

**UNCOVERING CHINESE PEDAGOGY : SPIRAL VARIATION—THE UNSPOKEN PRINCIPLE
FOR ALGEBRA THINKING TO DEVELOP CHINESE CURRICULUM AND INSTRUCTION OF
“TWO BASICS”¹**

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Abstract: I hope to do two things in my talk. First, argue that there is Chinese pedagogy for algebra development. Second, introduce “indigenous” principles and its application. Over the years, Chinese students have done exceptionally well in TIMSS and PISA. Interestingly, a number of studies consistently identified that Chinese variation practice offers some advantages. For example, Marton (2008) argued: “Chinese students do very well when compared to students from other cultures. Teachers spend much more time on planning and reflecting than teachers in other countries, and they develop their professional capabilities by the teaching, in which patterns of variation and invariance, necessary for learning (discerning) certain things, usually brought about by juxtaposing problems and examples, illustrations that have certain things in common, while resembling each other in other respects. By such careful composition, the learner’s attention is drawn to certain critical features ...instead of just going through problems that are supposed to be examples of the same method of solution.... (There) is a very powerful pedagogical tradition in the Chinese culture. ...”. The practice refers to the “routine” daily design used broadly in example or exercise to extend the original examples, known widely in a certain way as “one problem multiple solutions” (varying solutions), “one problem multiple changes” (varying conditions/conclusions), and “multiple problems one solution” (varying presentations) (Sun, 2007). It is interesting to note principles of task design embedded in hidden cultural custom are implicit, unspoken, but the local principles of curriculum design are explicit, “two Basic” , i.e. basic knowledge and basic skills, the central aspects of the unified teaching outline from the Ministry of Education in (1963; 2001). In fact, both “two Basics” as goal and variation problems as pedagogy are described “indigenous” principles of task design to compare the invariant feature of the relationship among concepts and solutions that may lead to mathematical abstraction, which could eventually support algebra thinking development (Sun, 2011). A Chinese theory called spiral variation is systematically articulated the rationale rooted in its mathematics traditions, language, philosophy (Sun, 2016). This talk will unlock the unspoken secrets how this model could be traced its root to local mathematics traditions, local philosophy, language, ancient curriculum practice, current textbook design , classroom design, and application done to in other countries (e.g. Italy) from different perspective.

References

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ⁱ I am greatly indebted to Maria G. Bartolini Bussi for critical feedback and for helpful framing of the ideas and perspectives presented here.