

Designing Professional Development

Workshop Outline

- What are your priorities for professional development in mathematics?
- What is the purpose of PD in mathematics?
- What are the characteristics of effective PD?
- What effective models of PD are there?
- What are the strengths and weaknesses of the different models of effective PD?

What are your priorities for PD in math?

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You have a set of cards containing possible topics for a professional development course.

- Organize the cards into two groups:
 - Most important for PD right now
 - Not a priority for PD right now
- If you think any important topics are missing, then add these using blank cards.
- Select **two topics of highest priority** and be prepared to justify why these are highest priority to the whole group.

Adapting lessons to students' individual learning needs.	Developing norms and routines for classroom discourse and work.
Setting long- and short-term learning goals for students.	Designing single lessons and sequences of lessons.
Learning how to teach mathematical modeling.	Designing effective mathematical tasks for students
Learning about the progression of a topic in a commonly used textbook.	Working with parents.
Current changes in the curriculum.	Understanding how math is used in the world around us.
How to lead whole-class discussions.	Eliciting and interpreting students' reasoning.
Understanding and using formative assessment.	Learning how to teach a difficult concept.
Assessing student progress.	Building respectful relationships with students.
Assessing student progress. Specifying and reinforcing productive student behavior.	Building respectful relationships with students. Asking questions that promote students' reasoning

What is the purpose of PD in mathematics?

What is the purpose and content of PD?



- Curriculum: Goals for learning; organizing learning sequences; making connections between topics; recognizing progress.
- **Students**: Understanding how students learn math and common obstacles to learning (e.g. 'misconceptions').
- Teaching: Recognizing what effective teaching looks like, and designing, selecting and sequencing tasks and activities that further the content and process goals.

A Framework for Teaching Mathematics

- Knowing school mathematics in depth and breadth
- Knowing students as thinkers
- Knowing students as learners
- Crafting and managing learning environments
- Developing classroom norms and supporting classroom discourse as part of "teaching for understanding"
- Building relationships that support learning
- Reflecting on one's practice

(Schoenfeld and Kilpatrick, 2008)

Practices, Learning Outcomes, Beliefs



The ideal PD experience – by teachers:

Relevant

"I can use the materials in my class now."

Sustained over time

"PD needs to be something you work on for a semester or a year."

Delivered by someone who understands my experience

Presenter explains how materials have helped to enhance her teaching practice and student learning.

"Fellow teacher in the classroom is best."

Interactive

"Hands-on strategies for us to participate in"

Treats us as professionals

"We are treated as adults rather than children."

What are the characteristics of effective PD?

Characteristics of Effective PD

- Experiential stimulating and drawing on teachers' own experiences as reflective practitioners.
- **Sustained** involving cycles of planning, predicting, enacting, and reflecting.
- Collaborative involving networks of teachers and administrators.
- Informed by outside expertise and research.
- Focused attentive to the development of the mathematics itself.

(Guskey, 2002; Joubert and Sutherland, 2009; Villegas-Reimers, 2003; and many others...)

What effective models for PD are there?

Different models of PD

1. Training models

Transmission of information by an 'expert'

2. Coaching models

Coach and teacher work together one-on-one.

3. Workshop courses

Courses mediated by a provider, that offer teachers opportunities to explore ideas in their own classrooms and report back.

4. Professional learning communities

Teachers take over responsibility for setting their own research goals and collaboratively and systematically study them in their own classrooms.

The Coaching Model



Example of Coaching



Back to different models of PD.

Go to strengths and weaknesses.

Video extract from 'Divergent Questioning in 8th Grade Math' from TeachingChannel - https://www.teachingchannel.org/videos/orofessional-development-teacher-evaluation

Workshop courses

- Coherent, linked series of experiences.
- Mediated by an experienced teacher leader.
- Elicits theory and design principles, not just activities.
- Uses research-based resources (videos, lesson plans)
- Offers opportunities for teachers to try out ideas in the classroom and report back.
- At least two from each school participate so that discussion is fostered between sessions.
- Expectation that teachers will share their learning with others in their own school through replicating the experiences ("The Cascade Model")

A cycle of PD processes

Reflect on and value

Teachers' evolving values, beliefs and practices and the reasons for them.

