really good teaching" that supports collaboration and critical-thinking skills aligned with standards. They told teachers they were all expected to teach a project each semester, and in surveys, 90 percent of teachers reported that they had facilitated a project. Both leadership team members and teachers said PBL is helping students think critically, investigate topics of interest, and collaborate with other students. In surveys, 88 percent of students reported collaborating with classmates on their projects, and 98 percent reported being better able to explain what they needed to know to answer a question.

"I think one of the things that teachers really appreciated this year was that we were listening to their feedback, what their needs were, and making sure that we align whatever supports we were giving with the teacher needs so that they could help the students."

PCW School Leadership Team Member

Scaffolding student knowledge and skills takes intensive planning and time

Although leadership team members discussed evidence of teachers moving toward student-defined driving questions, teachers said they still needed to "front-load" information and skills to ensure students had the foundation they needed to begin the project. This made planning projects particularly challenging, as teachers described needing to understand and adjust for students' needs as they went along. Even with this challenge, 92 percent of teachers at the school reported providing opportunities for voice and choice to their students, and 40 percent reported using a central driving question compared with 33 percent districtwide.

"In the first semester, we were able to do a project critique process … some grade levels did it together, some within a grade level … we thought that was helpful … we were able to see our weak points in the project so that we could tweak it for next school year."

PCW Teacher

School Profile

- Intermediate school
- Cohort 1
- No use of PBL before 2018
- Above complex area average in:
  - Students receiving special education services
- Below complex area average in:
  - Students of color
  - Students who qualify for free or reduced-price lunch
  - English learner students

LEADERS SET A POSITIVE TONE

Leadership team members integrated PBL into the school's vision and approach to teaching, portraying PBL as highly compatible with the school's commitment to developing "soft skills" and cultivating a sense of belonging. They focused on enthusiastic messaging to all stakeholders and a low-stakes, relationship-based approach that did not emphasize quality or outcomes but rather focused on "PBL celebrations" and "moral support." This was evident in teachers' focus group discussions, as well as survey responses; aggregate scores for PBL culture in the school were much higher than in the complex area overall (4.17 compared with 3.53).

Additionally, school leaders provided structural support for teachers' PBL work, including having all teachers trained in PBL and providing PBL collaboration time in grade-level teams and across grades. To shrink the change, leaders focused PBL on science as part of the school's adoption of the Next Generation Science Standards. On surveys, all teachers in the school agreed or strongly agreed that their colleagues were willing to collaborate, and 82 percent felt they had the time to collaborate for PBL (compared with 55 percent districtwide).

"Where the society is now, you can Google anything. It's not really about having that knowledge—it's about applying knowledge. That's why we feel strongly about PBL and how it fits within our vision."

PCW School Leadership Team Member

Educators report schoolwide awareness of PBL

Teachers said students were enthusiastic about PBL. Further, students were excited about the projects going on in their own classroom, as well as projects occurring in neighboring classrooms. In addition, teachers and leaders both said PBL supported critical thinking, ownership, and authentic collaboration among students.

"It's really nice to kind of go through it as a whole school together, to know that we're not the only ones that are having to do this, and seeing other projects being done and things like that."

PCW Teacher

The next step is deeper reflection and continuous improvement

Leadership team members described the need for project reflection to ensure continuous improvement. This could help teachers who said they wanted to improve the projects they worked on this year, including providing better supports for students to work together, better fitting PBL with existing standards, and finding enough time to complete their project.

Conclusion

The *Scaling HQPBL for Deeper Learning Impact* RPP is distinctive in several ways that offer useful insights for research and practice. One is the wide scope of the project, both in terms of the innovation to be scaled—a set of PBL design and teaching practices rather than a specific curriculum or program—as well as the goal of scaling HQPBL to all grades and subject areas over two years. To accomplish this ambitious goal, the partnership involves a nested set of aligned supports provided by PBLWorks at the district, school, and classroom level.

Another distinct feature of this RPP is that the training and coaching are designed to simultaneously promote the adoption of innovative instructional practices, as well as new leadership strategies, to build will and capacity across the system. This includes leadership training materials that translate diffusion of innovation theory and scaling research into practical tools for use by school and district leaders.

Finally, the RPP partners are based in four states, with implementation taking place in two school systems that are over 5,000 miles apart.

In this section, we summarize key implications and recommendations based on the findings of this report.

Implications

MSD and PCW are increasing access to HQPBL, including for students furthest from opportunity

There is evidence of widespread adoption of PBL supported by new developments in culture and capacity at the school and system level. Many educators attribute positive shifts in teacher practices, mindsets, and new collaborations to PBL. Leaders report little resistance to PBL at this point in the partnership, as the practice is now part of the culture at all schools and both school systems. In addition to PBL training, teachers identify peer collaboration and leaders who prioritize PBL as key supports for implementation.

