**Title:** A four level view of curriculum change

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**Description:** A snapshot of an ongoing Mathematics project focused on improving learning and practice at all levels of the school.

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**Introduction**

This project aims to support ongoing improvement in student learning, classroom practice, teacher collaboration and school effectiveness at a large international school in Singapore. A core focus for the project is the examination and promotion of effective research-based strategies to support differentiation in Mathematics. The decision to adopt a strategic, systems approach to the project was driven by an acknowledgement of the challenges that would be faced leading change in a K-12 school of over 2700 students and the desire to work towards long term improvement. The development of the project was informed by theory and practice from the field of organisational learning, with the storytelling method of Kemeny, Goodman and Karash a strong influence.

**Design**

The project's design was intended to promote learning at all levels of the school (students, teachers, team leaders and senior leaders) that was effective in driving sustainable improvement over time. At a teacher level, the project drew upon an understanding that professional learning should be anchored in the practicalities of everyday teaching in classrooms and reflective practice, with a learning cycle focused on teaching, gathering evidence, reflecting and planning. At a team level, there was a strong emphasis on disciplined collaboration, both as a way of extending individual learning and for building team capacity. At this level, the learning cycle focused on co-planning, co-teaching, co-assessing and co-reflection. At the senior leadership level, the focus was on the efficacy of team learning at different levels of the school, as well as exploring the impact of their own leadership practices upon the learning of team leaders, teachers and students. The learning cycle for leaders was similar to process adopted by teachers, but with the concept of co-leading replacing that of co-teaching.

The key phases of the collaborative learning cycles can be described in the following ways:

**Co-planning:** for the development of shared understandings and common approaches, teacher/leader engagement and creativity

**Co-teaching/co-leading:** for the promotion of innovation, change and systematic experimentation

**Co-assessing:** for development of an evidence-based orientation, in relation to improvement of student achievement, teacher practice and/or leadership practice

**Co-reflection:** for the enhancement of critical self and team reflection, the diversification and refinement of practice, and sustainable improvement

**Goals**

* An explicit and sustained focus by teachers on differentiation throughout all stages of the teaching cycle.
* Documentation to support a sustainable approach to the teaching of Mathematics – from a framework and methodology through to unit and lesson planning
* Effective collaborative practices at all levels of the school
* Improved student learning in relation to Mathematics, across a range of assessments
* Development of a systems-based method for leading change and improvement that could be transferred to other curriculum areas and scaled up across a range of schools

**Key focus areas for pedagogy**

The focus for classroom experimentation was on pedagogical innovation, in this case defined as the augmentation of teacher repertoire, with an emphasis on inquiry-based approaches. Teachers were regularly presented with theory and asked to make connections to practice; including the consideration of planning processes, curriculum and assessment. The primary interest for teacher collaboration was on building lessons that presented an appropriate level of challenge for the diverse range of abilities in a given class. This approach included the development of rich tasks with multiple exit and entry points, and the use of extended discussion in class among students regarding the use, application and efficacy of different methods and strategies. While some variation in focus was evident across the K-12 scope for the project, the following interests also crossed over all sections of the school:

* Constructing, transferring and applying understanding
* Inquiry: the disciplinary and transdisciplinary nature of Mathematics
* Developing a shared vision of an empowered learner of Mathematics

**Overview**

The initiative was projected initially to run over the course of three years. During the second semester of 2013, extensive research was conducted into current classroom and collaborative practice in the area of Mathematics. A survey of contemporary research literature focused on differentiation in Mathematics was also undertaken over this time, leading to the identification of Professor Peter Sullivan as a leading figure in the field and his subsequent involvement in the project. In 2014, the project was formally launched at the school, beginning with an intensive exploration of lesson design to support differentiation, including the examination of effective teaching methods. Subsequent focus areas have included the sequencing of lessons and unit development, documentation, the use of assessment, teacher collaboration and instructional leadership. In 2015, the project was expanded to include the participation of secondary school teachers and students. Regular cycles of review, including components of action research, have provided insight into the progress of the project, while allowing for refinement and the consideration of new directions for exploration.

**Impact**

The project has had a positive impact on the learning of all stakeholder groups at the school - student, teachers, administrators and parents. There has been a noticeable improvement in student attainment and growth in relation to key assessments in Mathematics, along with evidence of students feeling more empowered in their approach to learning in this area. There has also been a significant shift in the ways teachers' perceive differentiation, as well how they approach this focus in their professional practice, both as individuals and in teams. Finally, the methods employed in the project have had a transformative impact on leadership practice at the school, becoming seen as a blueprint for future projects and reforms. The project is now entering into its fourth year, with its scope expanding from K-12, There is also wider interest developing in the work from other educators, schools and networks, as the project methods and findings are shared in different forums.