Connected Lane Ignite

Professional Learning 2014

LANE ESD

UNIVERSITY OF OREGON

Contents

1 General organization of the model

1.1 Connecting content-based training to classroom through handoffs

Connected Lane Ignite Professional Learning will proceed from content-focussed to classroom-focussed professional development through handoffs. The content-based training will be primarily supported by the University of Oregon Department of Mathematics and Lane ESD under the umbrella of Connected Lane County. The instructional programming will rely on existing and new networks, some facilitated by Lane ESD and/or the University of Oregon and some located in districts. Some rationale are as follows.

- Alignment to the Common Core State Standards in Mathematics (CCSSM) will require new content knowledge for all teachers, in a variety of ways. Student proficiency around the meaning of mathematical concepts is being assessed for the first time, so those meanings need to be attended to in professional learning. The coherence of mathematics is to be emphasized, so while researchers have recognized the need for such horizontal content knowledge [1], its development is all the more critical in light of the Common Core. Indeed, having a Common Core, as elaborated through its Progressions Documents [3] supports teachers in developing all aspects of their Mathematical Knowledge for Teaching [8, 6, 2, 1].

- Standards-based educational design affords an opportunity to share content materials and training, while recognizing the wide variety of instructional approaches which can meet the proficiency aims which common standards set forth. The handoffs model from content-focussed to instructionally-focussed professional learning takes advantage of opportunities for coordination while allowing for diversity of approaches to instruction.

- The education literature bears out need for sustained professional learning efforts [4, 5]. While the transition to CCSS is a unique moment where "parachute" programs could have significant value, the impact will be greatly amplified by connecting with existent or new learning networks.

- The University of Oregon Department of Mathematics has special content expertise, in particular deep understanding of new vision for proficiency (see Section D). Their outreach team has been developing a framework around Meaning, Method and Mastery [7] which makes the impending shifts in K-12 mathematics understandable for teachers. The department has made a commitment to provide this expertise at no cost to local districts for three years.

- Lane ESD has existing strong coaching relationships throughout the county. In its coaching relationships, it will have the flexibility to blend the content and instructional sides.

1.2 Base and optional programming

There will be a base model for programming, with additional options available depending on the level of individual district commitment. The base programming will be based on modules which will be given at Lane ESD or at other sites. Each module will have two hours of content programming along with instructional follow-up as handoff material, which can be used in a variety of ways by learning communities, coaches, principals, etc. Additional programming will also be designed around content -based programming handing off to instructionally focussed programming.

- By developing common base program modules, we are able to be cost effective in delivering high-quality training. By providing instructional follow-up we promote sustained learning and classroom transfer.
- The base programming can be given repeatedly both at Lane ESD and at other sites. It can also be captured on the web, so that teachers could go back to their buildings and share with their colleagues or can view before attending a subsequent module.
- Programming can be customized to meet the needs of districts which are more thoroughly committed. The base modules are constructed so that examples can be drawn from curricula which are already in use. Optional programming is entirely custom.
- Modification and supplementation of the base programming to account for considerations for Special Education and ELL is a strong possibility for optional programming. UO Math already has relationships with special education math curriculum developers in the University's Center for Teaching and Learning.

1.3 Base programming design considerations

The base programming during the academic year will build on modules, with 3 or 4 such at each grade band (K-5, 6-8, HS). Summer programming will be centered around multi-day trainings. While the summer training will be organized around deeper content learning, the learning during the year will be organized around questions which teachers are facing in their classrooms. The first module will be an introduction/ overview, while the additional modules will focus on formative assessment, priorities, and task analysis and adaption. Addressing these topics quickly leads to investigating the Common Core progressions, high-quality curricular materials and their classroom purposes, engagement of the Mathematical Practices, and a closer look at the Smarter Balanced assessments, among other content-focussed topics. Instructional follow-up activities will be provided so that teachers could along with their networks (or individually) build on training to transfer to their classrooms.