Enact and take risks

Challenge teachers to act in new ways, 'as if they believed differently'.

Offer mentor and a network of support as they do this.

Contrast and challenge

Illustrate contrasting practices by working on tasks and observing them in classrooms or on video.

Where are teachers starting from?

- Teachers reflect on their beliefs and practices.
- They discuss the obstacles that often prevent them from working in the ways they would wish.

Mathematics is best learned through practice.	Mathematics is best learned through discussion.
Learners learn mathematics	Learners learn mathematics
best when they work on their	best when they work
own.	collaboratively.
Mathematics is a network of	Mathematics is a hierarchical
ideas.	subject.
It is best to begin teaching	It is best to begin teaching
mathematics with easy problems,	mathematics with complex
working gradually up to harder	problems, or learners won't
ones, otherwise learners make	appreciate why mathematics is
mistakes and lose confidence.	necessary.

Mathematics is a creative	Learners learn
subject. Learners learn best by	mathematics best by working
creating their own questions	through carefully
and methods.	constructed exercises.
It is better to spend time on	I always feel in a hurry when
fewer questions and solve them	I teach mathematics.
in more than one way, even if	There is so much
this slows the session down.	to cover in the time.
Learners are at such different	l try to teach the whole
levels of competence that I	group at once and
have to allow each one to work	keep them at the
at their own pace.	same pace.
l find out which parts of	l start teaching mathematics
mathematics learners already	from the beginning,
understand and don't teach	assuming they
those parts.	know nothing.
l try to avoid learners making	l encourage my learners to
mistakes when learning	make and discuss mistakes
mathematics.	when learning mathematics.

The MAP professional development workshops

Formative assessment

- How can I respond to students in ways that improve their learning?

Concept development

- How can I help students develop a deeper understanding of Mathematics?
- Problem solving
 - Do I stand back and watch, or intervene and tell them what to do?
- Questioning
 - How can we ask questions that improve thinking and reasoning?
- Working collaboratively
 - How can students learn from discussing mathematics?

Reflecting on learning

- What have we learned?
- How can we share this with colleagues?

Teachers report back on their experiences

- Teachers interview each other on what happened in the classroom.
- Their views are synthesized and reported to the whole group.
- General issues are discussed by everyone.
- The leader asks teachers to help each other overcome difficult issues.

Sample interview questions

- What were your fears and expectations?
- How did you plan for the lesson?
- How did you introduce and organize the lesson?
- What happened during small group work?
- What happened during whole class discussions?
- What did you learn from this experience?
- What general issues have arisen for you?

Professional Learning Communities

School-based

– Based in a single school or a cluster of schools.

Goal driven

- Focused on agreed, specific, common goals.

Collaborative inquiry

- Regular meetings among teachers.
- Supportive, non-judgmental.

Evidence-based

 Lesson observations, student work, assessment data, professional literature are used to improve practice.

Challenged from outside

- Contributions from outside 'experts' provide a wider perspective.

Teachers' activities to Improve Instruction

Find or write curriculum. Try to align with Standards. Develop local frameworks and articulation across grades

Plan lessons individually

Plan lessons collaboratively

Watch and discuss each other's lessons



From Lewis, C.; and Hurd, J. (2011), Lesson Study Step by Step, Heinemann

Japanese Lesson Study Model



A professional learning community



What are the strengths and weaknesses of the different models of PD?

Review

- Which of the characteristics of effective PD each of these models incorporates?
- What are the strengths and weaknesses of each model, in your view?
- How might these models be combined and organized in your schools?
- What immediate questions does this create for you?

Thank you! <Insert contact details>