There is progress since baseline in the number of projects taught—and to a lesser degree, in the quality of projects taught. Although most students in MSD and PCW still do not experience

high-quality projects, there is growing access to HQPBL for students furthest from opportunity, with more English learners, students receiving special education services, and students eligible for free or reduced-price lunch experiencing two or more high-quality projects in Year 2 compared with Year 1. Both students and educators report high levels of student engagement in the projects, and student survey results suggest the potential for high-quality projects to promote deeper learning, especially communication and critical thinking.

Challenges remain in terms of how to further scale, spread, and sustain high-quality practice once funding ends

Although more educators are adopting PBL, results indicate that the quality of implementation is uneven. This may be expected, given that some schools and educators were exploring PBL for the first time through this partnership, whereas others were already invested in PBL and used the additional training and coaching to deepen the quality and reach of their practice. Further, educators report that PBL challenges many of the education norms institutionalized in schools, such as teacher-driven instruction and standardized assessment. This requires deep transformation of systems and practice that extends beyond project design and facilitation—work that will take time to fully realize at scale.

Each school system is working through barriers to equitable access to professional development resources and developing internal capacity to help all teachers deepen the quality of their project design and facilitation. Priorities to address include ensuring teachers have adequate time to design and teach PBL, space for continued peer collaboration and learning (both in and across schools), and customized coaching for continuous improvement. Further investment is needed to develop and refine data inquiry processes, both in terms of measures of implementation quality and outcomes for students.

This study suggests the promise of a comprehensive implementation support system for deeper learning when adapted to local contexts

Over the course of the partnership, MSD and PCW received intensive coaching from PBLWorks to address key leadership, organization, and competency drivers of implementation (Bertram, Blase, & Fixsen, 2015). Although they operated under a shared conceptual framework and received the same PBLWorks supports, each school system strategically selected specific scaling strategies to fit their local context and built their implementation support system on their

existing strengths and infrastructure. For example, teacher leaders played an influential role in diffusing PBL throughout MSD, whereas school-based coaches were a key mechanism for scaling in PCW. This adaptation process was similar at the school level, as school-based leadership teams varied in how they approached the process of scaling HQPBL based on their school culture, structure, and stage of implementation.

Recommendations

Ensure adequate capacity at the system level to support implementation at scale

To coordinate an implementation effort of this size involved a significant investment of time and resources from MSD and PCW leaders. Having at least one dedicated school system staff person for whom this effort was their primary responsibility would communicate the importance of PBL and increase the capacity of a school system to sustain quality implementation at scale.

This study identified several aspects of existing infrastructure—such as school-based coaches and PLCs—that school system staff members were able to leverage to support scaling of quality practice. Future research may identify other pre-conditions at the school and system level that facilitate scaling and sustainability of quality deeper learning practice. Considering this information in conjunction with diffusion of innovation theory may help school system leaders sustain this work by strategically building internal capacity for sustaining PBL.

Systematize opportunities for peer-to-peer learning

Educators highly value the new opportunities for mutual learning and collaboration offered by this project. In many ways, these experiences exemplified the principles of deeper learning. Leaders appreciate the chance to visit other schools to observe practice, receive training in a role-alike context, and exchange leadership strategies. For teachers, this included working as a team with other teachers to participate in the training, collaborating on the design and facilitation of projects, receiving regular feedback on draft materials, and/or observing experienced teachers in practice. In MSD, teacher-to-teacher connections played a significant role in the diffusion of this innovation in and across schools.

Similar initiatives may intentionally build these elements into their work, as well as new ideas identified by teachers (such as tracking projects in a "PBL resource bank" to facilitate collaboration and sharing of resources or setting up more opportunities for educators to observe PBL in the classroom). Future research can explore in more depth the nature of teacher-to-teacher support (e.g., coaching and modeling vs. collaborative design and co-teaching), the conditions that enable this support (e.g., structured PLCs vs. more informal opportunities), and the link to project quality and sustainability.

Develop a systemwide culture of continuous improvement using rigorous measures of implementation quality and student outcomes

This study suggests the power of a systemwide effort to build will and motivate educators to adopt an innovative practice, yet there is more work to improve project quality and impact. In interviews and focus groups, educators often expressed appreciation for being part of something larger, encouraged to try new practices by a sense that everyone in the school system was growing and learning together. However, the broad nature of the effort also poses challenges in terms of assessing implementation quality and student outcomes across all grades and subject areas.

Similar efforts may consider scaling the innovation more gradually over time, starting with specific grade bands or subject areas. This would allow practitioners to engage in multiple cycles of inquiry to reflect and refine practice, using tools designed or adapted for their area. Additionally, this strategy would allow school systems to capture early lessons learned about the conditions that facilitate implementation in their context before taking the practice systemwide.

