A Lesson Is Like a Swiftly Flowing River

How Research Lessons Improve Japanese Education

By Catherine C. Lewis and Ineko Tsuchida

In recent years, Japanese elementary school teachers have succeeded in making a basic change in their approach to science teaching. They have shifted from "teaching as telling" to "teaching for understanding," and they accomplished this as they taught their classes and continued with their usual professional duties. How did they achieve this remarkable change? As we investigated the question over the past three years, Japanese teachers repeatedly pointed to the impact of "research lessons" (*kenkyuu jugyou*) as central to individual, schoolwide, and even national improvement of teaching.

Studying Pendulums

Forty Japanese fifth-graders, working in pairs, weight small wire pendulums with clay and "race" them. They are trying to figure out which of three variables suggested by the class—the length of the wire, the clay's weight on the pendulum, or the angle of release—affect the pendulum's cycle time. The students are intent on their investigations, so they pay little attention to their teacher's tape recorder or to the more than twenty observing teachers who are taking detailed notes, snapping flash pictures, and recording the lesson on videotape.

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After the lesson, the teachers move to another room to discuss what they've just observed. The classroom teacher, Mr. Ohara, begins by explaining that the lesson was designed to see whether students would demonstrate scientific thinking by "untangling the three variables...to study them one at a time." A lively debate ensues. Several teachers argue that it would have been better to tell students to control the variables since few did so spontaneously, but other teachers disagree.

Some teachers also say that using a stopwatch to measure the impact of the variables would have been preferable to comparing the pendulums side by side. Mr. Ohara explains that he rejected the idea of a stopwatch because fifth-graders take differences of just a hundredth of a second very seriously, and they would have been likely to draw erroneous conclusions about a variable's effect. Other teachers counter that fifth-graders are old enough to discuss and understand measurement error. As the two-hour colloquium on the lesson draws to a close, teachers offer their opinions on how Mr. Ohara should structure the next day's lesson in which students will report and discuss the results of their (often uncontrolled) experiments. Once again, tomorrow's lesson will be observed, recorded, and discussed by teachers from within and outside the school.

What Are Research Lessons?

Research lessons are actual classroom lessons, taught to one's own students, but they embody a number of special features that set them apart from an everyday class:

- *They are observed by other teachers.* A research lesson is always given before an audience of other teachers. Sometimes the observers are limited to other teachers in the school or to the faculty with a

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few invited outside commentators. But research lessons can be open to teachers from a district, town, region, or even the whole of Japan.

- *They are carefully planned, usually in collaboration with one or more colleagues.* In one school we studied, the four third-grade teachers met regularly for several months to discuss how to promote students' "initiative" in the study of science. When they decided that asking productive questions was a key, the teachers came up with strategies designed to encourage such questions. They honed their strategies by watching one another's lessons and discussing them. Finally, one of the teachers presented their new approach to the entire faculty as a research lesson while the other teachers recorded the session and distributed written background materials presenting highlights of their months of work together.
- *They are focused.* Research lessons are designed to embody a particular goal or vision of education. Teachers often choose a goal that is part of the current national debate about education. Examples of such goals from the research lessons we observed included helping students to "take initiative as learners," "be active problem-solvers," "be active problem-seekers," "develop scientific ways of thinking," and "develop their individuality." Research lessons can also be used to develop and demonstrate a successful approach to a particular topic—for example, to help children understand solar cells or grasp the connection between sound and vibration.

  Other teachers do not consider research lessons as finished products that they are to take up and use without any alteration. The lessons are examples of a particular goal or vision in action, and individual teachers feel free to draw on them as appropriate to their own philosophy and classroom.
- *They are recorded.* Usually teachers record these lessons in a number of ways, including one or more videotapes, one or more audiotapes, narrative and/or checklist observations, and copies of student work. Recording is focused on particular issues of interest to the instructing teacher. For example, we observed lessons in which the teacher asked colleagues to tally the number of students who volunteered their ideas during whole-class discussion, record the discussion in each small group, and transcribe all comments made by three selected children (one very shy, one outspoken, and one very knowledgeable in science).
- *They are discussed.* The faculty, sometimes joined by outside educators, discusses the research lesson during a colloquium or panel discussion. Typically, such a gathering begins with presentations by the teachers who planned and taught the lesson. Then, teachers who observed the lesson comment on its strengths and weaknesses and ask questions. Often an invited outside educator or researcher also comments on the lesson.

