'Your' Whole-school Professional Learning Program {WSPLP}:

Possibilities for revitalizing / rethinking your mathematics program

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- Before revitalizing there has to be a revisiting of the culture of your school, and how your school goes about the teaching of mathematics

- This session is mainly about:
  - Thinking together more deeply about how we teach mathematics
  - Whether, and if so how, our teaching should change
  - *AND how do we lead our colleagues in such a change*

  - **SO THAT**

  - There will be a positive impact on your students' learning

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- Key influences on such a project:
  - The school
  - The students
  - Leadership in school
  - Critical friend / School Maths Leader (SML)
  - The task of revitalization

- Implementing such a program

- Role play

- Last thoughts

- Any preliminary thoughts??

- The school context
  - {staff, resources, geographical context}
  - Context provides opportunities
  - Context brings limitations
  - A careful / thoughtful examination and evaluation of both is needed
    - What are possible opportunities / limitations?
    - What will help and what will hinder?

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- Staff:
  - Understaffed / auxiliary staff
  - Mix of staff re experience, gender, etc.??
  - Think maths is terrific and can't wait to do more?

- Resources:
  - Many, varied, out of date, ease of availability???
  - Teacher sure/unsure of effective use?

- School situation:
  - Community centered / never see a parent unless to complain?
  - Situated in poorer / well off area?

- OTHER??

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- Students:
  - Language(s):
    - All speak English as first language?
    - Most do not speak English at home?
  - Migrants:
    - Never seen a migrant?
    - Some migrants but from affluent countries?
    - Always have some 'new arrivals', some have never attended school at all?
  - Low / high SES families

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Belief about students

- There is potential for all students to grow and hence change.

- This happens best if you think about the growth of children as (teacher quotes):
  - "Students **move** from where they are now onto a good place"
  - "Growth points' / 'levels' / 'stages' are useful for the teacher, but …."
  - "Don't look at AusVELs levels and wonder about your kids, analyze what they are doing in your class and understand what growth they have made."

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- AusVELs levels, ENRP growth points, Intervention stages:

  - These can never 'define' a student.
  - They show where a student probably is now,
  - BUT do not predict where they get to.

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- Any other insights into students we should also note?

Leadership

- Motivation: (quotes from different principals)
  - "Unlike literacy, mathematics had not been growing?"
  - "Need to do something re NAPLAN mathematics results?"
  - "School review coming?"

- Will they support this project in practical ways?

- Is this a one-year 'trophy' project?

- OTHER??

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- Using an outsider?
  - Probably will morph into multiple roles of:
    - critical friend (CF)
    - flexible support agent
    - mentor to SML (School Maths Leader)
    - motivator / sounding board
    - at times driver of a possible idea
    - resource person for ideas
    - prompter to get back on track
    - And???

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- IF your school does not have an SML:

- What qualities does this leader need?
  - Appointment of an experienced and respected staff member to become School Mathematics Leader (SML) with a <u>time allowance</u> for the role.

- **AND** the SML must lead the project

- HENCE:
  - Critical Friend does not 'lead' the project.
  - Worse still, does not 'do' the project.
  - It becomes a joint effort,
  - BUT CF is always in a support role

- SO:
  - Think very carefully re your CF,
  - Many want to take over (though have good intentions).

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Task of revitalizing

- To start:

- IT IS A PROCESS!

  - A process which finally impacts on the students' mathematical abilities.

- For that to happen:
  - A process where teachers feel empowered to reflect on their teaching strategies for mathematics

- Staff need to <u>want to</u> explore new possibilities so they can:
  - Nuance / modify their present teaching strategies, and / or
  - Develop new teaching strategies

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- Such change needs to be *incremental* for the vast majority of teachers.

- Hence they need to be encouraged over a *reasonably long period of time* to keep reflecting and considering change.

- Although individuals may well change at different rates, all staff needed to be *part of their own supportive learning group*.

- If done right, this can be empowering for the school as a whole.

- Any problems with this list?

- Any other ideas to add?

