



A Regional Approach to P20 Education

Purpose

This document states the argument for the kind of work envisioned by this Partnership to make the substantive change needed to achieve the goals of 40-40-20. We also outline specific elements of our proposed work with a beginning focus on mathematics instruction, leading to the inclusion of science, engineering and technology in Career Technical Education (CTE) courses and finally to all subjects. We intend this document to be the base for beginning the necessary work for raising student achievement from elementary to beginning college, regardless of the funding source.

Our Vision: Pursuing excellence through equity in expectations, instruction and outcomes

Our Mission: To close the achievement gap for the diverse student population of Oregon's Mid-Coast and Mid-Willamette Valley region by creating a context of equitable teaching practices making valuable and compelling academic content accessible. *Ambitious teaching* conveys high expectations for every student. With a "can do" attitude, students, parents, teachers, administrators, community members and university partners join forces to co-construct a seamless coherent PK-20 learning continuum.

Partnership Leaders

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Susan Waddell	Superintendent, Linn Benton Lincoln ESD

Goals

1. To build a community-wide, sustainable, educational partnership in support of student learning from pre-kindergarten through college
2. To provide opportunities for all students to learn and opportunities to demonstrate learning both in and out of school
3. To support highly effective professional development for all teachers focused on student learning through robust university-school partnerships
4. To develop equitable practices for student teachers that sustain high expectations in cognitively demanding and meaningful tasks through robust university-school partnerships that enhance success for all students

Guiding Principles for Partnership Development and Work Coordination

1. Investment in teacher knowledge and skills and in the development of new teachers is foundational to high-performing schools.
2. Diversity is not just a demographic characteristic but foundational to the work of high-performing schools. Excellence is achieved through diversity.
3. The partnership is focused on student learning and on the factors influencing student learning that are under the control of the partnership.
4. Schools that beat the odds and outperform schools with similar demographics attend persistently to the details of implementing high-quality programs.

Outcomes

Within five years, we will:

- Reduce the achievement gap among all student demographic groups (race/ethnicity, gender, SES, ELL, SpEd) by 50% as measured by state assessments;
- Increase the percentage of students meeting or exceeding reading and math state criteria to 80%;
- Increase the high school graduation rate of students eligible to graduate from schools within the partnership as a whole to 90%, with no individual partner being lower than 85%;
- Increase completion rates for community college and university, including Early College Completion with regional high schools, by 50% (10-year goal);
- Increase the number of students prepared for college-level mathematics by 50% as assessed by instruments used at LBCC and OSU;
- Match or exceed the percentage of student teachers of color with the percentage of students of color in the partnership area;
- Ensure that all teachers licensed through OSU have an ESOL endorsement or meet TSPC required competencies; and
- Improve the alignment between the percentages of teachers of color employed by the partnership school districts with the percentage of public school children of color within the partnership school districts by 25%.

Overview

Criticism of teachers, teacher education and student achievement is coming from many sources. Serious critics recognize the increasing risk for not improving student achievement even as schools face budgetary shortfalls. Art Levine, president of the Woodrow Wilson Foundation, in his monograph, *Educating School Teachers*, stated "...But their challenge is even larger because today's teachers need to know and be able to do things their predecessors did not. They have to be prepared to educate all of their students to achieve the highest learning outcomes in history. This is a fundamentally different job than that of past generations of teachers."¹ To meet this challenge requires a broad partnership of educators across school districts, community colleges and universities. Further, community members and resources are integral in the PK-20 continuum, which

¹ Arthur Levine, *Educating School Teachers* (Washington, D.C.: The Education Schools Project, 2006) 11.

means that a change in the way teaching and learning are promoted inside and outside of schools. Currently in the state, Governor Kitzhaber and Rudy Crew, chief education officer, have challenged Oregon communities to build educational innovations with relentless focus on ambitious learning goals and, in response, ambitious teaching for all learners PK-20.