Types of Research Lessons

The most common research lesson is the in-school research lesson (*kounai kenkyuu jugyou*). These take place regularly at ordinary elementary schools throughout Japan. As one Japanese elementary teacher told us:

> The research lesson system is valued very highly by Japanese teachers. You find it even in very isolated mountain schools where there are fewer than twenty students. You won't find a school without them. That's one reason why the education throughout Japan is fairly standard, whether you're talking about Tokyo schools or the remotest mountain school.

Another teacher told us that research lessons were common because they were of such basic importance: "Why do we do research lessons? I don't think there are any laws [requiring it]. But if we didn't do research lessons, we wouldn't be teachers."

Teachers themselves decide the theme and frequency of research lessons. At the schools we studied, the lessons might occur several times a year or even as often as once a month.

A second type of research lesson is the public research lesson (*koukai kenkyuu jugyou or gakushuu kenkyuu happyoukai*). These research lessons are open to teachers from outside the school, and invitations may be sent to educators in the local district, the region, or even the whole of Japan. When schools receive grants to develop some part of their educational program—such as computer instruction or international education—they are often expected to conclude their work with a public research lesson. Public research lessons like these also help prepare teachers for changes in Japan's national curriculum. For example, when a new subject—life environment studies—replaced science and social studies for first and second-graders, teachers flocked to research lessons at schools that had pioneered the new subject.

Perhaps the largest and best-known public research lessons are those conducted several times a year at national elementary schools, the seventy-three selective-admission public schools throughout Japan where new educational approaches often originate. When we emerged from a Tokyo subway station in 1996 to attend a research lesson at a national elementary school, the broad walkways leading to the school were jammed with educators from all over Japan, in a scene reminiscent of the huge crowds that pay homage at shrines on New Year's Day. During the two days of research lessons, the elementary school attracted nearly

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five thousand educators. As lessons went on throughout the school, dozens of teachers crowded inside each classroom, and dozens more looked in from the hallways through large sliding windows. Visitors all received background materials on lesson goals, philosophy, and the larger unit of which the lesson was a part. During panel discussions following the lessons, they questioned the teachers about their lessons, exchanged views, and listened to the teachers' own assessments of what went well and what went poorly.

Research lessons occur in many other contexts. For example, at the annual conference of Japan's Elementary Science Education Association, which rotates yearly to different regions of Japan, the thousand or so teachers who are attending spend most of their time observing and discussing research lessons. Only at the end of the conference do participants assemble for a plenary session. Research lessons are also central to the work of many teachers' study circles and school districts' professional development (for example, the required professional development that is provided in some districts during the first, fifth, and tenth years of teaching).

Like Rings of Water in a Pond: The Impact of Research Lessons

Research lessons are centered in the practice of ordinary teachers in ordinary classrooms. But their impact does not stop there because, at the same time, a mechanism exists that allows these examples of good practice to be disseminated all over the country and thus contribute to the improvement of Japanese education.

1. Improving Classroom Practice

The teachers we interviewed were often very specific about the role research lessons had played in their own professional development. For example, the comments from other teachers helped them to see things about their teaching that might otherwise have escaped them. One teacher put it this way:

> Research lessons help you see your teaching from various points of view.... A lesson is like a swiftly flowing river; when you're teaching you must make judgments instantly. When you do a research lesson, your colleagues write down your words and the students' words. Your real profile as a teacher is revealed to you for the first time.

The comments on a research lesson often take the form of tips and suggestions like the ones offered to these three teachers:

> As a brand new teacher, my colleagues who saw my research lesson told me I talked too fast. They were right. My students were having a hard time keeping up with what I said, and I didn't even know it!

> I was told after a research lesson that I talked too loudly and scared the children. I had never taught first grade before, just upper grades, and I didn't realize how big my voice sounded to young children. They weren't used to a male voice.

