Title: Mathematical Progress and Value for Everyone (MProVE)
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Mathematical Progress and Value for Everyone (MProVE)

Tay Eng Guan, Quek Khiok Seng, Yap Sook Fwe, Leong Yew Hoong
Our starting points

- Our background as mathematicians, mathematics teachers, mathematics teacher educators, ...
- Should trial (and refine) our joint experiences and theoretical ideas in the testbed of actual mathematics classrooms
- View task of changing classroom practice as a complex process – teacher change, curriculum redesign, school structures ...
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[In short: “Hard and unglamorous” (Schoenfeld, 2007) research]
What we do

- Design “Replacement Units” (RU) for Normal (Academic) Lower Secondary mathematics in one school
- Work closely with teachers in the design process
- Trial the theory-design in the classroom
- Learn from the results of implementation and make changes for subsequent trials
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[In short: Design Research]
What we intend to achieve

- Improvements in the quality of mathematics instruction in the secondary NA classrooms
- Growth in teachers’ SCK and PCK
- Take the RUs to a ‘stable’ state – for subsequent diffusion to other schools
- Authentic experiences incorporated into pre-/in-service courses in NIE
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[In short: direct impact on students and teachers]
What we attend to in the design of RUs

- Curriculum planning: (1) Disciplinarity; (2) Procedural fluency; (2) Problem solving disposition; (3) Study habits; (4) Motivation

- Teacher development: (1) Support from KPs and opinion-shapers; (2) Teachers’ involvement in every phase of the design – including observation of lessons; (3) Gradual broadening to more teachers implementing the RUs
Model for overall design of RUs

Overall development guided by “Disciplinarity” and “PSD” or “SH”

Lesson 1  2  3  4 …  n – 1  n

Insert at various points “Motivation” and “Procedural fluency”
<table>
<thead>
<tr>
<th>PD process for each RU</th>
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<tbody>
<tr>
<td>Teachers’ participation</td>
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<td>Discussion on Replacement Unit (RU)</td>
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<td>Estimated duration</td>
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</tbody>
</table>
Examples of RUs

- 1NA: Addition/subtraction involving negative numbers
- 1NA: Number patterns
- 2NA: Expansion and factorisation of quadratic expressions
- 2NA: solving simultaneous linear equations in two variables
- 3NA: Indices