Cycles of inquiry should include data on implementation quality, student engagement, and deeper learning outcomes. This study offers useful insights on each of these issues to be explored more deeply in future research. First, investigation is needed to unpack how high levels of student engagement in projects can translate into academic progress, especially for students furthest from opportunity. Additional research is needed to identify the active ingredients of PBL, in terms of which elements of Gold Standard Design and Gold Standard Teaching practices are most impactful for students, especially students furthest from opportunity. Second, there is a need to develop and use systematic measures of implementation quality based on this research. These measures should include data from both a teacher and

student perspective to examine whether core elements of HQPBL (such as authenticity, as well as voice and choice) were experienced by students in the way teachers intended. Third, educators need training in the consistent use of these measures to ensure validity. And finally, there is a need for innovative measures of deeper learning, such as performance assessments, that align with the principles of deeper learning practice in terms of being authentic and student driven.

Appendix A: Teacher Survey

The teacher survey was administered in spring 2020 using teacher contact information provided by each school system. The survey was conducted online. Teachers were asked to reflect on their teaching during 2019–20. Teachers were asked to respond to questions about four topics: their experience with PBL, the projects they taught, the systems conditions in the schools where they taught, and their professional social networks.

Teachers were asked a series of questions about their projects that were used to create a composite quality rating score for their projects. The rating questions were related to six of the eight Gold Standard Design Elements: challenging problem, sustained inquiry, student voice and choice, critique and revision, authenticity, and public product. For each of the elements, a teacher was given a score of 1 or 0, depending on their answers to a question. A score of 1 indicated the project met the minimum threshold for that element, and a 0 indicated the project did not meet the minimum threshold. The composite quality rating was then created by adding the assigned values for each element, creating a range of possible scores of 0 to 6.

Teacher Survey Sample

The survey was sent to 1,569 teachers[23] across both school systems, and the overall response rate was 41 percent in PCW and 44 percent in MSD. In MSD, of the 340 teachers who completed the survey, 64 percent (217) had taken the survey in the baseline year or Year 1. In PCW, of the 291 teachers who completed the survey, 67 percent (196) had taken the survey in the baseline year or Year 1. For teachers who took the survey in both years, the survey responses were combined to compare changes across years.

Overall, the percentages of teachers in the subgroups for MSD in table A1 are not notably different across years. There was a decline in responses in MSD elementary school teachers, who went from 48 percent of respondents in the baseline survey to 41 percent in Year 1 and 40 percent in Year 2. Additionally, there were more responses from schools with an above-average proportion of students receiving special education services in Year 2 (53 percent) compared with baseline (42 percent) and Year 1 (39 percent). In addition, there were fewer responses from

[23] The survey was sent to 1,639 individuals, but we removed 38 individuals from MSD and 32 individuals from PCW from the sample who reported on the survey that they were not classroom teachers during 2019–20.

schools with an above-average proportion of English learner students in Year 2 (22 percent) compared with baseline (51 percent) and Year 1 (51 percent).

Table A1. MSD spring 2020 teacher survey respondent characteristics compared with fall 2018 baseline and spring 2019

Survey respondent characteristics		Baseline N = 512		Year 1 N = 298		Year 2 N = 340	
Grade band	Elementary school	246	48%	121	41%	135	40%
	Middle school	143	28%	84	28%	105	31%
	High school	123	24%	93	31%	100	29%
School cohort	Cohort 1	351	69%	173	58%	214	63%
	Cohort 2	161	31%	125	42%	126	37%
School scaling category	No PBL	101	20%	61	20%	65	19%
	Pockets of PBL	302	59%	172	58%	201	59%
	25 to 50% of classrooms	-	-	-	-	-	-
	50 to 74% of classroom	60	12%	27	9%	30	9%
	More than 75% of classrooms	36	7%	22	7%	22	6%
	Schoolwide	13	3%	16	5%	22	6%
School demographics	Above average: SPED	217	42%	117	39%	178	53%
	Above average: EL	163	32%	99	33%	92	27%
	Above average: FRPL	247	48%	133	45%	135	40%
	Above average: students of color	259	51%	152	51%	75	22%
PBL 101 participation	Cohort 1 participant	-	-	87	29%	84	25%
	Cohort 2 participants	-	-	-	-	48	14%
Leadership team	Leadership team member	46	9%	28	9%	39	11%

The percentages of teachers in the subgroups for PCW in Table A2 are also not notably different across years. There were lower teacher response rates from schools with above-average proportions of students receiving special education services, English learner students, students eligible for free or reduced-price lunch, and students of color, but there were higher response rates for schools with more Native Hawaiian students.