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WSPLP [Whole-school Professional Learning Program] works at three levels simultaneously:
(a) school as a whole
(b) Professional Learning & Teachng groups, and
(c) individual teachers

- Action inquiry: A spiral [based on a design-based research model]
  - [Use 'inquiry' not 'research']
  - First cycle:
    - Reflect [Find your question]
    - Plan
    - Act
    - Observe

    - Second cycle:
      - Reflect [Modify question]
      - Plan
      - ....
        - AND SO ON
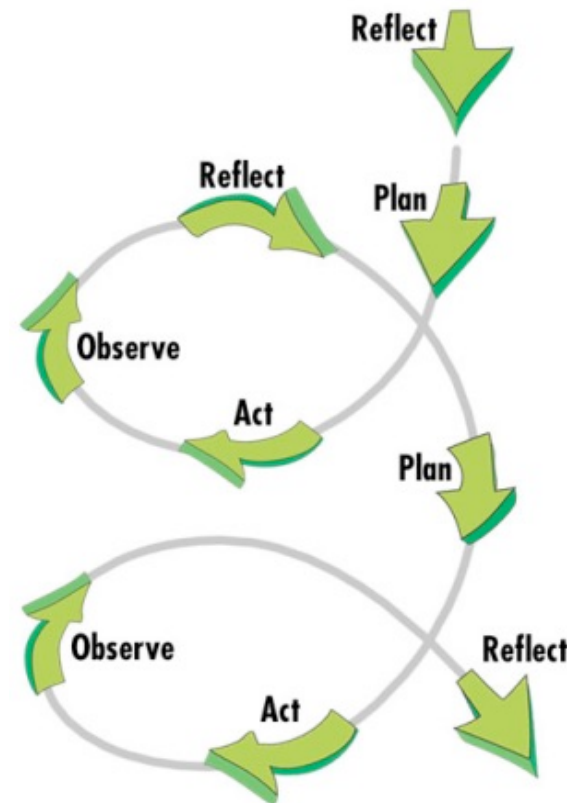
- Any examples of this in your schools?

Design-based research

- Two critical and interlinking aspects

- Pragmatic:
  - Involves and evolves a project that aims to investigate and improve a design for supporting learning and teaching

- Theoretical:
  - Involves developing {inc. literature search}, testing and revising conjectures about both learning processes and the means of supporting that learning
  - The resulting theory then constitutes the rationale for supporting learning and teaching

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Elements of program

- Core is 'staff meeting / thinking together'

  - Staff to devote some time in each of their weekly PLT meetings to this program
  - SML meets with staff in PLT at least every 2 weeks
  - Critical Friend (if you employ one) also joins PLT meetings at least once a month

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Whole school

- There is a 'whole school inquiry focus'
- ['Inquiry' – I/we are going to find out something about me/us which is new and exciting!!]
- This teaching and learning challenge is aligned with overall school planning
  - BUT there is always a cycle of: Reflect / Plan / Act / Observe / Reflect (modify if necessary) / Plan (because of modification) / …

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PLT Groups

- Group decides what will be their overall focus inquiry question.
- This needs to be clearly linked to the whole school inquiry focus.
- They need to report on progress to each other, SML and whole school.
- BUT there is always a cycle of:

  Reflect / Plan / Act / Observe / Reflect (modify if necessary) / Plan (because of modification) / …

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■Individual teachers:

- ■ Each teacher decides on an inquiry question.
- ■ This question needs to link to their PLT focus inquiry question.
  - ■ Keep it small and manageable : <u>Hence it is rewarding in the short term!</u>
  - ■ Record intentions on planning sheet
  - ■ Think about how you know change is occurring
  - ■ They need to report on progress to each other in PLT and SML.
- ■ BUT there is always a cycle of: Reflect / Plan / Act / Observe / Reflect (modify if necessary) / Plan (because of modification) / …

- These are the three levels working simultaneously as noted earlier:

  - Whole school

  - PLT groups

  - Individual teachers

- And each is interdependent on the other two.

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- Role of SML
  - Can vary considerably
  - See slide 8, but also depending on:
    - Own experience
    - Own style of leadership
    - Perceived needs of the various PLT groups
    - Perceived needs of leaders within the PLT groups
  - BUT
    - Must ensure the PLT groups and individual teachers remain 'on task' and don't wander
    - Make representations to principal re resources
    - Should build their own knowledge if necessary of key areas of the whole school program
    - Must keep an eye on the cycle of Reflect / Plan / Act / Observe / Reflect / Plan … for both PLT and individual teachers
    - Will at times suggest a move from one step to next

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- Role of Critical Friend (CF)

- 'May' agree to run some other inputs:
  - Introduction to program to full staff PD, with SML
  - Be careful that subsequent PD sessions do not become the sole focus of the program
  - These must dovetail with what the PLTs / teachers have built into their own programs.
    - That is, address issues relevant to the teachers' inquiry questions.