One area of research that holds promise for fundamental change in the profession comes from Richard Elmore who has designed a technique called “instructional rounds networks”.² Using a medical metaphor, administrators, teachers and teacher-educators engage in a process of learning in, from and about instruction through routines that reflectively share and examine instruction. Michael Fullan of the Ontario Institute for Studies in Education, University of Toronto, wrote of John Robert’s book, *Instructional Rounds in Education (2012)*, “Listen up! Instructional Rounds redefines the teaching profession.” The ideas in this document draw from this and other groundbreaking research on learning and teaching that has generated results that are replicable. Our work also recognizes the expertise of skilled teaching professionals who have asked themselves hard questions and devised remarkable practices. Through this document, the Partnership lays out an argument and plan of work that begins by redefining the teaching of mathematics, elementary through the first two-years of college, in the mid-valley, mid-coast region of Oregon.

Drawing guidance from research over the past 20+ years, we propose to focus the intellectual and professional energies of five school districts (Corvallis, Greater Albany, Lebanon, Philomath, and Lincoln County), the Linn Benton Lincoln Education Service District, Linn-Benton Community College, and the Oregon State University College of Education faculty on the task of improving student performance in mathematics across demographic and socio-economic status (SES) dimensions. We plan to achieve this end by promoting teacher and faculty learning about instruction through the study of our own instruction in the light of research on mathematical teaching practices. We expect to expand this work to science and technology (CTE classes) and to all subjects within three years. Table A presents key descriptive information about the Partnership, outlining central capacities and the scale intended by this work.

Table A: The Mid-Valley-Mid-Coast Regional Partnership

Member	Enrollment/Size	Staff	Schools/Programs	Math/Science
School Districts	25,500	1214 FTE	14 high schools 13 middle schools 38 elementary schools* 25,500 students	120 math teachers 110 science teachers
Linn-Benton Community	6,000	654 FTE full-time faculty	70 majors/programs	44 mathematics instructors

² Elizabeth A. City et al., *Instructional Rounds in Education: A Network Approach to Improving Teaching and Learning* (Cambridge, Mass.: Harvard Education Press, 2009).

College		269 FTE instruction, research, public service staff		41 physical science/chemistry instructors
Linn Benton Lincoln Education Service District	12 component school districts 33,500 students	210 FTE	<ul style="list-style-type: none"> • Cascades Regional Program • Early Intervention/Early Childhood Special Education • Long Term Care and Treatment Education • Special Education and Evaluation Services • Student and Family Support Services • Technology 	
OSU College of Education	270 Graduate 180 Undergraduate	50 FTE Instructional Staff	<ul style="list-style-type: none"> • Science & Mathematics Teacher Education • Free-Choice Learning • English for Speakers of Other Languages • School Counseling • Adult & Higher Education Community College Leadership • Online Education 	12 FTE Science & Mathematics Education

* Some of these schools are K-8

Leadership of the project will come from the following individuals or their designees: a school district superintendent, the OSU Dean of Education, the President of LBCC, and the superintendent of the Linn Benton Lincoln ESD.

Education faculty at both the OSU Corvallis and the OSU Cascades campuses are at work on Chalkboard TeachOregon proposals. There is a natural synergy between that work and the ideas and goals in this document. The two TeachOregon writing teams are in discussion about how to align our work. We are working toward the development of a collective impact on each region, recognizing that the two projects will need to be responsive to regional needs. Jacob Bronowski, writing about the growth of science, observed “culture is the multiplier of ideas.” And so these two regions of the state will learn from each other, enriching the productivity of both.

These innovations are disruptive for at least four reasons. First, they move teaching from a private, one teacher to one classroom model to teaching as a shared practice among professionals. Second, the practices of teaching (questioning, student responses, the amount and content of student and teacher talk, structures for student-student interaction, etc.) become the object of study by professionals with shared responsibility and shared

accountability. Third, the focus is on attention to and analysis of day-to-day expressions of student learning. Finally, the first three disruptions are in support of teacher, administrator and university faculty learning in, from and about teaching.

What we outline here is a focused program that fundamentally changes the way we think about, talk about and practice mathematics teaching from the beginning of a teacher education program, through induction, to experienced teachers. We propose a rigorous examination of teaching practices by linking student internship experiences with professionals from schools, the regional community college and Oregon State University, all studying the close relationship among student, teacher and mathematical subject matter.