Table A2. PCW spring 2020 teacher survey respondent characteristics compared with fall 2018 baseline and spring 2019

Survey respondent characteristics		Baseline N = 495		Year 1 N = 284		Year 2 N = 291	
Grade band	Elementary school	323	65%	161	57%	187	64%
	Intermediate school	71	14%	55	19%	33	11%
	High school	101	20%	68	24%	71	24%
School cohort	Cohort 1	246	50%	152	54%	151	52%
	Cohort 2	249	50%	132	47%	140	48%
School scaling category	No PBL	227	46%	138	49%	128	44%
	Pockets of PBL	202	41%	103	36%	128	44%
	25 to 50% of classrooms	66	13%	43	15%	35	12%
	50 to 74% of classrooms	-	-	-	-	-	-
	More than 75% of classrooms	-	-	-	-	-	-
	Schoolwide	-	-	-	-	-	-
School demographics	Above average: SPED	266	54%	171	60%	144	49%
	Above average: EL	325	66%	179	63%	138	47%
	Above average: FRPL	316	64%	182	64%	162	56%
	Above average: students of color	375	76%	211	74%	189	65%
	Above average: Native Hawaiian students	163	33%	106	37%	146	45%
PBL 101 participation	Cohort 1 participant	-	-	92	32%	94	32%
	Cohort 2 participant	-	-	-	-	125	43%
Leadership team	Leadership team member	42	8%	*	*	10	3%

Descriptive analysis

The educator survey was administered using SurveyGizmo. Upon completion of the survey administration period, the data were downloaded and imported into the statistical software Stata for cleaning and analysis. To analyze the data regarding the respondents' experience with PBL, reported use of Gold Standard Design Elements, and school-level conditions, we conducted basic descriptive analyses using tabulations and cross-tabulations of the data. The survey data underwent further cleaning in preparation for the SNA and roster-matching analysis, along with specialized analyses, which are described in detail below.

TEACHER AND STUDENT SURVEY OVERALL QUALITY SCORE

The study involves the triangulation of student and teacher perspectives on project quality. The student survey assesses whether students experienced HQPBL, and the teacher survey asks about the use of Gold Standard Design Elements. To facilitate triangulation across these data sources, we drafted an aligned composite measure of quality for each survey item (table A3), drawing on PBLWorks staff members' feedback on the Gold Standard Design Elements scoring guidelines, as well as the HQPBL framework.

These composite measures are intended to describe whether a project met a threshold for quality primarily for the purpose of triangulation. They are not meant to be a comprehensive indicator of HQPBL since the surveys did not have space to investigate in depth each Gold Standard Design Element or criterion for HQPBL. A composite score also enables us to increase our ability to conduct more nuanced statistical analyses related to project quality, particularly when examining diffusion in the SNA. For example, a composite score can concisely assess change in project quality from baseline to Years 1 and 2.

Overall composite scores of 0 to 6 were tallied by totaling the scores across each design element. A score of 6 indicates that the project contained evidence of all six Gold Standard Design Elements measured.

Table A3. Quality composite scores for student and teacher surveys

Gold Standard Design Element	Student Survey Question, Response Option(s), and Scoring	Teacher Survey Question, Response Option(s), and Scoring
Challenging Problem Or Question*	How did this project challenge you? a. I studied a problem or question that was difficult to solve. Score: 1 point for a	What was the primary focus of the project? a. A driving open-ended question that the whole class answered Score: 1 point for a
Sustained Inquiry	How did this project challenge you? a. I worked on the project for many days or weeks. Score: 1 point for a	What was the length of the project? a. 2–3 weeks b. 4 weeks or more Score: 1 point for a or b
Student Voice and Choice**	What steps did you take to complete your project? a. I made decisions about how I used my time. b. I made decisions about what resources to use. c. I planned what tasks I needed to do. Score: 1 point for a, b, or c	Were students given the opportunity to make choices about the following project elements? a. Determining the central project topic or question) b. The text and resources used to complete the project c. Which classmates they collaborated with during the project d. The format of the final product created (e.g., presentation, poster, video) e. How they used their project time f. Organizing the tasks needed to complete the project Score: 1 point for a, b, c, d, e, or f
Critique and Revision***	How were comments or suggestions part of this project? a. I used comments or suggestions from my teacher or other students to improve my work Score: 1 point for a	When did students get feedback on their project-related work? a. While working on the project Score: 5 points for a Who provided feedback to students about their project? a. Peers Score: 5 points for a
Authenticity	Why was this project important to you or to other people? a. I learned information I am interested in. b. The project can help solve a problem in my school or community. c. I was able to make choices about my work on this project.	Which of the following elements apply to the project you assigned to your class? a. Focused on a real need in our school or community b. Reflected my students' personal concerns, interests, or identities c. Used real-world tools and processes d. Solved a problem like those faced by people outside of school

