

where the day's assignment had been written. From this point on, the teacher spent most of the rest of the period walking about the room monitoring the children's work, talking to individual children about questions or errors, and uttering "shushes" whenever the students began talking among themselves.

This example is typical of the American classrooms we have visited, classrooms where students spend more time in transition and less in academic activities, more time working on their own and less being instructed by the teacher; where teachers spend much of their time working with individual students and attending to matters of discipline; and where the shape of a coherent lesson is often hard to discern.

American lessons are often disrupted by irrelevant interruptions. These serve to break the continuity of the lesson and add to children's difficulty in perceiving the lesson as a coherent whole. In our American observations, the teacher interrupted the flow of the lesson with an interlude of irrelevant comments or the class was interrupted by someone else in 20 percent of all first-grade lessons and 47 percent of all fifth-grade lessons. This occurred less than 10 percent of the time at both grade levels in Sendai, Taipei, and Beijing. In fact, no interruptions of either type were recorded during the eighty hours of observation in Beijing fifth-grade classrooms. The mathematics lesson in one of the American classrooms we visited was interrupted every morning by a woman from the cafeteria who polled the children about their lunch plans and collected money from those who planned to eat the hot lunch. Interruptions, as well as inefficient transitions from one activity to another, make it difficult to sustain a coherent lesson throughout the class period.

Coherence is also disrupted when teachers shift frequently from one topic to another. This occurred often in the American classrooms we observed. The teacher might begin with a segment on measurement, then proceed to a segment on simple addition, then to a segment on telling time, and then to a second segment on addition. These segments constitute a math class, but they are hardly a coherent lesson. Such changes in topic were responsible for 21 percent of the changes in segments that we observed in American classrooms but accounted for only 4 percent of the changes in segments in Japanese classrooms.

Teachers frequently capitalize on variety as a means of capturing children's interest. This may explain why American teachers shift topics so frequently within the lesson. Asian teachers also seek variety, but they tend to introduce new activities instead of new topics. Shifts in materials do not necessarily pose a threat to coherence. For example, the coherence of a lesson does not diminish when the

teacher shifts from working with numerals to working with concrete objects, if both are used to represent the same subtraction problem. Shifting the topic, on the other hand, introduces variety, but at the risk of destroying the coherence of the lesson.

CLASSROOM ORGANIZATION

Elementary school classrooms are typically organized in one of three ways: the whole class is working as a unit; the class is divided into a number of small groups; or children work individually. In our observations, we noted when the child was receiving instruction or assistance from the teacher and when the student was working on his own. The child was considered to be receiving instruction whenever the teacher was the leader of the activity, whether it involved the whole class, a small group, or only the individual child.

Looking at the classroom in this manner led us to one of our most pronounced findings: Although the number of children in Asian classes is significantly greater than the number in American classes, Asian students received much more instruction from their teachers than American students. In Taiwan, the teacher was the leader of the child's activity 90 percent of the time, as opposed to 74 percent in Japan, and only 46 percent in the United States. No one was leading instruction 9 percent of the time in Taiwan, 26 percent in Japan, and an astonishing 51 percent of the time in the United States (see Figure 1). Even American first graders actually spent more time on their own than they did participating in an activity led by the teacher.

One of the reasons American children received less instruction is that American teachers spent 13 percent of their time in the mathematics classes not working with any students, something that happened only 6 percent of the time in Japan and 9 percent in Taiwan. (As we will see later, American teachers have to steal class time to attend to the multitude of chores involving preparation, assessment, and administration because so little nonteaching time is available for them during the day.)

A much more critical factor in the erosion of instructional time was the amount of time American teachers were involved with individuals or small groups. American children spend 10 percent of their time in small groups and 47 percent of their time working individually. Much of the 87 percent of the time American teachers were working with their students was spent with these individual students or small groups, rather than with the class as a whole. When teachers provide individual instruction, they must leave the rest of the class unattended, so instructional time for all remaining children is reduced.