> A teacher who saw my research lesson commented that it was taking me a lot of time to write on the blackboard each word of every student comment—that I should just write brief phrases instead.

In one research lesson, an observing teacher told her colleague, "Only 47 percent of the children spoke up today during your science lesson. To increase participation, you might have quickly polled all students, especially since you already had their names on magnets."

When we asked how they had been able to change their teaching practice from lecture-centered to student-centered science, teachers often mentioned strategies they had picked up at research lessons. One teacher talked about a technique for bringing the previous day's discussion back to life:

> I've learned a lot from [the research lessons given by] other people. For example, to write on chart paper rather than the blackboard. That way, you can save it as a record. You can pull it out at the beginning of the next lesson, and the image of the prior lesson comes to mind immediately. Typically . . . there are some kids who have a hard time remembering. But if you have the poster paper, everyone can remember. You can also pull out the charts to show the path of learning over the year; you can reflect on the path of learning.

The same teacher said that a research lesson had taught him how to get a debate going when an overwhelming majority of the students are in basic agreement about the point under discussion:

> If there's just one child holding the "B" point of view, and the rest of the class holds the"A" point of view, the child holding B may feel bad if you stimulate a debate between views A and B. The B child may feel alone, and want to switch to be with the majority. That's a kind of torture for children. One thing many teachers will do in that situation is to take the B point of view themselves. But then the teacher is talking a lot, instead of the students. What I learned is that you can ask children how sure they are of the viewpoint they espouse. Are they 100 percent sure, or 80 percent sure, or half sure? Then you can ask what their doubts are about the idea, and have a debate between people who do and don't have doubts of a certain kind.

In addition to seeing research lessons as a source of feedback and of new techniques, teachers described how the lessons influenced their philosophy of teaching. For example, one teacher recalls that research lessons led to a radical change in his ideas about education:

> [Before I joined the teachers' research group], I had always seen education as teachers giving knowledge to children, as a top-down process. Through my work with the elementary science research group, I came to see education not as giving knowledge to children but as giving them opportunities to build their own knowledge. Initially, that was not what I believed. Even when I saw it in practice, I couldn't believe in it at first. When I first saw lessons in which children were building their own knowledge, I thought, "Is this kind of instruction really OK? It takes so much time." But then I began to realize that if children don't experience something, they don't understand it. They can memorize it, but when the time comes to use it, they can't.

2. Spreading New Content and Approaches

When a new topic—such as solar energy—is added to the curriculum, it often becomes a popular focus for

research lessons. The research lessons, which are held at schools where the new curriculum is developed and tried out, give teachers a chance to think through problems and question other teachers who have already worked with the new material in the classroom. In the discussion that followed a fourth-grade research lesson on solar energy, a teacher, who obviously did not consider herself an expert on the subject matter, was able to resolve a question that troubled her:

> I want to know whether the three conditions the children described—"to put the battery closer to the light source," "to make the light stronger," and "to gather the light"—would all be considered the same thing by scientists. They don't seem the same to me. But I want to ask the teachers who know science whether scientists would regard them as the same thing.

In addition to helping teachers understand new content being added to the curriculum, research lessons can also give them a chance to talk and think about the reasons for the changes. After the same solar energy research lesson, another teacher commented:

> I haven't taught fourth-graders for a while, so I have no idea how and why solar batteries were added to the curriculum. I'm only guessing that including solar batteries reflects adults' hope that children will become . . . interested in solar energy and thereby help Japan. Science education specialists might be concerned about children using the proper vocabulary or setting up certain experimental conditions, but if the goal of including solar batteries in the curriculum is to get children interested in the fact that electric current can be changed by light, then Mr. Hori's lesson fulfilled that. So I'd really like to know the reason why solar batteries were included as a new curriculum material for fourth-graders.

When we asked principals how they helped teachers shift to "life environment studies," the subject that replaced primary science and social studies, many, like this assistant principal, mentioned the importance of research lessons:

> The way to improve life environment studies is to see many good actual examples. We can do that by going to lots of schools that are doing presentations and research lessons on life environment studies. Many people from this school have gone. Each school has its own way of approaching the new subject. Some are appropriate for your school, some aren't. What works elsewhere might not work at your school because the children are different. So you need to see lots of examples.