Gold Standard Design Element	Student Survey Question, Response Option(s), and Scoring	Teacher Survey Question, Response Option(s), and Scoring
	d. I used the *same* tools, technology, or equipment that are used by people outside of school. Score: 1 point for a, b, c, or d	e. Resulted in a product that could be used by other people Score: 1 point for a, b, c, d, or e
Public Product	How did you share what you learned with other people? a. I gave presentations to students, parents, or people outside of my classroom. b. I gave presentations to people outside of school. Score: 1 point for a or b	Did students produce materials (e.g., presentation of their work or a tangible product, such as a website, video, or brochure) that were seen by people outside their own classroom? a. Yes Score: 1 point for a

*Intellectual Challenge & Accomplishment in the HQPBL Framework

**Drawn from Authenticity and Project Management in the HQPBL Framework

***Drawn from Reflection in the HQPBL Framework

SNA

A foundational assumption of this project is that teacher social networks influence the diffusion of quality PBL in schools and across school systems. According to diffusion of innovation theory (Rogers, 2003), the social networks of "opinion leaders" play a critical role in diffusing innovation to others in an organization and across a system. Opinion leaders regularly influence the mindset and behavior of others through informal means and relationships rather than positional authority.

At the start of this project, MSD and PCW leaders were asked to use diffusion of innovation theory to select individuals and schools to receive the first round of PBLWorks services that might support the diffusion of information from those opinion leaders to peers in their schools and the school system. They created system- and school-level scaling maps to document the rationale for selecting schools to participate in PBLWorks services in Cohort 1 and then selected the individuals to participate in PBL 101 training, including those whom school leaders described as PBL early adopter opinion leaders. The assumption of this approach is that starting with opinion leaders who were well-connected and already teaching projects at baseline would facilitate the diffusion of HQPBL in schools and across school systems.

To investigate the patterns of diffusion across MSD and PCW, we used SNA, a process used to analyze the relationships between individuals in which information or other resources are

exchanged (Wasserman & Faust, 1994). We used SNA to determine whether individuals identified as opinion leaders by school leaders using the diffusion of innovation theory were, in fact, people whom their peers chose as someone they would go to for advice.[24] We did this by asking teachers in the baseline (2017–18), Year 1 (2018–19), and Year 2 (2019-20) teacher surveys, "Who did you go to most often for advice or with general questions related to content knowledge, your instructional practice, or navigating school systems (i.e., figuring out school management or bureaucracy)?" By mapping relationships in and across schools, we can identify potential opportunities and challenges in how information about quality PBL might flow between individuals who have received this information and those who have not. We used ORA software[25] to visualize and analyze the networks.

DESCRIPTION OF BASELINE SOCIAL NETWORKS

Table A4 provides a descriptive overview of all individuals who are included in the SNA maps in the baseline in both MSD and PCW based on the results of the survey. These individuals either participated in the survey or were identified by a survey respondent—together forming the social network of each school system.

In MSD, 419 survey respondents identified 1,677 relationships with 891 individuals working in the district and 11 individuals working outside the district. In PCW, 434 survey respondents identified 1,764 relationships with 783 individuals working in the complex area and 30 individuals working outside the complex area. The number of survey respondents, as well as the number of individuals identified by survey respondents, was comparable across the two school systems.

Table A4. MSD and PCW survey respondents identified a similar number and type of individuals in their social networks at baseline (2017–18)

Network Member Characteristics		MSD (n = 902)		PCW (n = 813)	
Location	School-based staff	880	98%	767	94%
	District/complex area office staff	10	1%	17	2%
	Individuals outside the district/complex area	11	1%	30	4%
Role	Teacher	734	81%	694	85%
	School-level administrator	52	6%	41	5%

[24] In SNA, this measure is referred to as "in-degree centrality" (Wasserman & Faust, 1994).
[25] http://www.casos.cs.cmu.edu/projects/ora/

Cohort membership	From a Cohort 1 school	305	34%	392	48%
	From a Cohort 2 school	575	64%	373	46%
	Early-adopter opinion leader	45	5%	20	2%
PBL participation	Cohort 1 PBL 101 participant	201	22%	214	26%
	Leadership team member	65	7%	94	12%

Note: Individuals are represented in more than one category.

Description of Year 1 social networks. Table A5 provides a descriptive overview of all individuals who are included in the SNA maps in Year 1 in both MSD and PCW based on the results of the survey. These individuals either participated in the survey or were identified by a survey respondent—together forming the social network of each school system.

In MSD, 282 survey respondents responded in spring 2019 for Year 1. They identified 1,201 relationships with 733 individuals working in the district and 18 individuals working outside the district. In PCW, 277 survey respondents identified 1,172 relationships with 725 individuals working in the complex area and 12 individuals working outside the complex area. The number of survey respondents, as well as the number of individuals identified by survey respondents, was comparable across the two school systems.

