KIKAN-SHIDO: THROUGH THE LENS OF GUIDING STUDENT ACTIVITY

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The lesson event 'Kikan-Shido' (Between Desks Instruction) is used to compare different forms of guidance provided by teachers in mathematics classrooms across six cities. While Kikan-Shido had a recognizable structural form in all the mathematic classrooms in the data set, there was variation in both the amount of time devoted to Kikan-Shido and in the way individual mathematics teachers' 'Guided Student Activity'. In this paper, examples of individual teacher guidance are examined to draw out the subtleties of practice in three 'Asian' and three 'Western' classrooms. It is posited that differences in activity are related to specific pedagogical principles that appear to underlie the teachers' practice. The occurrence of similarities in practice across apparent cultural categories problematises simplistic East-West comparative cultural analyses.

INTRODUCTION

Of all the Lesson Events that might be observed in mathematics classrooms around the world, one of the most immediately familiar is that moment when the teacher, having set the students independent or group work, moves around the classroom. This paper reports a fine-grained analysis of this Lesson Event in a selection of well-taught mathematics classrooms located in Berlin, Hong Kong, Melbourne, San Diego, Shanghai and Tokyo. The Lesson Event is conceived as a type of classroom activity sharing certain features common across the classrooms of the different countries studied. Lesson Events represent one type of pattern of participation (Clarke, 2004), co-constructed by teacher and students in mathematics classrooms around the world, each having a form sufficiently common to be identifiable within the classroom data from each of the countries studied. This paper focuses on one specific function of Kikan-Shido (Between Desks Instruction): the provision by the teacher of overt guidance of student mathematical activity.

THE DATA

This paper reports results from the Learner's Perspective Study (LPS) based on analyses of sequences of ten lessons, documented using three video cameras, and supplemented by the reconstructive accounts of classroom participants obtained in post-lesson video-stimulated interviews, and by test and questionnaire data, and copies of student written material (Clarke, 1998, 2001, 2003). In each participating country, data collection focused on the classrooms of three teachers, identified by the local mathematics education community as competent, and situated in demographically different school communities within the one major city. This gave a data set of 30 'well-taught' lessons per school system and, for the purposes of the

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analyses reported here, a total of over 180 videotaped lessons, supplemented by over 20 teacher interviews, and almost 400 student interviews.

KIKAN-SHIDO: BETWEEN DESKS INSTRUCTION

Japanese teachers possess an extensive vocabulary with which to describe their practice. Among the many terms available to them is the term 'Kikan-Shido,' which means 'Between Desks Instruction' in which the teacher walks around the classroom, predominantly monitoring or guiding student activity and may or may not speak or otherwise interact with the students. For all classrooms in the data set, the activity of Kikan-Shido appeared to have four principal functions: (i) monitoring student activity, (ii) guiding student activity, (iii) organization of on-task activity, and, sometimes, (iv) social talk. These are defined in Table 1.

Kikan-Shido Between desks instruction in which the teacher walks around the classroom, predominantly monitoring or guiding student activity and may or may not speak or otherwise interact with the students.		**Monitoring Student Activity** The process through which the teacher: observes the progress of on-task activities and homework; ascertains student understanding; or selects student work with the intention to keep track of student progress, question student comprehension and record student achievement.
		Guiding Student Activity The process through which the teacher: provides information; elicits student response for the purpose of promoting reflection; or facilitates engagement in classroom activity with the intention to actively scaffold student participation and comprehension of subject matter.
		Organisational The process through which the teacher: distributes and collects materials; or organizes the physical setting in the classroom with the intention to support interactions among students and facilitate student engagement in learning activities.
		Social Talk The teacher engages with student(s) in conversations not related to the subject matter or current on-task activity.

Table 1. Definition of the Principal Functions within Kikan-Shido

Each principal function is comprised of a number of mutually exclusive clustered activity codes that have recurrent form across all 180 taped lessons, and the purpose of this paper is to examine key differences in instructional practice within Guiding Student Activity. Guiding Student Activity is comprised of seven activity codes. Table 2 presents the definitions for each activity code.