3. Connecting Classroom Practice to Broader Goals

In recent years, as concerns that Japan's students are passive, unimaginative test-takers have dominated the Japanese press, national educational guidelines have increasingly emphasized student qualities such as "initiative," "autonomy," "desire to learn," and "active problem-solving." As already evident in some of the earlier examples, the qualities discussed and advocated at the national level often find their way into the goals chosen by school faculties for their research lessons.

For example, in a school that had chosen student "initiative" as its research goal, third-grade teachers who used to start the science unit on sound by asking students "What is the connection between sound and vibration?" redesigned the unit so that it began by having students build musical instruments. Their intent was to provoke *students* to ask about the connection between sound and vibration, rather than have teachers introduce the question.

In another school, where stimulating students' "desire to learn" was chosen, teachers who had formerly taught about levers using small desktop models decided on a new approach. They would make poles and ropes available and challenge students to lift 40-kilogram sacks of sand using classroom furniture as fulcrums. Teachers talked about the effect of the materials on their goal of building students' desire to learn: "How can you discover the beauty of a lever if you're using it to lift something you could lift easily with your bare hands?"

Research lessons provide an opportunity for teachers to discuss big ideas currently shaping national educational debate, think them through, and bring them to life in the actual classroom. The impact of research lessons in connecting teachers with practice outside their school is reflected in the comments of teachers who said they attend national school research lessons "to see where Japanese education is going" and "to find out what's new."

Teachers also reported that research lessons connected them with teachers *within* their schools. A teacher who had just completed a research lesson commented:

> The research lesson is not over yet. It's not a one-time lesson; rather, it gives me a chance to continue consulting with other teachers. For example, I may say to other teachers, "I want to ask you about my last lesson you saw. . . ." Then, the other teachers can provide me with concrete suggestions and advice because they have seen at least one lesson I conducted. We teachers can better connect with each other in this way.

4. Exploring Conflicting Ideas

Research lessons can also give teachers a chance to bring up, discuss, and perhaps reconcile competing goals or visions of education. The following discussion occurred after the pendulum research lesson:

> Host Teacher: We have the feeling that recently in science education the process has been overemphasized and the results and conclusions underemphasized. We feel that the conclusions—what you might want to call children's knowledge—have been underemphasized of late. Why is a lesson good simply because children are active?
>
> Visiting Teacher: If children are making connections with daily life, then that's science. [Reads a quote to that effect from the national science Guidelines.]
>
> Host Teacher: Not just any kind of experience qualifies as science. If children leave here thinking that weight makes a difference in a pendulum swing, then there's something wrong with the scientific process that's going on here.
>
> Visiting Teacher: Do you call it scientific reasoning if they get the right answer, but not if they don't? When does it suddenly become unscientific thinking?

Research lessons expand teachers' ideas of what teaching can be.

In this conversation, two views of science education are coming into conflict. Is it more important to have students gain the factual knowledge that weight does not influence pendulum cycles or to be active, interested scientific experimenters? The research lesson system increases the likelihood that such opposing views of education will bump up against each other and that teachers will be forced to listen to and consider views different from their own.

In the discussion following a research lesson on solar batteries, several people suggested that the teacher should have used the students' words, rather than his own, to summarize the lesson. One teacher said, "I felt sorry for the students when the teacher concluded the lesson with his own summary statement." Another agreed that the teacher had pushed students' results into his own summarizing statements. Yet other teachers disagreed. One said:

> I don't agree...that students' ideas were somehow stifled by the teacher's summary. As someone who doesn't know much about electricity, I found the teacher's summary helpful. Students who, like me, have limited knowledge about solar cells may have found the teacher's statement helpful, after hearing such a wide variety of [student] opinions.