Table A5. MSD and PCW survey respondents identified a similar number and type of individuals in their social networks in Year 1 (2018–19)

Network Member Characteristics		MSD (n = 733)		PCW (n = 725)	
Location	School-based staff	715	98%	695	96%
	District/complex area office staff	9	1%	9	1%
	Individuals outside the district/complex area	9	1%	12	3%
Role	Teacher	592	81%	614	85%
	School-level administrator	50	7%	39	5%
Cohort membership	From a Cohort 1 school	423	59%	152	46%
	From a Cohort 2 school	292	41%	132	46%
	Early-adopter opinion leader	41	6%	9	3%
PBL participation	Cohort 1 PBL 101 participant	165	23%	92	32%
	Leadership team member	59	8%	6	2%

Note: Individuals are represented in more than one category.

Description of Year 2 social networks. Table A6 provides a descriptive overview of all individuals who are included in the SNA maps in Year 2 in both MSD and PCW based on the results of the survey. These individuals either participated in the survey or were identified by a survey respondent—together forming the social network of each school system.

In MSD, 340 survey respondents responded in spring 2020 for Year 2. They identified 1,369 relationships with 738 individuals working in the district and five individuals working outside the district. In PCW, 277 survey respondents identified 1,223 relationships with 713 individuals working in the complex area and 12 individuals working outside the complex area. The number of survey respondents, as well as the number of individuals identified by survey respondents, was comparable across the two school systems.

Table A6. MSD and PCW survey respondents identified a similar number and type of individuals in their social networks in Year 2 (2019–20)

Network Member Characteristics		MSD (n = 738)		PCW (n = 695)	
Location	School-based staff	727	99%	671	94%
	District/complex area office staff	6	1%	12	2%
	Individuals outside the district/complex area	5	1%	12	2%
Role	Teacher	555	76%	559	83%
	School-level administrator	113	16%	9	1%
Cohort membership	From a Cohort 1 school	451	61%	448	67%
	From a Cohort 2 school	286	39%	136	20%
	Early-adopter opinion leader	36	5%	20	3%
PBL participation	Cohort 1 or 2 PBL 101 participant	257	35%	446	64%
	Leadership team member	93	13%	82	12%

Note: Individuals are represented in more than one category.

The survey focuses on teacher social networks, but administrators and district/complex area office staff members play key roles in connecting individuals across networks. We note when the analysis includes administrators and district/complex area office staff members who are identified by teachers.

Not all teachers in MSD or PCW completed the survey, and the networks used for this study do not represent all the relationships in either school system. Therefore, although we can talk generally about the different structures of the two networks represented by MSD and PCW, there may be different relationships through which PBL knowledge might spread that are not captured here. This is a challenge for most studies using SNA, and it was considered during the analysis.

The teacher survey also provides information for tracking changes from baseline to Year 1 to Year 2 regarding awareness of PBL and use of quality PBL practice over time. However, as the response rate was low for teachers who took the survey all three years (32 percent for MSD and 36 percent for PCW) and not all the respondents taught a project, we were able to provide only limited insights into changes for individuals. Additionally, survey respondents were given the opportunity to identify individuals outside their school whom they go to for advice, but only 43

individuals from MSD and 10 individuals from PCW identified a cross-school connection in Year 2. Therefore, this analysis is not included in the findings due to its limited scope.

Specifics from reported items are described in table A7.

Table A7. Centrality measures and project participation for network members, Year 2

	MSD (n = 738)				PCW (n = 695)			
	N	Mean in-degree centrality	Did a project*	Project quality rating*	N	Mean in-degree centrality	Did a project*	Project quality rating*
School leadership team	93	8.3	97%	5.1	82	8.7	71%	5
Others	645	4.7	80%	4.6	613	4.2	80%	4.9
PBL early adopter opinion leaders	36	8.6	100%	4.9	20	4.3	64%	4.8
Others	702	5	81%	4.6	675	4.7	81%	4.9
Individuals who have participated in PBL 101	124	6.1	83%	5	446	5	89%	4.9
Individuals who have a connection to an individual who participated in PBL 101	217	5.2	82%	4.4	174	4.7	59%	4.7
Individuals who do not have a connection to an individual who participated in PBL 101	206	3.9	81%	4.4	75	2.9	39%	**

*Note: These items are calculated for only teachers who responded to the survey. Individuals are represented in more than one category.

**This item was not reported on due to having fewer than 10 respondents who reported project quality.

Matching Class Rosters With Teacher Survey Results

To determine the extent to which students, including students furthest from opportunity, experience two high-quality projects each year, the research team matched teacher survey reports of project facilitation with class rosters and student demographic data from the same school year. Education Northwest received a list of students, which included demographic and course enrollment information, from MSD and PCW for 2017–18, 2018–19, and 2019–20.

Individual student records were matched with teachers who participated in the survey by using the course enrollment file that included teacher names for both MSD and PCW. In MSD, matching was also done based on teacher email address, which was available for teachers who were also included in the 2018–19 staff roster list. In 2019–20, the matching results were superior using teacher names instead of email address, and they were used for the analysis in this report.