Some, perhaps too many, will argue we already know how to teach effectively; we just need to scale it up and take “no excuses” from students. Such was the substance of a New York Times report by David Kirp about schools in Union City, N.J.³ The accomplishments were impressive, but we know very little about what teachers did in the classrooms (“...the schools gradually morphed into a coherent system that marries high expectations with a ‘we can do it’ attitude.”). Instead, we take a more critical stance with respect to our knowledge about teaching as reflected by Michael Goldstein, founder of the Match Teacher Residency at the Sposato Graduate School of Education. He questions the amount of work that has actually been focused on the complex work of teachers.

Michael Goldstein, 2012

Studying Teacher Moves: A practitioner’s take on what is blocking the research teachers need

...Many of us would agree to a very different proposition: We know teacher moves “that work” to some extent, enough to create very large achievement gains, but we don’t know teacher moves well enough to get our college graduation rate near where we’d like it to be. Nor do we know how to help teachers do these moves more efficiently, so that their jobs are sustainable.

Without a massive uptick in our knowledge of teacher moves, we’ll continue on the current reform path. That path is a limited replication of No Excuses schools that rely on a very unusual labor pool (young, often working 60+ hours per week, often from top universities); the creation of many more charters that, on average, aren’t different in performance from district schools; districts adopting “lite” versions of No Excuses models while pruning small numbers of very low performing teachers; and some amount of shift to online learning. ***Peering into that future, I don’t see how we’ll generate a breakthrough*** (<http://matcheducation.org/>).

This document encompasses a sweeping professional development effort to redesign how mathematics is taught, elementary through the first two years of college. The focus of most significant change is in the nature of instructional practices and the school atmosphere about learning and using mathematics. We begin with the professional teacher core in

³ David Kirp, “The Secret to Fixing Schools,” (New York: New York Times, February 9, 2013).

participating school districts and the teacher education program in mathematics education at Oregon State University. We will also design a community-wide effort to emphasize the value of learning and valuing mathematics. Students and parents need to be fully aware and also participants in this significant change in the culture of schooling.

In the U.S., education is thought of as a relatively intuitive process that uses uncomplicated, vaguely meaningful language and few specific skills outside of knowing a body of traditional, discipline-based knowledge. This thinking is common in society across business, community and government leaders, the labor force, university faculty and even the teaching workforce. In our new approach as described in this document, we start with the premise, grounded in research, that *teaching is a discipline* carried out through specific practices that are effective and learnable. Further, there is a professional language associated with the discipline. This language is not the broad, generalized language of “standards”⁴ but a more nuanced and rigorous language that allows professionals to discuss problems of practice and work toward solutions that are shareable across settings. We lay out in this document the rigorous implementation of instruction designed for engaging all students in a classroom in structured academic discourse in mathematics, enabling the expression of the students’ own thinking. The developing expertise of the teacher utilizes expression of student thinking to fashion deep understandings in mathematics across an entire class, not just those few who volunteer to answer questions.

The work outlined in this document is about learning. It is first and foremost about teacher learning at the limits of their abilities. A premise of this work, borrowed from Elmore, is that when teachers learn more, students learn more. This work is *rigorous*, meaning that professionals (teachers, administrators and college and university faculty) explain, debate and critique their work with a precise language that is about specific teaching practices and descriptive of student responses from which close inferences can be made about learning. A task of this project will be to build and refine the professional language to address the goal of increasing instructional expertise validated by student learning. The work is also about fostering learning in groups, in teams and in communities. It is through understanding and cultivating learning among professionals that the efforts started here result in a redefinition of how teachers influence the achievement of students in a school district, allowing it to be replicated across a state. This is not a project limited by a grant timeline or by the lifetime of a fad born by the emergence of a book or charismatic speaker. This work will build capacity in professional communities and develop instructional leaders who will maintain the productive focus of these working groups within their communities so that there is a permanent change in the culture of teaching and learning in mathematics that benefits every student in a school district. This culture of learning through teacher work groups will form the basis for creating student-teacher internships orders of magnitude better than we have had in the past. These groups will also serve to provide a rigorous, focused and supportive induction of new teaching professionals entering the region.