Drawing on our content expertise, we organize content in the trainings using a framework of Meaning, Method and Mastery. Rather than trying to read the Common Core Standards line-by-line with teachers, we look at curricular materials and discuss how they engage the learning of meaning in ways not done previously or look at assessments to see how mastery engages both meaning and method. The trainings will be organized around activities for teachers.

All modules will be given at least once at Lane ESD. Time permitting, the overview module will be delivered at a wide array of sites, as a way to reach out to the broader teacher community and establish face-to-face relationships. Other modules might also be delivered at sites where teachers from multiple buildings gather. Modules will be video recorded, and training resources shared on the web, so that teachers and trainers can use them freely. This content-focussed training will be delivered by Tricia Bevans from UO Math, who is developing the material in consultation with Dev Sinha from UO Math. Bevans could do up to two trainings per week for the months of January-May, for a total of forty, which would then reach roughly 200-400 teachers. Trainings will also be incorporated into coaching by Bob Curtis from Lane ESD, whose existing coaching relationships are extensive. If there is further demand, trainers may be developed from the ranks of UO and LCC instructors, especially those who teach courses for

preservice teachers and thus are already becoming familiar with the Common Core.

The base content programming will "hand-off" to the variety of existing teacher learning networks which exist across Lane County. Faculty from the University of Oregon College of Education will be engaged to develop classroom-focussed follow-up activities related to the content-focussed modules. High-quality practitioner blogs can also be used for starting points. These activities could be used by teacher coaches, principals or simply groups of teachers studying on their own. For example, activities around questioning strategies in the classroom could follow up the module about formative assessment. Participants will be surveyed how they are following up on the programming, with the possibility of monitoring follow-up activities and rewarding teachers with some small acknowledgement. A web forum will be made available to serve as a learning community for teachers, especially those not already active in a professional learning community.

1.4 Optional programming hypothetical models

The base programming should promote significant progress for teachers in the understanding they need to implement the Common Core. Some districts, buildings or other networks may be ready for even more significant work. Depending on demand, Connected Lane Ignite can meet the additional attention and resources districts provide with additional custom programming. There is a range of possibilities, which we elaborate through fictional cases. (Resemblances with reality entirely intentional).

District A has TOSA's as coaches along with a mentor network. They commit to having both TOSA's and mentors following up as part of the handoff model. These teacher leaders get to have a special follow-up question-and-answer session after one of the trainings which occurred at their building, so they can more confidently answer questions which come up in coaching and mentoring.

Building B has a successful lesson study group. They have all of their teachers either come to Lane ESD for the introductory module or watch it online and discuss it with their colleagues. They focus their lesson study on formative assessment, and then have the module on formative assessment delivered at their building, with time built in to address content-related questions which have come up in their study group.

District C relies heavily on principals as instructional coaches. They commit to attending the trainings along with teachers. And they receive a special training, including a chance to look at resources to structure classroom visits to attend to the Mathematical Practices, as well as some time to discuss questions which come up from parents.

District D is small and remote, so its teachers engage in the programming mostly remotely. It arranges for Lane ESD to provide a greater amount of follow-up in-person coaching.

Buildings E, F and G serve similar students, have very active parent communities, and have teachers and principals who are ready to work together. They coordinate their follow-up learning and together (rotating) host the additional modules between the three sites. Their teachers follow up by implementing some lessons from suggested resources and sharing those experiences. Connected Lane Ignite provides an expert to meet with parents and answer questions about the

shifts and the rationale for them, allowing teachers to focus more on student learning.

District H has focussed more on literacy for the past decade, and now wants to devote all of its attention and resources to math. In addition to hosting the content programming, it hires instructional coaches from the Center for Teaching and Learning to follow up with it teachers. It also uses funds it has on hand to hire Connected Lane Ignite content expertise in helping to choose new curricula, eventually settling with EngageNY through middle school and then the Utah integrated curriculum at high-school, and to design trainings for implementing these curricula which borrow heavily from existing support materials.

