Integrating Information and Communication Technology (ICT) in Mathematics for Students with and without Special Needs

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Abstract

In Mathematics education, Singapore has earned top rank internationally for students' leading performances in Trends in International Mathematics and Science Study-2003 (TIMSS). Due to our world-famous Mathematics system and curriculum, the American Institutes for Research (AIR) conducted a study for the U.S. Department of Education to explore the advantages of the Singaporean and American mathematics systems ([1] Ginsburg, Leinwand, Anstrom, & Pollock, 2005). Their research has shown that whereas the United States can learn from Singapore in terms of fundamental skills, Singapore can learn from the United States in the emphases of 21st century skills, such as higher order thinking, reasoning, and data analysis and probability highlighted by American's *National Council of Teachers of Mathematics* (NCTM) framework.

A research project uses *Blending Assessment with Instruction Program* (BAIP) online resources as a research-based intervention to promote mathematics learning for students as well as in teacher preparation. The BAIP is developed by the University of Kansas e-Learning Design Lab (eDL), in collaboration with the Center for Educational Testing and Evaluation (CETA) for students in grades 3 through high school with particular emphasis on struggling learners. BAIP responded to the current trend of (1) research-based interventions in collaboration with experts and teachers, (2) ICT integration in education, and (3) alignment with NCTM standards, which emphasized on higher order thinking and reasoning that were found lacking in the Singapore Mathematics curriculum.

Before using *Blending Assessment with Instruction Program* (BAIP) online resources with students in Singapore context, a team of teachers are requested to review the online resources and animation tutorial in order to provide their insights in the appropriateness of the online resources for Singaporean students as well as their views on the research based strategies employed in the design of the online resources. The purpose of the review are two folded, which are (a) to provide necessary feedback to the online resources developed in the United States on the appropriateness of the resources in a different cultural context, (b) to use the review process to enhance the teaching of instructional pedagogies in teacher preparation programs. Specifically, teachers were asked to review and identify what and how research-based strategies for students with special needs were integrated into the design of online animation tutorials. Teachers are then taught specifically the strategies underpinning the design and development of the online resources and how the same strategies or principles can be implemented in their teaching in other areas and their lesson plans. Discussions on the implications of integrating Information and Communication Technology (the online tutorials) as a pedagogical tool to enhance teaching and learning will be presented in this presentation.

References

[1] Ginsburg, A., Leinwand, S., Anstrom, T., & Pollock, E. (2005). *What the United States can learn from Singapore's world-class mathematics system (and what Singapore can learn from the United States): An exploratory study.* Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.111.5128&rep=rep1&type=pdf.