The research team assigned matched students with the number of projects conducted by each of their assigned teachers during the school year. Then the number of projects taught in each student-teacher pair was added together to create a single number of projects experienced for each student. This number was used to determine whether a student was exposed to no projects, one project, or two or more projects each year. If a student was not matched to any teacher on the survey, the student was excluded from the analysis of students by subgroup, since we could not infer whether they experienced a project during the given school year.

Roster-matched students were also matched with the quality composite rating reported by their teachers. If a teacher reported teaching a project and completed the project quality items, they were given an overall quality composite score, which was assigned to the students. Compared with the number of students matched to a teacher survey, fewer students had a project quality score because not all teachers taught a project or completed the rating questions. If a student had multiple teachers who had a project quality rating, the higher rating was used for the analysis.

MSD Roster-Matching Results

The roster-matching analysis was done only on students for whom there was a match to at least one teacher who took the teacher survey. Therefore, we compared the matched students to the total student population reported in the 2019–20 student rosters to ensure the demographics of the MSD student population were close to the demographics of the matched student

population. Overall, 68 percent of students were matched to a teacher, and only one demographic group had a difference of more than 2 percentage points: students eligible for free or reduced-price lunch. These students were overrepresented in the sample by 8 percentage points, indicating that the matched population does look like the overall student population in the district (table A8). In MSD, 68 percent of the matched students (6,153) had a quality rating matched to them from the teacher survey.

Table A8. Percentage of students in MSD compared with roster-matching results for race/ethnicity, students receiving special education services, English learner students, and students eligible for free or reduced-price lunch

Student characteristics	Percentage of total students in district (N = 13,317)	Percentage of total students matched with teacher survey (N =9,003)
Asian	4%	4%
American Indian/Alaska Native	*	*
Black/African American	10%	10%
Hispanic/Latino	28%	27%
White	52%	53%
Pacific Islander	*	*
Two or more races	5%	5%
Received special education services	18%	20%
English learner	17%	18%
Eligible for free or reduced-price lunch**	53%	61%

* indicates less than 1 percent.

** Percentages of students eligible for free or reduced-price lunch were reported by MSD after roster matching to protect student privacy.

Source: Teacher survey data matched with student rosters.

PCW Roster-Matching Results

The analysis of PCW students who experienced a project was done only for students who could be matched to a teacher from the teacher survey. Therefore, it was important to compare the matched students to the total student population reported in the 2019–20 student rosters to ensure the demographics of the PCW student population were close to the demographics of the

matched student population. Overall, 71 percent of students were matched to a teacher. None of the demographic groups were over- or under-represented in the matched population by more than 5 percentage points. Asian students made up 50 percent of the population in the student rosters but comprised 54 percent of the matched students; no other student group had a greater than 3 percentage point difference from the total population (table A9). In PCW, 78 percent of the matched students (7,531) had a quality rating matched to them from the teacher survey.

Table A9. Percentage of students in PCW compared with roster-matching results for race/ethnicity, students receiving special education services, English learner students, and students eligible for free or reduced-price lunch

Student characteristics	Percentage of total students in district (N = 14,500)	Percentage of total students matched with teacher survey (N = 10,274)
Asian	50%	54%
American Indian/Alaska Native	*	*
Black/African American	1%	1%
Hispanic/Latino	13%	11%
White	2%	2%
Pacific Islander	20%	19%
Two or more races	15%	13%
Received special education services	9%	6%
English learner	17%	18%
Eligible for free or reduced-price lunch	45%	44%

* indicates less than 1 percent.

Source: Teacher survey data matched with student rosters.

Appendix B: Focus Groups

Typically conducted with groups of seven to 10 people who share a common experience, focus groups are especially useful for gathering information about group processes (Marshall & Rossman, 2006). The open-ended nature of focus groups provides richer and more nuanced data than interviews or forced-format surveys. In this project, we use focus groups to explore educator perspectives of PBL implementation, scaling, and diffusion. The primary purpose of the focus groups is to provide more detailed information about the diffusion process and implementation conditions (research question 2) from the perspective of multiple stakeholders (teachers, school administrators, and district/complex area administrators). In designing these protocols, we drew on PBLWorks' leadership rubrics and research on teacher motivations, practices, and school-level conditions related to PBL (for a summary, see Condliffe, 2017).