District I already has made curricular adoptions which could support Common Core implementation. They work with Connected Lane Ignite planners to tailor programming, so that in particular all of the examples are drawn from its curriculum. In this process, instructional hand-off materials are also worked on to be more seamless.

In scenario J, teachers who have previously attended Lane Ignite workshops form the core of a group of teachers who gather regularly to talk about classroom practice as it relates to the new programming. A local restaurant chain is approached and donates meeting space and food for those attending.

2 Base programming modules

2.1 Summary

Our first training will deepen understanding of the structure and demands of the Common Core State Standards in Mathematics. We will modify the discussion as needed to be specific to the content at each grade band. The introductory training will be appropriate for administrators and policy makers as well as teachers. We'll organize around the concepts of Meaning, Method and Mastery (M^3). Using these for example one can more clearly see the three main shifts in the CCSSM, namely Focus, Coherence, and Rigor.

This framework will serve as a vehicle for participants to understand how to analyze their current practices and curricular materials for alignment and make appropriate transitions. To this end, we'll address how the M^3 framework informs following areas: 1) Prioritizing, 2) Formative Assessment, and 3) Use of Curricular materials. These will become the basis for two or three follow-up trainings. Throughout, participants will work from high-quality resources in order to increase their understanding of the CCSSM as well as enhance their ability to recognize such resources.

2.2 Outcomes

Participants will be able to

- Use Meaning, Method and Mastery as a way to understand the demands of the CCSSM and to organize discussions of mathematical proficiency more generally.
- Identify tasks which promote meaning and/or method and/or mastery.

- Identify Major vs. Supporting vs. Additional clusters in the CCSSM documents, and understand the consequences for those levels of emphasis on how the material should arise.
- Identify "Pinnacle" clusters from among the Major clusters at a given grade level to inform focus needed, especially in transition.
- Begin to apply knowledge of priorities and of Meaning, Method and Master to 1) Formatively assess student understanding, 2) prioritize concepts for appropriate pacing, and 3) Better use current materials to support alignment with CCSSM content and mathematical practice standards.

2.3 Module Outlines

2.3.1 Introduction to Meaning, Method and Mastery (M^3).

Key Concepts

- Mastery requires both meaning and method. This relates the major shift to rigor in the CCSSM, promoting conceptual understanding, procedural fluency, application.
- The three aspects of M^3 support each other. Mastery of a concept at one level can serve either meaning or method later. This dovetailing works because of the *coherence* in the standards.
- Effective student progression through this spectrum requires rich content as well as instruction which attends to the Standards for Mathematical Practice.

Possible Activities:

- Look at several tasks in a cluster (grade band specific) and identify which require a student to demonstrate understanding at each level of M^3.

  Place Value examples for Grades K-5:

  1. Here's a worksheet that claims to be"Common Core Aligned" but is method without connection to meaning: Writing Standard Form
  2. Here is a task that helps students understand the meaning of place value representation: Bundling and Unbundling
  3. Here is a task that allows students to apply meaning and method for mastery: Counting Stamps
  4. Mastery in place value is demonstrated by application to addition with regrouping here: Saving Money 1

  Ratio and Proportional Reasoning Examples for Grades 6-8:

  1. Tasks focused on method of "solving proportions": Ratios
  2. A task focused on the meaning of proportions: Running at a Constant Speed
  3. A task that demonstrates mastery of a topic: 7th Grade SBAC Performance Task

Functions Examples For HS:

1. Here's a task that gets at the meaning of functions and their graphs Bike Race
2. This task is focused on the methods of graphing and evaluating a piecewise-defined function: Piecewise-Defined Functions
3. This task asks students to apply functions to demonstrate mastery Javert's Fall

- Discuss what types of tasks and teacher behaviors can encourage or discourage a student from progressing from meaning through mastery.
- Watch classroom video(s) for development of M^3 and discuss. Pay special attention to how the *content* of the lesson informs the teacher moves and either encourages or discourages both conceptual understanding–the Meaning– and engagement in the Standards for Mathematical Practice.