⁴ See the Council of Chief State School Officers’ Interstate Teacher Assessment and Support Consortium – InTASC -- http://www.ccsso.org/Documents/2011/InTASC_Model_Core_Teaching_Standards_2011.pdf

This proposal is the start of a long-term collaboration of PK-20 partners toward high performance schools with the highest quality teachers, high-performing teacher education programs and a richly diverse professional workforce reflecting the demographics of the state. Over the course of this project, we expect to expand this work to all teachers and all subject areas in participating districts as well as to other teacher education programs that choose to participate. The program will be *accountable* to specific outcomes supported by high-quality data. It will be built from a close and enduring *partnership among school districts, LBCC, Linn Benton Lincoln ESD, and OSU*. Tied to this effort will be a *recruitment effort*, beginning at middle school and continuing up to the point of application to a professional teacher education program (PTEP), that will increase the diversity of the teacher workforce. The school-PTEP partnership will create a close *alignment with workforce needs* across districts. This project will be informed by current innovative efforts in teacher education, for example Match Teacher Residency at the Sposato Graduate School of Education⁵, Boston Teacher Residency Program,⁶ and Bank Street College of Education⁷.

The natural connection with the OSU Cascades campus region and ongoing work to align TeachOregon proposals will grow a strategy to bring more Native Americans into teaching. With the growing capacity at the Cascades campus and the development of four-year programs, the coordinated efforts across the OSU system and school partnerships, this project will design new pathways toward success in post-high school education with the capability of completing a professional teacher education program for more students from underrepresented groups.

The partners will work together to meet the common and persistent challenges that have been blocking real improvement. This is possible because there exists a political and professional commitment to forge a new kind of educational experience for all students in Oregon. There is the political and professional will flowing from the Governor's Office through the Oregon Education Investment Board (OEIB) to PK-20 institutions and individual professionals. These familiar, well-worn challenges will be bent to the collective will of the partnership and include: bureaucracy, theory/practice divide, PK-20 instructional conservatism, existing policy and multiple competing initiatives. See Appendix A for an expansion of the principles of this partnership.

⁵ <http://matcheducation.org/mtr>

⁶ <http://www.bostonteacherresidency.org/program/>

⁷ <http://bankstreet.edu/>

Components Leading toward High Student Performance in Mathematics

The following outline presents elements of the project that initially focuses on instructional practices in mathematics, elementary through college, in the mid-Willamette Valley, mid-Coast region. This outline sketches the general form of the work, anticipating the development of a full plan based on the contributions of all the partners having vetted the concepts and committed to the long-term work.

Supporting Mathematics Instruction

- 1) Student learning goals aligned with the Common Core State Standards for Mathematics (CCSSM)
- 2) School-wide programs supporting positive attitudes toward mathematics and its value
- 3) Curricular materials aligned with CCSSM learning goals
- 4) Cadre of instructional coaches attends professional training on coaching and the planned program of high-leverage practices. Coaches are highly qualified, with expertise in mathematical knowledge needed for teaching students across grade bands.
- 5) Instructional coaches across districts and buildings meet in their own professional learning communities to identify, analyze and solve instructional coaching problems and work with teacher leaders and university faculty, building a professional language that allows an increasingly precise description and analysis of teaching and learning toward the improvement of instruction accountable to student achievement.

Work with Teachers and Student Teachers in Math Instruction

- 6) Classroom instruction that provides daily opportunities to learn and to demonstrate learning (see Appendix B)
 - i) Teacher coaching provides feedback on target instructional practice by demonstrating incremental improvement toward goals.
 - ii) Teachers, coaches and university faculty work from images of ambitious teaching found in video records and classroom observations.
 - iii) Teacher workgroups or professional learning communities (PLCs) support the ongoing practice of and inquiry into target instructional practices; the target of inquiry is a tight focus on ambitious teaching – those skills, behaviors and intellectual orientations that produce stunning results with students – where the PLC use the developing professional language to express and modify ideas.
 - iv) Teacher PLCs also examine discipline knowledge that supports ambitious teaching. This is discipline knowledge that expands understanding about student learning and is not simply more sophisticated discipline knowledge for the highest performing students but benefits all students bridging to deeper learning in the discipline.
 - v) Teacher Leaders within each PLC *own* the work of learning from instruction and make sure the PLCs are focused and productive in identifying, analyzing and resolving instructional problems – this is a model for continuous improvement.