	Encouraging Student Activity pursued by the teacher designed to motivate, provide support and feedback to individual or groups of students.
	Giving Instruction / Advice at Desk The teacher scaffolds students' understanding by providing information, instruction or advice, focusing on: the development of a concept that addresses meaning; reasoning; relationships and connections among ideas or representations; or the demonstration of procedure.
	Guiding Through Questioning A series of specific teacher questions intended to guide student understanding of a procedure or concept during the on-task activity.
	Re-directing Student Activities pursued by the teacher to: regulate the behaviour of the student(s) who are perceived to be not paying attention to the current on task activity; and to support student(s) on-going engagement during the lesson.
	Answering a Question The information given by the teacher when requested by a student.
	Giving Advice at Board Instruction or advice is given while an individual or group of students work at the board. The instruction or advice may be intended for those students working at the board or may be intended for the whole class.
	Guiding Whole Class The teacher walks around the classroom and provides information, instruction or advice intended to address the whole class.

Table 2. Guiding Student Activity Codes Defined

Using the 'StudioCode' video analysis software, it was possible to code for Kikan-Shido, and its various functions as they occurred in the video record. Using this coding system we can map the various activity codes to a timeline of a single lesson. For the purpose of statistical analysis of each teacher's practice, the individual lesson timelines from each class were combined to identify the frequency of occurrence of each activity code across the ten-lesson sequence.

The actual functions served by Kikan-Shido help us to distinguish one classroom from another. The ways in which different mathematics teachers initiated Kikan-Shido were diverse and distinctive. This can be seen graphically in the comparison of 180 mathematics lessons across six countries in the LPS data set (see Figure 1). Note: only Guiding Student Activity and its constituent sub-codes have been recorded.

