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ABSTRACT

The Third International Mathematics and Science Study (TIMSS) results suggest to American citizens that compared to the United States' goal of excellence among nations, the U.S. is not on track with other nations. By contrast, Japan is consistently at the top of international rankings in mathematics and science. To gain insight into the Japanese education system success, the U.S. Department of Education commissioned a case study that is documented in "The Educational System in Japan: Case Study Findings" (The Japan Study). The Japan Study, summarized in this report, indicated that one possible explanation for Japan's success is that the educational system actively works to build students' motivation to learn. This study highlights how the Japanese system works to motivate students. The report is divided into four sections: (1) academic standards; (2) individual student differences; (3) adolescent life; and (4) teacher life. Academic standards are set by the Japanese Educational Ministry for all students in mathematics and science. The Ministry focuses on creating well-rounded students in the elementary and junior high school and sets the number of hours per subject in the national elementary school curriculum. Whole-class instruction is used in most elementary school and junior high school classes. This teaching method has students of all ability levels cover one subject at the same pace interactively in one classroom. The focus of the instruction is to emphasize effort over ability, engage students, build strong classroom relationships, and unify the classroom. After school activities for adolescents support the educational goals. This is accomplished through school clubs, supplementary classes, and friendships formed at the clubs and classes that contribute to school values. Japanese schools support an atmosphere of collegial student interaction and teacher interaction that helps to motivate student learning. Although some Japanese students still have motivation problems, part of the explanation for student success in mathematics and science in Japan is due to an education structure that works to build student motivation. (JH)

Japanese Education System: A Case Study Summary and Analysis.

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The Japanese Education System: A Case Study Summary and Analysis*

Table 1.—TIMSS rankings of Japan and the United States at the 4th and 8th grade levels (rank/no. of participating countries)

Grade and Subject	Japan	U.S.
4th grade Math	3rd/26	12th/26
4th grade Science	2nd/26	3rd/26
8th grade Math	3rd/41	28th/41
8th grade Science	3rd/41	17th/41

Source: *Pursuing Excellence.* OERI, U.S. Department of Education. (4th and 8th grade Studies).

The Third International Mathematics and Science Study (TIMSS) results suggest to American citizens that "compared to our goal of excellence among nations, we are not where we aim to be." The TIMSS scores show that American 4th-graders do well in science, but that otherwise there is plenty of room for improvement in both mathematics and science.

By contrast, Japan remains consistently at the top internationally in both math and science. The Japanese education system may offer useful lessons for enhancing teaching and learning in the United States. To gain insight into the Japanese education system's success, the U.S. Department of Education commissioned a case study, documented in *The Educational System in Japan: Case Study Findings* (The Japan Study).

The Importance of Motivation

The Japan Study indicates one possible explanation for Japan's success in TIMSS: the Japanese education system actively builds students' motivation to learn. Each section of the Japan Study offers vivid examples of how the system works to motivate Japanese students. The Japan Study's four sections concern (1) academic standards, (2) individual student differences, (3) adolescent life, and (4) teacher life.

*This report was prepared by Angela Wu, a summer intern with the National Institute on Student Achievement, Curriculum, and Assessment, Office of Educational Research and Improvement, U.S. Department of Education.

National Standards Define a Well-Rounded Education

Many educators are focusing on the role of curriculum standards in education systems, and some observers believe that Japan's challenging national math and science standards explain students' success in TIMSS. The standards set by the Japanese Educational Ministry for all students do indeed provide the framework for offering students challenging and interesting curricula in mathematics and science. Interesting material certainly makes a difference for attracting students' attention to learning.

There is more, however, to the story of Japanese students' success. The Japanese Education Ministry highlights creating well-rounded students at the elementary and junior high school level through the various subject areas in the national curriculum. They set standard hours per subject in the national elementary school curriculum, emphasizing subjects such as "music, arts and handicrafts, and homemaking," "physical education," and "moral education," as well as math and science. The standards also devote a large amount of time to "Japanese language" and "life activities," a subject that gives younger students personal life experiences in preparation for classroom-oriented science. In life activities class, students participate in activities such as picking flowers, catching frogs and insects, raising rabbits, and watching falling stars.

Table 2.—Standard number of hours spent in various subjects in Japanese elementary schools

Subject	Grade					
	1	2	3	4	5	6
Arithmetic and Science	136	175	280	280	280	280
Life Activities	102	105	105	105	105	105
Japanese language	306	315	280	280	210	210
Music, arts & handicrafts, and homemaking; Physical education; Moral education; Special activities	306	315	315	350	420	420

Source: Jichi Sogo Center, 1991.
Note: Implemented in April 1992.

The Japan Study suggests that Japanese schools' focusing on all of the subjects in a well-rounded education serves several purposes:

Student Engagement: The elementary school curriculum recognizes the importance of activeness, "because young children cannot sit still for such long days." The junior high school curriculum recognizes the value of fun and interaction by allowing time for socialization and special nonacademic activities, such as camping trips.

Strong Classroom Relationships: The well-rounded curriculum allows students frequent and varied opportunities to interact, creating a welcome classroom community.

