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In addition, lesson study facilitated development by Japanese teachers of a sophisticated professional language and technical terms to describe their instruction and learning (Lewis & Tsuchida, 1998; Stigler & Hiebert, 1999; Fernandez & Yoshida, 2004; Takahashi & Yoshida, 2004). The collaborative and continuous nature of professional learning through lesson study, as well as lesson study’s focus on observation and discussion of actual classroom teaching, greatly influenced the depth and sophistication of the professional language that was developed. This professional language ingeniously describes and discusses teaching and learning in the classroom during lesson study. These technical terms have been polished and articulated through observation and discussion of actual lessons. In addition, use of these technical terms in the context of lesson study also facilitates development of new ideas of teaching and learning, as well as helping to spread these new ideas of teaching and learning (Takahashi & Yoshida, 2004).

It is essential that mathematics educators understand how professional language and technical terms were developed and polished, through the practice of lesson study, in order to establish the problem solving approach of teaching in Japan, and about how the mechanism of lesson study helps facilitate the use of technical terms to analyze lessons as well as influences the creation of new images of instruction and learning in Japan.

2. QIFA SHI TEACHING: CONFUCIAN HEURISTICS

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Five lessons from each of two Shanghai mathematics classrooms in the data set of the Learner’s Perspective Study (LPS), were analysed (lessons 6 to 10 in each case), using the video analysis software StudioCode, with a focus on the Qifa Shi teaching practice as it was enacted in each classroom studied.

The following characteristics of Qifa Shi teaching practices were identified in the classrooms studied. First, these lessons are conducted in a highly structured and unified fashion with the teacher taking the lead of the lesson. Second, neither “teacher-centred” nor “student-centred” is a useful descriptor for these practices. Rather, it was found while the teacher is the one who was leading the lesson, the students were active participants in their classroom, whose interactions were usually mediated by the teacher. In this sense, both the teacher and the students are the active participants. Third, these classroom practices placed a great emphasis on elicitation and guidance, which was accomplished through frequent dialogue between the teacher and the students. Fourth, the teachers made careful selection of the problems for the lessons. Fifth, the teacher provided timely feedback to students. This feedback given by the teacher was tailored to specific student needs. Finally, the students
rarely helped each other or elicited information from each other, and student-initiated contributions to the classroom discussion were absent in the lessons studied.

In our experience, mathematics classrooms in western countries (e.g. U. S. and Australia) are more likely to employ open-ended tasks and real world contexts than is the case in China. In Chinese mathematics classrooms, teachers placed a great emphasis on student comprehension of knowledge, the acquisition of basic skills and the improvement of mathematical capability, with less reference to real-world contexts. Given the different focus of mathematics curriculum depending on which cultural setting one situates, it is crucial for us to understand the specific characteristics of Chinese mathematics classroom, and how those characteristics are enacted in these classrooms.

“Qifa Shi” teaching has been the long-standing practice in the field of education in China. The word “Qifa” can be traced back to Confucius and his heuristics. Some prevalent contemporary educational thinking has been deeply influenced by the philosophy and pedagogy of Confucian Heuristics. An analysis was undertaken of 10 mathematics lessons in two Shanghai classrooms from the perspective of Confucian Heuristics, in particular in terms of the Qifa Shi approach to teaching. Five consecutive lessons in the middle of the lesson sequence (Lesson 6 to 10) from each classroom were coded using the video analysis software StudioCode.

An important characteristic of the Chinese mathematics classroom is that the teacher exposition to the whole class is conducted using Qifa Shi, which includes the elements: pudian (bridging), comprehend the problem, guide the solution process, and evaluation.

The Key Components of Qifa Shi（启发式）

The components of Qifa Shi teaching practice can be classified into four major categories: Pudian (铺垫 Bridging), Comprehend the problem (理解), Guide the solution process (引导 yindao), and Evaluation (评价pingjia):

Pudian (Bridging) - In order for students to solve the central problems, to understand the key concepts, and to apprehend mathematics thinking methods, the teacher often needs to have some preparations before teaching the new content. In the mathematics classrooms, there are three forms of Pudian (铺垫): (1) Connection (联接lianjie); (2) Designing transitional/middle problems (中间问题 zhongjian wenti); (3) Creating the context of a problem (问题情景 wenti qingjing). We have characterised pudian as bridging because of the connective intent of each of the three forms, but “bridging” is not a literal translation of “pudian.”

Comprehend the problem - Comprehending the problem is the necessary condition for solving the problem. Many strategies are used to help the students to understand
the tasks. Five strategies were identified: (1) Student reading problems (学生读题 xuesheng duti); (2) Teacher reading problems (教师读题 jiaoshi duti); (3) Student giving explanations (学生解释 xuesheng jieshi); (4) Teacher giving explanations (教师解释 jiaoshi jieshi); (5) Demonstration by teacher (演示 yanshi).

Guide the solution process - The core of Qifa Shi is not that the teacher does not tell the student the answer to the problem, but provides cues or pre-contexts to the solution by questioning students or articulating the nature of a problem. Four sub-codes were identified: (1) Analysing the relationships (分析关系 fenxi guanxi); (2) Pointing out specific methods (具体方法 juti fangfa); (3) Giving hints about the general rules (一般规律 yiban guilu); (4) Reflecting and following up with questions (反思追问 fansi zhuwei).

Evaluation - Four strategies were used for evaluation: (1) Non-verbal evaluative communication (暗示 anshi); (2) Individual spoken evaluation (点评 dianping); (3) Appraisals (表扬 biaoyang); and, (4) Public evaluation of student solutions (点评 jiangping).

Through coding Qifa Shi teaching practice in each lesson in terms of its forms and functions, we attempted to explore the nature and characteristics of the enactment of Confucian Heuristics in these Chinese mathematics classrooms. Our second purpose was to provide an analytical lens that can be used to investigate mathematics classrooms in China. In our view, the characteristics of the activities documented in these two mathematics classrooms reflect some of the general situations characteristic of mathematics teaching in Mainland China.

3. A COMPARATIVE STUDY OF SCHOOL MATHEMATICS TERMINOLOGY IN KOREAN, CHINESE AND JAPANESE

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The learning of mathematics involves the use of mathematical terms when teachers assist learners to organize what they have learned. The professional language of mathematics teachers involves both pedagogical and mathematical terminology. The comparison and analysis of mathematical terms offers significant insight into prevalent forms of discourse. In addition, because such terms are influenced greatly by culture, the analysis of mathematical terms can also provide an opportunity to observe mathematics classroom discourse from a cultural aspect. Korea, China, and Japan, which share Confucian traditions, each have their own alphabets, but all three