  - BUT if principal has decided on 'the issue' then some modification might be needed.

- Will always be considering the cycle of Reflect / Plan / Act / Observe / Reflect / Plan … for school, PLTs and individual teachers and discussing such with SML

- See slide 7

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Find the two handout

- The A3 sheet is for completing our imaginary project
- [Stapled sheets have explanation and are a template]
- Assume this is year long project

- First: What is the background of your imaginary school?

- Second: Act as the principal and the SML to:
  - Complete first two columns, and
  - Decide on what sort of CF you will employ.

- Third: Each of you are now a member of the same PLT. Complete column 3.

- Fourth: Act as the SML and the CF:
  - Review how you will begin to advise the PLT as a whole, and the individual teachers, regarding their inquiry questions [too big?/ too small?/ resources needed?/ ...].
  - What roles will you (SML & CF) play individually / together?

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A CASE STUDY

- Whole school inquiry focus was:

  - We will collaboratively investigate and find strategies to address the following questions:
    - What is the impact of language on mathematics?
    - What teaching strategies can we explore, varied according to year level, so;
      - teaching strategies are appropriate, and
      - will foreground language in the students' learning of mathematics?
  - Principal had nominated the topic

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- Four input sessions (?) run by CF / SML
    1. Introduction to program; Background research re language & maths (Nov.)
    2. Deciding on the PLT & individual teacher questions (Feb.)
    3. Language / maths and assessment (principal wanted this one) (July)
    4. Celebration time / looking to continue (Nov.)

How did it pan out?

- Dynamic discussion re 'PLT group inquiry question' and 'individual teachers' inquiry questions' for some months before firm decisions made:
  - This could have been speeded up.

- Some teachers did not come on board till July:
  - Concern; "Am I doing the right thing?"
  - "Already have good teaching strategies, why change?"
  - Already hassled over coping with doing …
  - Not convinced this was important

- Vast majority of teachers were on board from the word go

- Intuitively felt language issues were important

- But had not been asked to think about this issue in maths teaching

- Happy to use an action enquiry model

- Working in groups was for them par for the course

- 'Slower' staff choices were influenced by peers' ideas

Role of SML / CF:

- Constant, firm, but non directive support for groups and individual teachers

- Asking groups/ teachers to explore possibilities

- Suggesting avenues

- Mentioning resources

- Not telling

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- We (SML / CF) decided to launch an additional cross-PLTs joint project in June.

- Focused on what at least one teacher in each PLT had made their own question;
  - 'maths word walls'.

- Hence the 'Whole School Listing of Words'
  - What vocab is used throughout school for this or that topic / idea / operation / etc.
  - Is there consistency between levels?

Meeting of celebration

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- This is a really important time (Nov.)

- Staff need to experience their ideas coming to fruition.

  - What did you (plural) do?
  - How did the students respond?
  - How did you change?
  - What now?

What did you (pl.) do?

- Mathematical Word Walls

- Examination of school maths curriculum planning documents re language

- Some staff started experimenting with taking video snippets

- Preps and 1's started to focus much more on writing maths
  - "Writing is not just for language sessions"

- Started to use open ended tasks
  - This lead to more questioning
  - Hence more emphasis on the process, rather than finding the answer
  - That promoted more learning

How the students responded

- They are having more group discussions.

- Children and parents are contributing to word walls.

- Students have been able to refer to word walls to assist with problem solving.

- Children are "thinking before they speak".

- They are speaking in their first language to solve problems.

- Children of mixed abilities are able to contribute and feel comfortable contributing to discussions.

- Using the language of maths.

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How the teachers changed

- "Language really is part of all maths."

- "It is just not word problems."

- "We're beginning to recognise the differences between formal and informal language."

- "We have started to look at AusVELS to understand the difference between "curriculum language" and "everyday language.""

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AND
What still to do?

- Nuance and progress our 'new' teaching strategy we have began to explore,

    OR / AND

- Leverage what we have done to move onto explore another teaching strategy.

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- Possibilities:
  - Build on students' new found confidence
    - "They cheer now and don't dread maths"
  - Build on their new engagement
  - Relate maths to their life through their language**s**
  - Wait time
    - Allow students time to struggle with language
  - Share time
    - Helping students articulate their ideas themselves
  - What does this mean for assessment?

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Thanks for participating

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