Student Motivation: When students find subjects they enjoy and feel welcome at school, they identify positively with school and feel motivated to learn.

Whole-Class Instruction Attends to Individual Differences

In Japanese "whole-class instruction," students of all ability levels cover one subject at the same pace interactively in one classroom. For example, instead of strictly lecturing, math teachers ask individual students to stand up to present their solutions to the class, and then ask members of the class to evaluate each solution. Whole-class instruction is used in the majority of Japanese elementary school and junior high school classrooms.

Whole-class instruction seems to play a large role in the Japanese students' academic success. This is contrary to a popular belief that Japanese schools cram their top students with intensive math and science drills from an early age to produce high achievement. Only later in junior high do tracking and drilling for high school entrance examinations begin. Japanese whole-class instruction seems to offer greater motivational support than tracking and drilling by:

- **Emphasizing Effort Over Ability**
- **Engaging Students**
- **Building Strong Classroom Relationships**
- **Unifying the Classroom**

Emphasizing Effort Over Ability—A Japanese teacher explains, "As far as inborn ability goes, I can't say that it isn't there, but I say that it doesn't matter. Regardless of whether you have ability, if you persevere, you can get a good outcome." To prevent the slower students from being discouraged, Japanese classrooms work on the same problem together, making sure everyone catches up to the class' pace. Teachers let students choose their own partners when completing seatwork to avoid labeling students as fast or slow learners.

Engaging Students—It has long been known that presenting math in terms of concepts rather than calculations engages students. In whole-class instruction, Japanese teachers go beyond simple conceptual learning by purposely withholding the correct answer to a problem, asking the class to think of as many ways to solve the problem as possible. Presenting material as a sort of puzzle sparks their curiosity in the subject matter and encourages them to participate.

Motivating Students

When students feel that they are given a chance to achieve as long as they work hard, the subject matter is interesting, the classroom environment is encouraging, and the class is working together toward the same goal, they identify positively with school values and are motivated to learn.

Unifying the Classroom—Whole-class instruction unifies classrooms because students work on the same material together at the same pace. This common sense of purpose is reinforced by classroom mottos such as "If there is a good thing to do, all of us will do it together." Individual students feel motivated to learn when they identify with class goals.

Building Strong Classroom Relationships—While students look to teachers for comprehension and evaluation in American classrooms, students look to each other in Japanese whole-class instruction classrooms. The teacher asks the class to evaluate individual students' solutions to math problems. When given seatwork, those who understand usually offer to help those who do not. While some may complain that whole-class instruction brings advanced students down to the below-average level, it allows these students to learn how to cooperate with people of diverse abilities and backgrounds. Learning how to interact with others is so important to the Japanese that they consider it a form of "studying." The Japanese classroom's competitive but cooperative atmosphere serves to motivate all students to learn from their classmates.

Adolescents' After-School Activities Support Educational Goals

Do Japanese students do better because they spend more time on homework? According to TIMSS study findings, Japanese and U.S. eighth-grade students on average spend the same amount of time—between 30 minutes to an hour—studying math and science homework each day. Japanese adolescents do not spend more time than U.S. adolescents on homework, but the structure of their daily routines provides more consistent support for educational experiences. Japanese students' participation in other after-school activities may encourage their in-school striving and high academic performance:

School Clubs

The Japan Study authors report that "at both junior high and high school, teachers believe that there is a strong link between participation in clubs and success in academics." Over half of all Japanese junior high students spend 2 to 3 hours per day after school and on weekends in student-organized school clubs, such as broadcasting, Japanese fencing, or brass band. Teachers and parents see club participation as academically motivational because it makes for a more well-rounded school experience. They emphasize the clubs' role of providing opportunities for physical activity and socialization within a school setting.

Juku: Supplementary Classes

Some adolescents choose to spend after-school time at *juku*, privately owned academies that provide supplementary classes for students who pay a fee. *Juku* offers challenging and remedial courses for students who feel that the public schools do not offer enough. Both those who are bored with the slow pace of regular whole-class instruction and those for whom whole-class instruction is too fast can pay for *juku* classes targeted at improving individual academic ability. Many adolescents spend after-school time in *juku* to prepare for entrance exams. Students enrolled in *juku* may also choose to take enrichment courses, such as piano lessons that will round out their individual abilities in nonacademic areas.

Friendships Formed in School Clubs and *Juku* Contribute to School Values

While parents send their children to *juku* to develop individual ability in various areas, many junior high students claim that they attend *juku* primarily to socialize. Clubs also provide ample opportunity for social interaction. Clubs and *juku* channel the social experiences of Japanese adolescents toward educational goals. By contrast, in America, friendships form through commonalities unrelated to school. The goals of peer interaction in America are often so polarized from the school's goal of learning that, according to one teacher, "some kids don't want to show that they're bright because their peers will look down on them." Japanese adolescent friendships made in clubs or *juku* are most often based on school values. For example, many Japanese adolescents see academic competition as contributing toward friendship because it reflects a shared value in achievement: "Rather than trying to do better by undermining others, the students . . . participate in a culture of mutual striving," or a "mutual spirit of competition and cooperation." Students preparing for entrance exams do not see themselves competing directly with their friends, but rather competing indirectly with a large pool of applicants. When Japanese students play down potential antagonisms with friends by sharing school values, they maintain the internal harmony of the school and motivate each other to learn.