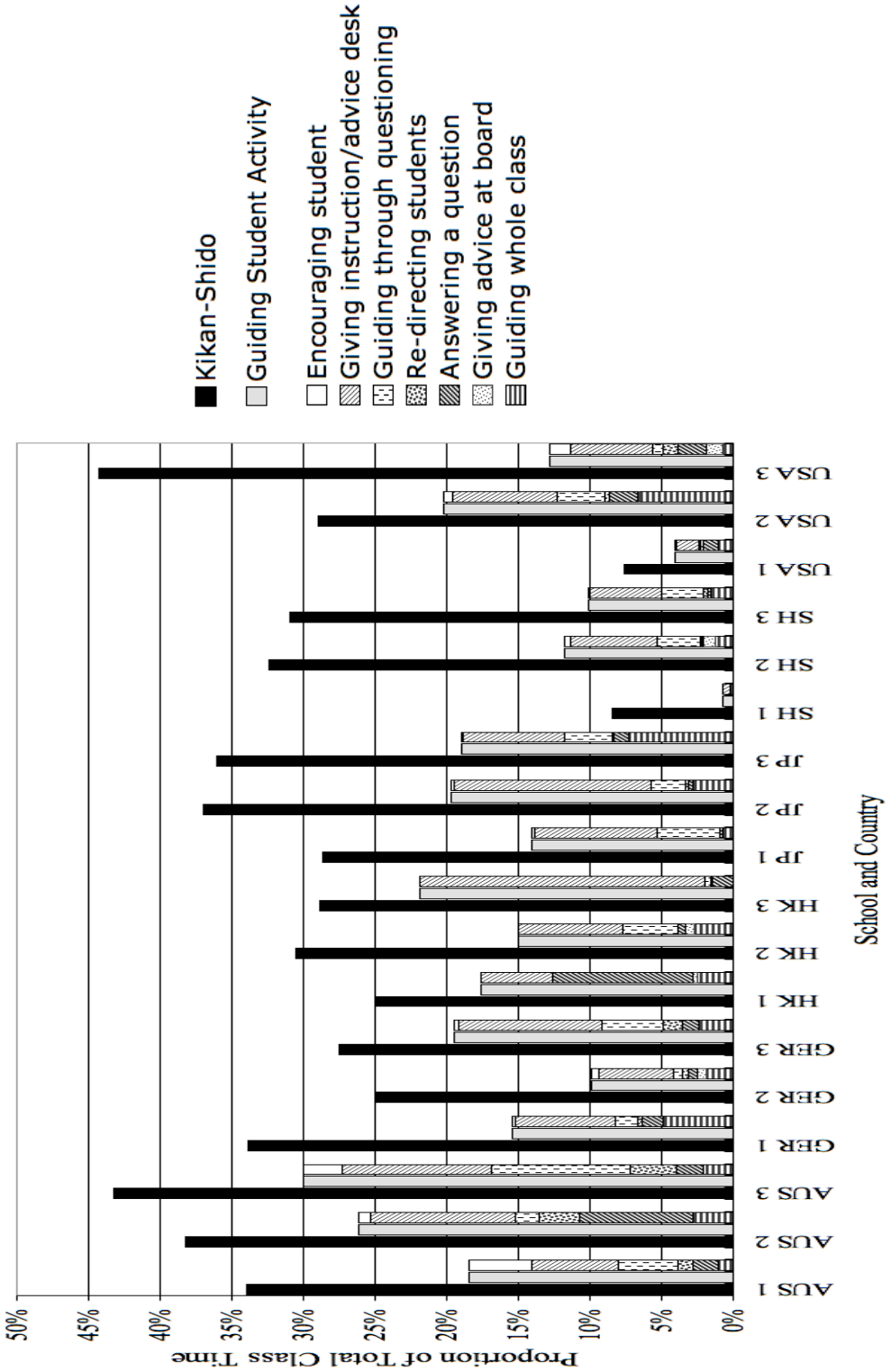

Figure 1. Comparison of Kikan-Shido, Guiding Student Activity and its sub-functions across 180 lessons from 18 classrooms in six countries.

An essential point must be made here: We have analysed sequences of ten mathematics lessons taught by eighteen teachers designated as competent in six different countries. We do not presume to characterize the teaching of a country or a culture on the basis of such a selective sample. Nor do we intend to compare teaching in one country with teaching in another. Our analysis is intended to compare and contrast the practices of competent teachers and their classrooms, not cultures.

Figure 1 graphically illustrates both the similarities and the significant differences in the way that 18 competent, experienced teachers enacted the lesson event that we have called "Kikan-Shido." For example, AUS3 and USA3 both devoted nearly 45% of their class time to Kikan-Shido, but Figure 2 makes it clear that the relative weighting of Guiding Student Activity for these two classrooms was completely different. If we compare GER3 with JP2, we find similarity not only in the time devoted to Kikan-Shido, but even in the relative proportions of Guiding Student Activity. However, at the next level of analysis, we find significant differences in the manner in which the guiding activities were carried out.

Similarly, if we compare HK 3 with USA 2, we find similarity in the time devoted to Guiding Student Activity, but difference in the utilization and amount of time devoted to each activity code. For example, the predominant activity of HK Teacher 3 during Guiding Student Activity was Giving Instruction and Advice at Desk (80% of the time spent on Kikan-Shido). Such explicit preference for one activity code was less apparent in the practice of USA Teacher 2 who adopted a more varied employment of each activity code. However, if we compare USA2 with JP3, we find significant similarities even to the level of the sub-codes.

The fact that teachers are situated very differently and share some similarities in both the amount of time and preference for particular guidance activities suggests not only the generality of the pedagogical strategy but also its cultural transferability. It is clear from Figure 1 that there are differences between and within each school system. The occurrence of such culturally-distributed practices problematises simplistic East-West comparative analyses. Real understanding of the decisions and pedagogical principles underlying each teacher's classroom practice is only evident from a fine-grained analysis of Guiding Student Activity as it was enacted in each mathematics classroom. The following examples illustrate individual teacher use of Guiding Student Activity.

Motivational Support and Encouragement

On many occasions, Australian Teacher 1 would provide verbal encouragement to individual students (see Figure 2). In fact, the practices of all three teachers in Australia and of USA Teacher 3, appeared to prioritise the development of student confidence by providing motivational support and encouragement.

> AUST3 She needs that encouragement … she's not particularly independent and she's not well skilled and she relies heavily on a lot of other students … on this day she was by herself doing the task … and that was really pleasing … mmm.

Such explicit encouragement was much less evident in the other mathematics classrooms studied. In fact, the teachers in the Asian data set (Shanghai, Hong Kong and Tokyo), with the exception of SH Teacher 2 (0.4%), typically did not encourage students during Kikan-Shido. The only instance of Encouraging the Student coded in Shanghai School 1 illustrates a unique strategy that was employed by the teacher intended to encourage, motivate and provide feedback to individual students, while addressing the whole class:

SHT1 Be quick – finish the other one. Eh, (to whole class) some of you drew it very well. (Points to student 4's work) You drew it wrongly. (To student 5) You also were wrong. (To student 6) You. You speed up [moving down the row]. You did it right (pat on the back of student 8) [taking up the paper of student 9]. Eh, he did it right (to whole class). Student 9 also did it right.