As recent battles over both reading and mathematics attest, U.S. education is often plagued by pendulum swings between different educational approaches. How often do U.S. teachers have opportunities for conversations like the one above, where Japanese teachers debated the importance of facts vs. process in the context of a lesson they had all watched? Research lessons bring together teachers from the whole spectrum of viewpoints to plan, view, and discuss lessons. It seems likely that the more frequently different educational philosophies come into contact around a shared lesson, the more likely teachers are to notice the strengths of approaches that are different from their own and modify their practice so, for example, it attains a balance between scientific content and inquiry. An American teacher who saw our videotape of a Japanese research lesson commented: "How different American mathematics education might be if we saw each other's lessons and found out what other teachers actually meant by terms like 'constructivism.'"

5. Creating Demand

Richard Elmore (1996) has made the case that education in the U.S. suffers not from a low *supply* of good educational programs, but a low *demand* for those programs. Demand occurs when teachers want to improve their practice—and when they can see the possibility of doing so. Research lessons expand teachers' ideas of what teaching can be. One Japanese teacher recalled how, early in her career, she burst into tears after seeing a wonderful research lesson by her fellow first-grade teacher:

> I felt so sorry for my own students. I thought their lives would have been so much better if they'd been in the other teacher's class. You realize you have had a big impact on your students. You see how authoritarian teachers have very quiet classes. Teachers who value students' ideas have very active classes. You see how teachers are creating a class, not just teaching a lesson. The teacher's way of speaking and the teacher's way of getting angry are all passed on to the students.

Several principals expressed the view that research lessons build momentum for improvement much more effectively than direct leadership by the principal (see also Bjork, unpublished). One principal, a science expert, explained that he could have instructed his teachers who, he said, did not "know much about science." However, he relied instead on research lessons to stimulate demand for improvement among teachers:

> It is necessary for teachers themselves to think about how to teach science, to tell their ideas frankly to other teachers, to get ideas from other teachers, and to improve themselves. The teachers in this school don't know much about science, but with their own knowledge, they will express their opinions as to what kind of lessons they want to do and what kind of teaching materials they want to develop.... Since there isn't a science specialist here, they don't know at all whether their ideas are good or bad. They come to me, but I try not to interject my own ideas. So who can advise them? Since this school will be...the site for the National Science Teachers' Association conference, teachers in Tokyo will assist this school because they want the research lessons at the Tokyo conference to be successful. Members of the Science Teachers' Association in Tokyo want to assist us. Our teachers can discuss with them how to design the flow of the lessons, and what kinds of teaching materials should be developed. Based upon their exchange of opinions, our teachers will redesign lesson plans...and then, they will conduct the research lessons. Our teachers and those teachers who assist them...will improve themselves together. That is how we work together.

6. Shaping National Policy

As already noted, research lessons are influenced by national educational policy, but, on occasion, the influence goes in the other direction. Solar energy, for example, entered the national *Course of Study* after individual classroom teachers pioneered research lessons on the topic. These lessons spread among teachers through the research lesson system, and were noticed by members of the national curriculum committee.

A second way in which research lessons can influence national policy is through the outside commentators invited to research lessons. Commentators are

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often classroom teachers, but they may also include principals, district resource teachers, university professors, and policymakers. When such people observe research lessons, they get instant feedback on how students and teachers are grappling with new subject matter, or with vague new national goals such as "initiative" and "autonomy." For example, one invited commentator at the solar energy lesson was an elementary school principal who had served on the Ministry of Education committee that added solar energy to the national curriculum. At research lessons, he could see how this new content area was actually brought to life in the classroom, hear teachers' questions and concerns, and see how students were dealing with the new content. He could share this information with individuals in a position to shape curriculum and textbooks, and he could spread word of exemplary techniques. Well-known teachers and principals may be invited to dozens of research lessons every year as commentators. They see how new approaches and topics are being implemented and understood in many different schools across Japan. In effect, this amounts to a system of "formative research" in which policy can be informed by actual classroom education.