Teachers' Support of Collegial Interactions Cultivates a Positive Learning Environment

The Japanese school system does not use an authoritarian, top-down system of school management that emphasizes obedience of students to teachers and of teachers to administrators. Japanese schools actually employ a much more collegial system than most American schools, a system that cultivates an atmosphere of high-quality instruction and learning:

Collegial Student Interaction

Japanese teachers do not exercise stern authoritative control over their classrooms. As mentioned earlier, Japanese elementary school whole-class instruction encourages students to respond to each other's learning, emphasizing that the teacher's way is not the only way to solve a problem. In addition, instead of placing blame on a particular student for discipline problems, teachers let students discuss and resolve classroom conflicts on their own. At the high school level, teachers encourage collegial management by having students run their own clubs.

Collegial Teacher Interaction

Japanese teachers collaborate in a school management system as collegial as the students' classroom interaction. Teachers display a strong desire to improve themselves by learning from each other through frequent interaction. They chat about how to align their curriculum and how to improve their teaching techniques. Sometimes teachers sit in on other teachers' classes to learn from observation. This interaction is especially helpful for first-time teachers, who learn from the expertise of their colleagues.

Formal decision-making takes place in a wide variety of committees of teachers, administrators, and students. According to the Japan Study, "this complex organizational structure forces participation of all teachers in school management that . . . provides for the distribution of power and shared decision making."

Collegial Interactions Among Students and Teachers Motivate Student Learning:

1. When students are expected to cooperate with each other to learn, they are less likely to become discouraged because their peers are not viewed as competing adversaries, but as encouraging friends.
2. When students are given some measure of autonomy, they feel that their ideas are respected, and they become more confident about their ability to learn.
3. When students are given the chance to make school policies and to teach their peers, they are more likely to want to participate in school and classroom affairs.
4. When higher authority refrains from forcing policies and lessons on students, the students are more receptive to these policies and lessons.
5. Collegial relations among teachers motivate them to teach well, much in the same way students are motivated to learn. Motivated teachers not only provide better quality lessons, but also are more willing to encourage their students.
6. When teachers coordinate their lesson plans and techniques with other teachers, they become more effective in reaching out especially to problem students.
7. Motivated teachers who cooperate collegially are role models who inspire their students.

Some Japanese Students Still Have Motivation Problems

Japan has succeeded in producing many motivated students through developing a well-rounded curriculum, using whole-class instruction, encouraging school-related after-school activities, and supporting collegial teacher and student interactions. However, some students may still fall through the cracks of Japan's system. The Japan Study identifies several common student motivation problems:

1. *Loss of interest in school.* As students advance towards high school, "the pressure of the entrance exams appears to play a role in making instruction in the five basic subjects more hurried and intense." Students who are already discouraged or behind appear to lose interest in classes that increasingly rely on lectures, drills, and reviews.
2. *School-refusal syndrome.* Students who "have problems fitting in socially" are most likely to develop "school-refusal syndrome." The 10,000 elementary school students and nearly 50,000 junior high school students with school-refusal syndrome may not come to school for weeks or months. The remedy is usually "to reconnect students gradually to the social life of the school" by encouraging them to attend one non-academic class a day and engaging them in more school activities.
3. *School violence.* There is a growing concern about school violence in Japan, which many teachers attribute to a breakdown of human relations between parents and children, as well as teachers and students.

The Japanese education system is by no means perfect in its effort to build motivated students. However, the problems listed above reflect the necessity for educators to concentrate further on strengthening student motivation. The explanations and remedies to these problems reinforce the importance of striving for a well-rounded curriculum and school-based friendships as effective motivation-building principles.

Conclusion

The Japan Study suggests that part of the explanation for Japanese students' success in TIMSS is that the Japanese education structure helps build student motivation. Japanese national standards motivate students to learn through a well-rounded curriculum that engages students and builds strong classroom relationships. Whole-class instruction helps Japanese schools motivate their students by emphasizing effort over ability, engaging students, building strong classroom relationships, and unifying students under a common goal. Because Japanese adolescents participate in school-related activities such as school clubs or supplementary *juku* classes after school, they develop an attachment to school values, especially through the school-based friendships strengthened through these activities. Collegial management of student and teacher interactions in Japanese schools creates a positive environment that builds student motivation. While some Japanese students still have motivation problems, the Japanese recognize that the remedy to these problems lies in expanding upon motivation-building principles.

Where Can I Get More Information?

To request a copy of (1) *The Educational System in Japan: Case Study Findings* or (2) the video *Attaining Excellence: Eighth-Grade Mathematics Lessons: United States, Japan, and Germany,* please call the following toll free number: (877) 433–7827, or e-mail your request to *edpubs@inet.ed.gov*

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