  1. Here's a lesson that gets at the meaning of place value: Shoe Box Place Value
  2. Here's a lesson that focuses almost entirely on method: Butterfly fraction addition
  3. Here's a lesson that aims to promote mastery through application, though we can also find ways in which the teacher could demand more on the mathematical side: Trig in Flight

- Discuss how M^3 ties in to the Math Practice Standards.

2.3.2 M^3 and Prioritizing

Key Concepts:

- CCSSM has a greater degree of focus than previous standards. This is clear through direct counting of topics in lower grades. In high-school, standards overlap so careful reading is required to see focus.
- Understand the CCSSM using clusters as well as individual standards.
- Progressions Documents can assist in understanding the major focus for a grade level and connections between concepts
- Some of the major clusters represent the major focus for a grade level, we'll call them "pinnacle" clusters. They should be addressed through a full M^3 development.
- Cover Supporting and Additional Clusters for Meaning, and continue to Method and Mastery as time allows. These clusters are likely to be served by Method in Pinnacle Clusters. Give preference for tasks that reinforce more than one major cluster or a "pinnacle" cluster.

Possible Activities:

- Look at the standards for your grade level (including the Progressions documents). What do you see as the major work of the grade? Then look at curricular resources and Smarter Balanced assessments to see how that major work is manifest.

- Introduce Achieve the Core document on Major/Supporting/Additional Clusters. Discuss: How well do these line up with your understanding of priorities? How could such a document inform how you teach?
- What connections between topics at your grade level further enhance the focus of the standards? What tasks could serve those connections?

    1. K-5: teachers might notice that a major cluster 2.MD.B relates length to addition and subtraction (2.OA.B) which is another major cluster.
    2. 6-8: 6th grade teachers could note that linear equations and proportional relationships reinforce one another
    3. HS: Connections here will depend on the model for dividing the concepts into courses.

2.3.3 M^3 and Formative Assessment

Key Concepts

- Formative Assessment is critical for determining what content needs to be covered and how it should be addressed.
- Accurate understanding of the mathematical content in a CCSSM cluster/standard is essential to proper assessment.
- Choosing appropriate tasks can assess different aspects of the M^3 spectrum.
- You may need to use tasks from other grade bands or adapt tasks at your grade level.
- One can usually assess and build prior content understanding at the same time as working on Meaning and Method of current content.

Possible Activities

1. For a major cluster at your grade band, examine the standards to identify which standards focus on each level of the M^3 spectrum (perhaps using a set of cards and sorting them into the three groups on the table?)
2. For a standard relating to method, determine where the meaning and mastery of the concept appear (you may need to look to a grade above or below yours)

2.3.4 M^3 and Task Analysis

Key Concepts:

- Understand what aspects of M^3 a task is intended to serve.
- Look at units of curricula to see whether full spectrum of M^3 is addressed for pinnacle clusters, paying special attention to the "Meaning" level which is often neglected.
- If need be, understand how to find supplementary tasks or modify current ones to promote aspects - usually Meaning and Mastery - which are lacking.

Possible Activities

- Show an example of modifying a task into one that demonstrates a different level of M^3 spectrum

  1. K-5: Here the teacher changes the directions slightly.Modifying a subtraction worksheet
  2. 6-8: Adapting the solution method might be appropriate to correctly align a task. Here the task is to solve the equations representing proportional relationships. At the 6th grade level, this is not an aligned solution method. Adapting this might include relating this to finding equivalent fractions or using a table or graph to find the missing values.
  3. HS: Teachers can remove supporting structure to allow students to engage in more problem-solving. Dan Meyer Ted Talk Slope Example (begin video at 4:32, end at 6:30)