Formative Assessments for Sustaining Continuous Growth

- 7) Assessments that are aligned with (i.e., validated with) CCSSM learning goals
 - i) Pre-service & in-service teacher mathematical knowledge for teaching <instrument>
 - ii) Quality of professional development and teacher education <instrument>
 - iii) Discussion & analysis of video records of teaching as formative assessment <resources>
 - iv) Observations of teacher/university work groups as formative assessment <protocols>
 - v) Student performance on Smarter Balance Test sample items (prior to deployment of test), then performance on the Smarter Balance Test itself
 - vi) Student performance on OAKS test until it is dropped
 - vii) Student motivation and engagement valuing mathematics <instrument>

Supportive Environment Inside and Outside the Classroom

- 8) Engage students inside and outside of school in mindful reflection on the purpose of mathematics
- 9) Parent and community reinforcement of learning and attitude goals
 - i) Establishing school-wide support, drawing from the whole community for difficult classrooms or students where teachers can instigate interventions from older students, teachers and parents
 - ii) Parent program in support of high expectations in math performance
 - iii) Counseling faculty (OSU) consult on a school-wide environment for math
 - iv) Counseling faculty (OSU) support a process for lowering math anxiety across the building for students and teachers

Additional Infrastructure for Supporting High-performing Schools

Preparation for Post-High School Education and Career

- Students produce educational plans, starting in middle school, and update them each year.
- Students set goals for career and post-high school education, and students and parents reevaluate these goals each year against their school performance.
- Students plan toward and take at least one college course before finishing high school; some participate in high school – associates degree program.
- LBCC & OSU students meet with high school juniors and seniors each year, anticipating the transition to post-high school.
- Students engage in their own “learning communities,” sharing strategies for how to learn across settings, i.e., large and small classes, during individual study, working in a tutoring session (e.g., with teacher or with peer), using the Internet (e.g., information sources and social networking)

Database Support

Ideal: Track from pre-college through college to licensure to first job to student performance to career trajectory of mathematics teachers

Readily accessible, high-quality, educational data:

- Data-driven business and programmatic decisions
- Ongoing formative evaluation

Questions to Faculty/Staff:

- What data do we need?
- What data would make the most difference?

Increasing Data Quality:

- Coding methods
- Procedures that reduce errors
- Data system

Tracking Student Performance

Included in assessment (beyond graduation rates and test scores): early college credit, enrollment in career pathway programs, disaggregated tracking of student progress into:

- community college
- Four-year college/universities
- Technical/business/community internships
- Skilled trades
- Armed Services

Data on Instruction, Teacher and ESOL

- Track quality of instruction (using nationally validated, both quantitative and qualitative, instruments) in mathematics with intention to scale up;
- Increases in ESOL-endorsed teachers (OSU and school district)
- Achievement gap is positively influenced by addressing latent inequalities in instruction for English Language Learners. OSU is seeking funding for the creation of the *Oregon English Language Learner Leadership Network*, a partnership between researchers and selected districts to improve outcomes for ELLs.

Proposed Comprehensive Career Pathway

Teacher Recruiting through Professional Development and Advancement

Beginning in middle school, the project creates career awareness of STEM degrees and STEM teaching broadly construed. Particular focus will be on attracting and encouraging students from underrepresented groups. Interested students complete recognized Cadet experiences, qualifying them for Candidate status when they apply to a Professional Teacher Education Program (PTEP). Candidate status is recognition of completing valued early teaching and learning experiences, creating a “preferred status” when applying for PTEP.

With cooperation with OEIB and Oregon’s Teachers Standards and Practices Commission, “instructional assistants” or “paraprofessionals” acquire an “Instructor License,” allowing them to work in classrooms. This becomes an additional pathway for minorities to gain “preferred status” for entering a PTEP. PTEPs work with foundations to offer scholarships for minorities who prepare for teaching through this pathway.

“Apprentices” come from Candidates who have advanced to Student Teaching level. Some Apprentices can be judged sufficiently skilled to become “Residents,” paid assistants in the classroom. This provides another mechanism for monetary support on the path toward becoming a highly qualified teacher. This can be coupled with a professional development program for those Cooperating Teachers (CT) who have Residents, where both the CT and Resident work together with PTEP faculty and PLCs on key teaching skills.