In this example, the teacher draws the attention of the class to the student's error. While the teacher's intentions appear to be motivational, there is no example of this strategy (public announcement of student error) in the Australian, American, German or Japanese data. However, similar statements were recorded in SH1, SH2, HK1 and HK2. This suggests that encouragement and motivation in these four classrooms were predicated on a value system different from that operating in non-Chinese classrooms.

Instruction and Advice at Desk

Huang (2002) has suggested that the practices of teachers in Shanghai are grounded in a different pedagogy from those of teachers in Hong Kong. Certainly, the practice of Hong Kong Teacher 3 appeared predicated on different pedagogical principles from those underlying the practice of Shanghai Teacher 2. While the dominant function of Kikan-Shido in Shanghai School 2 was to Monitor Student Activity (20.5% of total class time) (see O'Keefe, Xu & Clarke, in preparation), in Hong Kong School 3, an even larger proportion of time was devoted to Giving Direct Guidance (21.9%). The teacher would walk around the classroom in order to help students with their difficulties, and the guidance during Kikan-Shido was typically quite directive, as illustrated in this example:

S [in Chinese] Come here! Come here! Hey! Hey! Come here! I don't know how to do question four! (...)

HKT3 [in Chinese] A little bit different! This time...these two... Both twenty-one and twenty-four are multiples of three!

S [to T] [in Chinese] Yes! Just to simply it? Okay.

HKT3 [in Chinese] It isn't to simplify it! It can't be simplified! This one no either (...) this one is okay! This one can be simplified but this one cannot.

S [to T] [in Chinese] Then how?

HKT3 [in Chinese] So...this one is okay! This can be simplified! You have to divide this by seven and then multiply it by eight.

Orchestrating Whole Class Activity

Although most of the teacher support provided during Guiding Student Activity was directed to individual students, teachers (particularly in AUS 2, GER 1 and 2, HK 1 and 2 and JP 3) also provided information, instruction or advice intended to inform the whole class. This type of activity was coded as Guiding Whole Class. The exercise of Guiding Whole Class during Kikan-Shido suggests that the teachers attached sufficient importance to the class learning as a whole group, such that they would give guidance to the whole class, when this was judged to be appropriate, while also continuing to give assistance to individual students. Guiding Whole Class was enacted differently according to the teacher's judgment of the situation: either upon perceiving the difficulties among students to be global, the teacher would interrupt students' work by making clarifications to the whole class; or the teacher would provide information, instruction or advice to the whole class as a way of orchestrating whole class activity.

On identifying a common mistake among the students, Hong Kong Teacher 2 would give instructions to the whole class while walking around in order to remind the class of the errors they made or tended to make. Here is one sequence of teacher statements during Kikan-Shido.

HKT2	[to VANESSA] Young lady, you've copied down the question wrongly. You are really overtaken by the twins!
HKT2	[to S] What's wrong? Okay.
HKT2	[to whole class] Hey, be careful with one thing. You've got one thing, your fatal mistake is miscopying questions. Very often you copy from your book wrongly, or you've copied the first thing correctly, but you get it wrong in the second step. Is this illusion or what? Is this a kind of 'sense discoordination'?

CONCLUDING REMARKS

By examining the practices of 18 competent mathematics teachers in Berlin, Hong Kong, Melbourne, San Diego, Shanghai and Tokyo, it has been possible to identify the different forms of guidance provided by teachers during Kikan-Shido. While Kikan-Shido represents a recurrent form of co-constructed classroom practice, evident across all the 'well-taught' mathematics classrooms studied, our analyses demonstrate that both the proportion of time spent on Guiding Student Activity and the distinctive character of each teacher's guidance appear to be a signature characteristic of their practice. The examples provided in this paper illustrate both similarities and differences in individual teachers' use of Guiding Student Activity. Where classroom practices are found to be similar across such culturally-disparate circumstances, the particular similarities of practice assume heightened significance. The fact that teachers are situated very differently and have developed similar solutions to a particular classroom challenge suggests not only the generality of the pedagogical strategy but also its cultural transferability. We also argue that variations in teacher guidance (with respect to form, frequency and timing) are predicated on

specific pedagogical principles that appear to underlie each teacher's practice. On the one hand, differences between the practices in classrooms in China and Japan represent a challenge to overly-inclusive culturally-based categorizations. However, the occurrence of identifiable culturally-distributed practices problematises simplistic East-West comparative cultural analyses. In fact, regularities in the practices of competent teachers across cultures may provide the basis for an international pedagogy of mathematics.

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