7. Honoring the Role of Classroom Teaching

As is undoubtedly clear, research lessons acknowledge Japanese teachers' central position in Japanese education. Teachers are not expected to be passive recipients of whatever new reform comes along; they help to shape and change classroom education. Japan's national educational guidelines underscore the idea that policy is created in the classroom, not on paper. These guidelines are remarkably terse. The entire Japanese *Course of Study for Elementary Schools* takes up just 122 pages of a 6 x 8 ½ inch booklet. The additional volume provided for each subject area is also brief and does not specify the particular teaching materials to be used. (The volume for all of elementary science, for example, covers 116 pages of a 6 x 8 ½ inch booklet.) The changes made to these documents—about once a decade— are often brief, abstract descriptions of new goals: "autonomy," "initiative," "desire to learn," "problem-solving capacity." When we first began our research, we found that goals this vague—provided without accompanying concrete examples—were frustrating. Yet they probably reflect an underlying assumption that policymakers cannot define good classroom practice; rather, research lessons provide a systematic way for teachers to bring policy to life, thoughtfully and collaboratively, in the classroom.

Research lessons also provide a way for Japanese classroom teachers to rise to national stature while remaining in the classroom. Although teachers do not receive increased salary or position because they conduct research lessons, they do, in some cases, become known throughout Japan, often publishing books and articles about their lessons. As we have interviewed teachers in various regions of Japan about the influences on their science teaching, we've had the odd experience of hearing them talk about teachers whose lessons we have also observed: "I don't know him, but I saw his research lesson nine years ago, and I realized I had seen a real student discussion for the first time," said one Nagoya educator, about a Tokyo teacher whose lessons we had both seen, albeit eight years apart. The research lesson system provides a route to become nationally known that does not lead inexorably out of the classroom. It encourages teachers who have attained a high level of proficiency to remain in the classroom where they can continue to refine their craft and guide others who seek to become skilled teachers.

Research Lessons: What Are the Supporting Conditions?

Though it is difficult to isolate all the conditions that have made it possible for this extraordinary system to take root and flourish, here are several features of the Japanese educational landscape that have clearly played a part:

1. A Shared, Frugal Curriculum

The Japanese have a national curriculum, and by U.S. and world standards, it is very spare. As TIMSS (Third International Mathematics and Science Study) researchers found, Japanese eighth-grade science textbooks cover just eight topics, compared to an average of more than sixty-five for U.S. eighth-grade textbooks (Schmidt et al., 1997). Japanese textbooks are all brief, so there is substantial time to cover each of the small number of topics they study. For example, Japanese fifth-graders are expected to spend twelve science periods studying levers, although there are just a few pieces of knowledge that they are expected to take away. This allows plenty of time for hands-on exploration of how the force needed to lift an object differs depending on where the fulcrum is placed. Since Japanese teachers have a relatively large number of class periods to help students master a relatively small amount of science content, teachers can devote time to studying the most effective ways to present it, rather than to wading through massive textbooks to figure out what's really important to teach (Lewis & Tsuchida, 1997, 1998; Stigler & Hiebert, 1997). The education standards, which are in the works in most states, could make U.S. science curricula more manageable but only if the people putting those standards together are willing to make some tough choices.

2. Collaboration Among Teachers

Collaboration is routine for Japanese teachers, so even without research lessons, teachers would not be isolated from one another as they commonly are in the United States. Japanese teachers plan lessons together as well as thirty or more days per year of schoolwide activities; they work together on many schoolwide committees; and since substitutes are not hired for short-term absences, they cover classes for one another. (Lewis, 1995; Sato, 1996; Sato & McLaughlin, 1992; Rohlen & LeTendre, 1996; Shimahara & Sakai, 1995). Accounts of Japanese elementary school life suggest that collaboration among students is emphasized and competition avoided (e.g., Lewis, 1995). And teacher collaboration is undoubtedly part of the same cultural attitude. Electing a "teacher of the year" is, for example, an American practice that surprises many

Japanese teachers who visit the U.S.

The oft-noted finding that the Japanese attribute success to hard work rather than ability (Stevenson & Stigler, 1992) is not limited to students. Teachers also believe that they can improve their teaching if they work hard at it, and collaborative study of lessons is seen as an important way of doing this:

> Our textbooks are very thin, with few explanations. . . . Teachers have to fill in the blanks between the lines in the textbook. That is why we have to study about lessons. . . . Unless you improve your own skills, you can't do a good lesson even with a good lesson plan or good textbooks. Precisely because of this belief, we all do open lessons and try to improve our teaching skills. If you isolate yourself and do whatever you wish to do, I don't think you can ever conduct good lessons.