With cooperation with OEIB and TSPC, teachers judged to be exceptional by a joint group of administrators, teachers, university faculty and association representatives may apply for a Teacher Leader License. This qualifies them for a new position in leading PLCs.

Theory of Change

IF

- Teachers, administrators and college and university faculty engage in professional learning communities as *learners*; and
- Teachers, administrators and college and university faculty make a commitment to long-term professional development and learning; and
- Teachers are supported by a curriculum supporting CCSSM and are protected from competing district-level initiatives; and
- Teachers develop and deploy skills in fostering students' mathematical discourse, pressing students to construct mathematical generalizations and justifications and cultivating students' capacities to express, process and reflect on their own thinking and the thinking of others; and
- Teachers present students with high-quality, cognitively demanding tasks across STEM classes that involve problems students find meaningful; and
- The school and community support an atmosphere projecting the importance and value of mathematical learning;

THEN

- Students representing all demographic categories will construct mathematical generalizations and justification as they develop quantitative reasoning to make sense of STEM-related, real world problems; and
- These students will be able to communicate mathematical reasoning in a variety of STEM-related contexts (e.g., individually, whole group, small group, out of school), reflect on their learning and understand the import of their ideas; and
- These students will perform as proficient on the new world-class, Smarter Balance tests; and
- These students will have developed a healthy relationship with and respect for mathematical knowledge supporting rewarding careers and productive lives.

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Appendix A

Principles Defining the *Mid-Valley-Mid-Coast Partnership*

PREAMBLE (draft)

MVMCP is one starting point for a major reexamination of education in Oregon in order to address long-standing problems. MVMCP, in concert with the Governor's Agenda, is about directly confronting issues that have foiled reform efforts over decades and have brought us to the point we are now – funding sources are not buying the repetitive churn of practices and worn out language that mask the reality that little change is taking place (Rudy Crew, Linus Pauling Middle School, November 30, 2012).

The nature of successful work will look different from what has gone before. At this point, we cannot be sure what characteristics will prove successful, but we can be sure that, if our reform efforts do not disrupt the current course of our collective effort and discourse, we will fail again.

What follows is a start at identifying candidate characteristics for significant change, culled from experienced observation of school reform by teachers, administrators, authors, state leaders and university faculty. Each category points to potential changes in the way that professional development has been done in the past.

Collegiality & the Individual

Partnership and collaboration inside and outside the classroom are part of the core commitment for change. The focus is on bringing school district professionals in partnership with university faculty and programs because it seems clear we are not able to fashion a new order separately. This principle applies to the internal efforts of institutions as well as to the efforts among institutions. But just as “putting students in groups” does not guarantee innovative outcomes, putting professionals into groups runs the risk of a “contrived collegiality” (Fullan & Hargraves, 1996) that can inhibit innovation and growth. A long-standing finding in psychology is that groups are more vulnerable to faddism than individuals. **A characteristic of MVMCP collaborations will be acceptance of risk-taking among diverse professionals, leading to a substantive dialogue using language that has operational meaning to all parties.**

Innovation requires individuals thinking and reflecting alone. While a characteristic of collaboration will make teaching practices more public, individual K12 teachers and university faculty will need time to personally reflect on and critique the collective work. Most attempts at reform fail because individual teachers and instructors do not adopt new ideas to change instruction in substantive ways. Reforms typically take the form, outside the classroom, of structural solutions such as aligning curriculum and changing or increasing assessment and testing. **Reformers are late to realize that the burden of reform has always rested on the shoulders of individual teachers and faculty inside the classroom.** In the end, many reform strategies “not only fail to motivate teachers to implement improvements but also alienate them further from participating in reform” (Fullan & Hargraves, 1996, p. 13). This point applies equally to university faculty. Each

individual involved in the work will reach his or her own conclusions about the efficacy of the collective effort. **It is the responsibility of each professional to find his or her voice and assert his or her point of view for the benefit of the group, be it for or against the anticipated course of action.**

Curriculum & Instruction

Any attention to curriculum automatically means addressing instruction. These are two sides of the same coin. For example, efforts to “align” current curriculum with new reform guidelines means critically examining instruction and teaching practices that are required to teach to the curriculum and achieve curricular goals. If a university teacher education program revises courses to include new research guidelines on classroom instruction, then this automatically brings university instruction into critical relief. Curricular and assessment objectives are achievable only if instruction makes them so.