3 Online resources

- Standards Documents
  - Common Core State Standards (standards in outline form):
    `http://www.corestandards.org/Math`
  - Common Core Progressions Documents (standards in narrative form):
    `http://ime.math.arizona.edu/progressions/`
- Openly Available Curricular Resources:
  - Illustrative Mathematics:
    `http://www.illustrativemathematics.org`
    Primarily a task bank aimed at illustrating the standards. Tasks provide commentary for teachers to help them determine the context and purpose of a task as well as potential student errors etc. as well as solution paths appropriate the common core level of the task. Illustrative math also hosts weekly "Task Talks" on Adobe Connect which feature discussion around a spotlighted problem. Find details on the Illustrative Math Google+ page.
  - Dan Meyer 3-Act Math:

    `https://docs.google.com/spreadsheet/pub?key=0AjIqyKM9d7ZYdEhtR3BJMmdBWnM2YWxWYVM1UWow`
    `html`
    Full lesson plans for 6-8 and HS levels available to download for free.
  - Mathalicious:
    `http://www.mathalicious.com`
    Engaging full lesson plans mostly for grades 5-12. Sample lessons are available without a subscription and subscription rates are somewhat negotiable.
- Openly Available Full Curricula:

  - Mathematics Vision Project:
    http://www.mathematicsvisionproject.org/
    openly available curriculum offered by the state of Utah. Seems to be just H.S level, where it offers an integrated approach.
  - EngageNY:
    http://www.engageny.org/mathematics
    Openly available, downloadable, common-core aligned curriculum High school is Algebra 1-Geometry-Algebra2 based rather than integrated. Pages may be easier to access at this site: http://pages.uoregon.edu/dps/engageny/

- Assessment
  - Smarter Balanced sample tests
    : https://sbacpt.tds.airast.org/student/
  - PARCC sample items:
    http://www.parcconline.org/samples/math

- Blogs
  - Common Core Tools:
    http://commoncoretools.me
    A blog focussed on tools for implementation maintained by William McCallum, a lead writer of the CCSSM.
  - Dan Meyer:
    http://blog.mrmeyer.com/?p=10285
    A blog at the HS level which is a particularly good resource for problem-based learning.
  - Emergent Math:
    http://emergentmath.com
    Another problem/inquiry-based resource for the HS level.
  - Fawn Nguyen:
    http://fawnnguyen.com
    A frank and funny blog by a teacher at the middle school level.
  - Math Coach's Corner:
    http://mathcoachscorner.blogspot.com
    A blog aimed at K-5 math, full of "freebies."

4 Budget - Outline of Expenses

Line Item	Cost to Districts
UO Mathematics Content Expert Time, AY (0.4 + 0.1 FTE)	0
UO Mathematics Content Expert Time, Summer	5,000
Presenter Mileage Reimbursement	600
Lane ESD Classroom Expert Time (0.7 FTE)	0
Additional UO or LCC Content Expert Delivery (up to 0.5 FTE)	0 - 30,000
Development of Instructionally-Focussed Follow-up Materials for Base Programming	6,000
Development of additional programming focused on Special Education and/or ELL	5,000
Total	16,600 -47,6000

A Mission, Vision, Values and Priorities

Mission - To promote deeper understanding of mathematics and mathematics education on the part of teachers and the broader community concerned with K-12 education.

Vision - A world in which all children, especially those in Lane County, have access to high-quality mathematics education.

Basic Values - We value **quality** in a combination of mathematics and pedagogy, in all aspects of education including instruction, curricula and assessment. To achieve this quality, we value **open, honest, welcoming discussion** between people with a range of **expertise** in content and pedagogy.

