ENHANCING MATHEMATICAL UNDERSTANDING OF CHILDREN IN HONG KONG VIA EFFECTIVE GROUP WORK; CHANGES IN PERFORMANCE AND ENGAGEMENT IN A SCHOOL YEAR WITHIN A CONFUCIAN HERITAGE CULTURE (CHC)

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Background:

This HK part of SPeCTRM builds upon HK teachers’ recognised expertise in mathematics, the local government’s encouragement of greater pupil participation/engagement in their learning within a Confucian Heritage Culture, and the introduction of a social pedagogic approach to enhance group work in the learning of mathematics in primary schools. Over the last decade, HK pupils have shown generally high levels of mathematical (and science) performance on international comparisons, but the government (and other international commentators) have criticised the long-term maintenance of this performance by focusing on pupil passivity and limited creative/high-order cognitive communication. Current government recommendations for the improvement of primary school (learning) performance have called for a drive to increase pupil participation through improved classroom discussion and group work. These recommendations are particularly urgent in mathematics classrooms where teaching methods have been described as individualised, didactic and rote-learning based (typical characterisations of CHC).

Research Focus:

Project objectives were to introduce and assess the use of social pedagogic-based group work skills on pupils’ mathematical performance and high order thinking/communicative skills with focused groups of primary school mathematics teachers and their classes in HK

Research Methods/analytic framework:

Within a quasi-experimental design involving 20 mathematics teachers (12 experimental/8 control) of Primary 4 (493 children, aged 10 yrs), a social pedagogic approach to effective group work was implemented and assessed in experimental classrooms. Pre-test data included age-appropriate mathematics test (based on HK government tests) and teacher knowledge (SMK)/pedagogic efficacy(SE) assessments. A two-term intervention developed a relational approach to group work (adapted from SPRinG), supporting teachers to model and encourage group work, and changed classroom context to support children’s group work; Experimental teachers attended 5 training sessions between December and May of a school year. On-the-spot classroom observations (SPRinG) were undertaken twice during the study and an end-of-year mathematics test was administered to all children. Teachers also completed an end-of-year pedagogic SE assessment. Data was analysed initially at a descriptive level and later with MML.

Research Findings:

Initial pre-to-post results for Experimental v Control classes show: significantly greater pupil mathematical improvement in Experimental classes (effect size of 0.2 over 6 months); increased levels of pupil questions, suggestions, giving information, agreeing and group maintenance in Experimental classes; and significantly increased pedagogic SE in Experimental teachers. MML and
SEM models show that Experimental children’s increased classroom (high-order) discussion was strongly related to teachers’ increased pedagogic SE and both enhanced children’s mathematical performance.