Japanese teachers do not feel that collaboration is antithetical to developing one's own ways of doing things. Far from it, as two Japanese teachers indicate:

> Even if you copy someone else or are copied by someone else, I don't think anything can be absolutely the same. So, I think it is all right to copy others.

> If you shoot for originality too early in your development as a teacher, you're likely to fail. Initially, you must take a lot from others. But ultimately, to move to a higher level of teaching, your lesson must become your own original thing, not simply imitation of others. But it's through imitating others' lessons that you create your own authentic way of teaching.

It is *not* the case (despite accounts to the contrary) that Japanese elementary teachers have more time for collaboration than their U.S. counterparts; daily time with students is comparable or longer in Japan (see Lewis, 1995). However, general support for teachers and for their professional development activities may be greater in Japan (U. S. Department of Education, 1987). For example, Japanese parents expect that children will return home early on the regular occasions when teachers meet to discuss research lessons or attend research lessons at other schools.

3. Self-critical Reflection

Within Japanese schools, as within the larger Japanese culture, *hansei*—self-critical reflection—is emphasized and esteemed (Lewis, 1995; Rohlen, 1976). Teachers and students both set goals for self-improvement in a "quest for character improvement [that] is close to being a national religion" (Lewis, 1995; Rohlen, 1976, p.128). At the same time, there is much less emphasis on external evaluations (merit reviews, checklist evaluations, etc.) of teachers, and this undoubtedly creates a greater feeling of safety about revealing one's weaknesses (Bjork, unpublished; Heine & Lehman, in press). Criticizing oneself has a decidedly different emotional meaning when it is established and valued, as it seems to be in Japan. Indeed, identifying one's shortcomings and gracefully accepting criticism seem to be ways of showing competence, not failures to be avoided. Nor is a critique typically focused on a single individual; collaborative planning of research lessons means that criticism is generally shared with several colleagues.

4. Stability of Educational Policy

Although some Japanese educators complain that Japanese education is slow to change, (Shimahara & Sakai, 1995; Horio & Platzer, 1988), overall stability may make it easier to concentrate on policy changes that do occur. The comments of a Ministry of Education official suggest a surprisingly long timetable for change:

> We change the *Course of Study* about every ten years. But the truth is that ten years is too short a time to change classroom education. If we greatly changed the *Course of Study* every ten years, teachers would be turning their heads this way and that so often that their necks would break. So we make major changes in the *Course of Study* only every twenty years or so, and in between it's just fine-tuning.

Epilogue

On day two of the research lesson, Mr. Ohara begins science class by asking students to report the results of the previous day's experiments. As students volunteer their results, he records them on the blackboard and then regards the findings with a puzzled expression: "From these results here, I can't say at all what we found—if we found that [variable] A, B, or C, was important. Here it says A alone; here it says C alone. . . . What should we do? . . . Different groups found different results." Students comment that some students changed weight at the same time as length, and several students offer the opinion that everything but the variable under study needs to be kept the same. Students then suggest crossing out the experiments that don't meet this criterion. When this is done, a pattern suddenly emerges: The properly controlled experiments show that the length of the pendulum, but not the weight, was important. As students see that the controlled experiments give clear results on two of the variables, the feeling of "aha" in the classroom—not just among students, but among the observing teachers—is almost palpable.

For us as observers, the second day's lesson was stunning. Believers though we were in the power of student-centered instruction, we never imagined that the sloppy experiments of the prior day could be salvaged, let alone turned into such a powerful "aha." Although much remains to be learned about the nature and impact of research lessons in Japan, we felt no doubt about its dramatic impact on us: Mr. Ohara's lesson pushed us to think, in ways large and small, about the nature of good teaching, about how good practices are honed and spread, and about how teachers can be recognized and supported as they reinvent policy in the classroom. □

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