Additional Values and Priorities -

- We value learning which promotes **creativity and freedom of thought** which is responsive to validity and usefulness. We maintain the importance of this value to both childrens learning and to professional learning.
- We value **depth, sustainability and scope**, in that order, in our training efforts.
- We deeply value our **partnerships**, which are essential to success in any of our efforts. We believe that by sharing and identifying nationally-recognized best resources, we can achieve the kind of quality maintained by the national professional communities in which we are grounded.
- We recognize the unique opportunities afforded by the transition to the **Common Core State Standards in Mathematics**. This transition means greater opportunity and value for even one-time, introductory programming.
- We prioritize efforts which are **well-integrated into ongoing work**. We look for partnerships which bring in classroom expertise and help us reach out to the teaching community. Lane ESD is our most natural partner, given our similar interests and desired scope. We will also work directly with districts, with the University of Oregon College of Education, with parent groups and others.
- We will engage in policy discussion to the extent of communicating an understanding of quality in mathematics education, as well as the need for focus and resources to achieve such quality.
- We will progress from being more introductory to looking for opportunities for deeper, sustained engagement. We must be increasingly cognizant about funding moving forward.

B Ongoing and Past Activities

- Ongoing discussion between content experts and district leaders, roughly once per month since May of 2012. A main focus is programming. Also discuss resources (Illustrative Math, EngageNY, MARS, Mathalicious, Dan Meyer), teacher concerns and our responses to them, changes happening at the state level, etc.

- Summer training, 2012. Three-days, spread over the summer, serving all grades K-12 at once. Included instructors, graduate students and undergraduates from UO in order to facilitate table-level discussion. Covered a broad array of topics. Served roughly 70 teachers.
- Training on Fractions Progression, December 2012. Used Illustrative Mathematics videos and other materials. Served roughly 30 teachers.
- Summer training, 2013. Three days each in four grade bands, with overlap of programming. Over 100 teachers served, with Bevans, Sinha and Paules co-facilitating. Focussed on one progression at each grade band (except high-school). Comments included All teachers in Lane County should be required to come to this.
- Lane ESD support for Local Performance Assessment and Essential Skills, ongoing.

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D Core personnel bios

Tricia Bevans is the K-12 Outreach Specialist at the University of Oregon Department of Mathematics. She was the primary facilitator of the Lane Ignite Summer Workshop at the K-2 and 3-5 grade bands, designing and delivering programming around the Numbers and Operations in Base Ten and Fractions Progressions. At the University, her primary focus is preservice teacher education. She has done extensive tutoring at the K-12 level and has four children,

three of which are in the public schools here in Eugene. She worked extensively for the Center for Educational Policy Research on the Standards For Success project which aimed to align High School standards with college level expectations for incoming freshman. Tricia has B.S. and Masters degrees in Mathematics from the University of Oregon.

Bob Curtis is a Curriculum Specialist at Lane ESD specializing in science and mathematics K -12. Bob works with all sixteen districts in Lane County coordinating professional development, grants, and Oregon Department of Education compliance. Prior to working at the ESD, he taught junior high and middle school science, math and TAG in Roseburg and Springfield and coordinated a watershed grant for Springfield Public Schools. Bob has a B.S. in General Science from the University of Oregon and a M.S. in Science Education from Oregon State University.

Dev Sinha is an Associate Professor of Mathematics at the University of Oregon. He is an Item Reviewer for the Smarter Balanced Assessment Consortium, working regularly with the consortium's math lead. He is a member of Oregon's State Leadership Team, supporting teachers as they help build the Digital Library of formative tools. He represented Oregon in the process of drafting Achievement Level Descriptors for Smarter Balanced's summative math assessments, at all grade levels. He is a Content Leader at Illustrative Mathematics, working directly with Bill McCallum, one of the three lead writers of the CCSSM. Through Connected Lane Ignite, over the past eighteen months he has worked with around 200 local teachers, promoting the content knowledge needed for Common Core implementation. His work in mathematics is internationally recognized and supported by the National Science Foundation. He earned his B.S. in Mathematics at the Massachusetts Institute of Technology, graduating Phi Beta Kappa, and his Ph.D. in Mathematics from Stanford University.