Research & Practice

Professionals have well-developed knowledge about the panoply of situations that they must confront on a daily basis to make the current system work. **The real-time, discretionary, decision-making based on accumulated skill and expertise in the dynamic circumstances of instruction virtually defines educator professionalism** (Fullan & Hargraves, 1996). But change is driven by research. Research may take the form of empirical results, such as data demonstrating an “achievement gap,” or research may take the form of carefully orchestrated and observed work in a school or district. All forms of credible research will be published in peer-reviewed journals. Pursuing and administering reform is a collaborative effort among administrators, teachers and university faculty. **It is essential to respect and build on professional knowledge, while the research driving reform requires critical reflection on current practices in ways that open thinking to significantly different and potentially better forms of instruction.**

Appendix B

Oregon State University Secondary Science and Mathematics Education Teachers Learning Practice Project Principles, Practices, and Instructional Activities for Ambitious Teaching

High-Leverage Practices of Ambitious Teaching	Ambitious Principles of High Quality Instruction	Secondary Science & Mathematics Instructional Activities	Cycles of Enactment
<p>Novice teachers develop repertoires of skilled practice through cycles of investigation and enactment.</p> <ol style="list-style-type: none"> 1. Teaching toward a clear learning goal 2. Representing student reasoning 3. Constructing and organizing public records 4. Eliciting and responding to student reasoning 5. Orienting students to one another and to the discipline 6. Making sense of students' reasoning to inform instruction 7. Positioning students as competent 8. Developing and maintaining a productive learning environment 9. Managing time and pacing 10. Using body and voice effectively <p>Strategies (used across practices)</p> <ol style="list-style-type: none"> 1. Using discourse moves in whole class and small group settings 2. Using appropriate questioning <p>© 2013 Oregon State University</p>	<p>Principles guide teachers' use of high-leverage teaching practices.</p> <ul style="list-style-type: none"> • Teachers must design instruction for all children to do rigorous academic work in school and to have equitable access to learning. • Teachers must have clear learning goals to enact <i>Ambitious Instruction</i>. • Teachers must know and connect with their students as individuals and as sense makers. • Teachers must treat children as sense makers. • Teachers' quality of instruction is measured by student learning. • Teachers must represent the nature of the discipline (mathematics or science) with integrity. • Teachers engage their students in reflecting on their own learning. • Teachers must be responsive to the requirements of the school and community environments at the same time considering how schools function and how they may need to improve. 	<p>Instructional activities are structured and bounded discipline-specific routines built around the work of teaching mathematics and science. Teacher candidates develop skill with these routines through supported cycles of investigation and enactment.</p> <p>Instructional Activities</p> <p><u>Mathematics:</u></p> <ul style="list-style-type: none"> • Facilitating explanations of a procedure using tasks • Facilitating an explanation of a concept using a representation or task • Developing explanations in response to common errors <p><u>Science:</u></p> <ul style="list-style-type: none"> • Constructing big ideas • Eliciting student ideas to adapt instruction • Making sense of material activity • Pressing students for evidence-based explanations <p>adapted from Kazemi, Franke, & Lampert, 2009; LTP project; Windschitl, tools 4teaching</p>	<p>Supporting secondary teacher candidates to learn practice is accomplished through repeated <i>Cycles of Enactment</i>, which focus on <i>Core Instructional Activities</i>. These cycles involve investigating practice, developing instructional skills and reflecting on practice.</p> <ol style="list-style-type: none"> 1. Analyze the instructional activity (decompose, analyze & discuss) 2. Plan components of the instructional activity (using protocols & feedback) 3. Rehearse with peers (coach, analyze, discuss & reflect) 4. Rehearse in 6-12th grade classroom – small or whole group (coach, analyze, discuss & reflect) 5. Video Group Professional Learning on rehearsals (analyze, discuss & reflect)

For more information visit: <http://education.oregonstate.edu/secondary-science-and-mathematics-teachers-learning-practice>