Sample focus group questions (from the principal and school leadership team protocol) include:

1. Which strategies from the scaling map did you find most effective for supporting PBL implementation across your school? Please indicate any new strategies your team developed over the year.
    a. Prompt for effective strategies for supporting innovators and early adopters
    b. Prompt for effective strategies for engaging and supporting majority and late majority

2. What do you think made these strategies so effective with each of these groups of teachers?

3. Which strategies were less effective and why?
    a. Prompt for challenges in supporting innovators and early adopters
    b. Prompt for challenges in engaging and supporting majority and late majority

4. What are some signs that your school is making progress with PBL?
    a. Prompt for changes in schoolwide culture and teacher engagement
    b. Prompt for changes in motivation and demand
    c. Prompt for changes in classroom practice
    d. Prompt for changes with students: mastery of core content, collaboration, communication, and critical thinking/problem-solving

Data Collection

Education Northwest conducted 16 focus groups: 10 in MSD and six in PCW. A total of 65 individuals participated in focus groups, specifically, 42 individuals from MSD and 23 individuals from PCW (table B1). All focus groups were conducted online using Zoom in May and June by two members of the research team.

Table B1. Number of focus group participants by role and school system (N = 65)

Role	MSD participants	PCW participants
District or complex area administrators	3	3
Principals	6	5
Leadership team members who were not principals	14	5
Teachers	19	10
Total	42	23

Teacher and leadership team focus groups

Education Northwest proposed to conduct case studies of eight "bright spot" schools, four in each school system. By conducting focus groups with teachers and leadership team members from those schools, we aim to provide more in-depth, contextualized information about the scaling and diffusion process.

We collaborated with the lead staff members from MSD and PCW to identify schools and invite them to participate. MSD secured participation from two Cohort 1 schools and two Cohort 2 schools. Two Cohort 1 schools from PCW were willing to participate, but the Cohort 2 schools declined. We then worked with the principal from each "bright spot" school to recruit leadership team members and teachers to participate in the focus groups. A $75 gift card was raffled off at each school as a thank you to participants. In total, 35 educators from MSD and 17 educators from PCW participated in the school-level focus groups.

Principal and school system administrator focus groups

We directly contacted Cohort 2 principals in each school system to invite them to participate in the principal focus groups. The lead staff members at MSD and PCW recruited their district/complex area colleagues to participate in the school system administrator focus groups.

Data Management and Analysis

All focus group data were collected via written notes and audio recording, de-identified, and stored securely on our organizational servers. All focus groups were transcribed in full. The two researchers who conducted the focus groups used ATLAS.ti to manage and code the data. Analysis involved both deductive and inductive coding (Marshall & Rossman, 2006), as the study is both testing established frameworks related to PBL quality design, facilitation, and experience and developing theoretical insights related to the diffusion of innovation. First, data were coded using a scheme organized by key research issues:

- Diffusion process outcomes (e.g., increased educator engagement)
- Deeper learning outcomes for students (e.g., communication)
- Systems conditions (e.g., vision)
- Scaling strategies (e.g., messaging)
- Overall challenges and recommendations

Reports were generated based on the frequency of codes in each school system and focus group. Next, we summarized the key themes in each of these issues; patterns in the data by school system, focus group, or participant type (e.g., teachers); and illustrative quotes and examples. Finally, we triangulated our analysis of focus group data with analysis of data from the student and teacher surveys in three analytic memos:

1. Deeper learning, project facilitation, and project quality
2. Systems conditions that enable or constrain PBL
3. Diffusion, scaling strategies, and the role of teacher networks

Appendix C: Student Survey

As a part of this project, students in grades 4–12 were asked to complete an online survey after they completed a project. In PCW, only elementary school students completed the survey. Students were asked a series of questions about the project they had just completed, and the corresponding data collected were used for descriptive analysis and to create a composite quality rating that matched the teacher composite quality rating from the teacher survey.

The survey responses were later matched to the student roster using the name provided by the student in the survey to examine the responses by student group. In MSD, 458 students in seven schools completed the survey, with 90 percent of the responses coming from four schools. Most students who took the survey completed it (95 percent) and were matched to the student roster (93 percent). In PCW, 136 students in four schools took the survey, and all of them were complete. Of the students who took the survey, 97 percent were matched to the student roster (table C1).

Table C1. Student survey response information

	MSD student survey percentage of respondents (N = 458)	PCW student survey percentage of respondents (N = 136)
Complete responses	94%	100%
Matched to student roster	93%	97%
Elementary school	29%	100%
Middle school	52%	-
High school	19%	-
Grade 4	16%	44%
Grade 5	14%	46%
Grade 6	22%	10%
Grade 7	17%	-
Grade 8	12%	-
Grade 9	6%	-
Grade 10	6%	-
Grade 11	2%	-
Grade 12	5%	-
English learner students	15%	21%
Special education	12%	*

	MSD student survey percentage of respondents (N = 458)	PCW student survey percentage of respondents (N = 136)
Eligible for free or reduced-price lunch	*	36%
Asian	*	33%
Black/African American	10%	*
Hispanic/Latino	25%	14%
White	58%	*
Native Hawaiian or Pacific Islander	*	23%
Two or more races	5%	27%

* indicates data are unavailable to protect student privacy.

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