6

Japan: A Story of Sustained Excellence

Japan has been at or near the top of the international rankings on education surveys since those surveys began. This chapter explores how Japan may have achieved this consistent standing and what other countries might be able to learn from the Japanese experience. The Japanese education system is grounded in a deep commitment to children that is concrete and enduring. The research also attributes Japan's success to a first-rate teaching force, superb family support for Japanese students at home, the way resources are focused on instruction and the strong incentives the system provides for students to take tough courses and study hard in school. The school curriculum in Japan appears very coherent, carefully centred on core topics, with a clear goal of fostering deep conceptual understanding. The academic programme follows a logical sequence and is set at a very high level of cognitive challenge. Though it is applied nationwide, Japanese teachers have a remarkable level of autonomy in its application. The entire approach is aided by the shared belief that effort and not ability is what primarily explains student achievement. There is no tracking in Japanese schools, classes are heterogeneous and no student is held back or promoted on account of ability. The system has a great deal of inherent accountability – to one's parents, one's peers and so on. While entrance exams are deeply important for progression to Japanese higher education, the system of teacher accountability in schools is interestingly not based on student assessments. These, and many other factors, have combined to produce one of the world's best-educated and most productive workforces.

INTRODUCTION

The performance of Japan's students in mathematics and science compared with those in the other OECD countries is impressive, and its comparative performance on the PISA reading survey, though not in the very top ranks, is also impressive (Table 6.1). There is nothing new about this consistently good performance; Japan has placed at or near the top of the international rankings on all such surveys since they began.[1]

Some seasoned observers report that average Japanese high school graduates who enter colleges compare favourably with average American college graduates in terms of what they know and what they can do. Less generous observers suggest that they compare favourably to American college students with two years of college. Other observers note that many Japanese high school graduates know more about the geography and history of many other countries than natives of those countries.

Table 6.1 Japan's mean scores on reading, mathematics and science scales in PISA

	PISA 2000	PISA 2003	PISA 2006	PISA 2009
	Mean score	Mean score	Mean score	Mean score
Reading	522	498	498	520
Mathematics		534	523	529
Science			531	539

Source: OECD (2010g), *PISA 2009 Results: What Students Know and Can Do: Student Performance in Reading, Mathematics and Science* (Volume I), OECD Publishing.
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It is tempting to believe that these comparisons are due to the achievement of only a small elite of students, but that is not the case – 95% of the age cohort completes high school in Japan (Figure 6.2).

This has repercussions for daily life. Newspaper articles in Japan routinely assume that their readers can understand sophisticated statistical tables and highly technical scientific topics. Factory managers allocate manuals that assume knowledge of calculus to teams that include recent high school graduates.

The advantage of this level of knowledge and skill to a country, in both citizenship and economic terms, is incalculable. The question asked in this chapter is: How did they do it? And the corollary to that question is: What can other countries learn from Japan that might transcend any cultural differences?

THE JAPANESE EDUCATION SYSTEM: HISTORICAL AND SOCIAL CONTEXT

Japan is a mountainous island nation. The proportion of arable land to population is among the lowest in the industrialised world. Its inhabitants crowd together in the mountain valleys and along the coasts in densely populated enclaves. Japan is also subject to regular frequent disasters such as typhoons and earthquakes, and the regular possibility of crop failure. And, finally, these islands contain very little in the way of readily extractable natural resources. Instead, they have achieved a high level of success through their education system.

A long history in such a challenging environment has had a profound effect on Japanese culture; people developed very strong co-operative ties as a collective survival mechanism. Society recognised early on that a lack of natural resources meant that the best way to succeed was through developing human capital. The result is a culture in which great value is placed on education and skills on the one hand, and on the group and social relations on the other. In Japan there is a shared belief that if the individual works tirelessly for the group, the group will reciprocate. But if one flouts the group, one can expect very little from society. Below we look briefly at how historical factors have shaped Japan's educational philosophy.

The Tokugawa era: 1603 to 1868

Prior to the Tokugawa era, Japanese culture had been a warrior culture. The Samurai had the highest social status in the nation for a long time. During the Tokugawa era, for about 250 years up until the middle of the 19th century, Japan was at peace. From the middle of the 19th century the Samurai, while retaining their social status, replaced their swords with pens to become the bureaucrats who ran the country. Largely isolated from the outside world, Japan prospered and enjoyed a rich culture. By 1850, at least a quarter of the Japanese were literate, putting Japan about even with Europe, although it lagged behind the Europeans in technology and finance.

Towards the end of the Tokugawa era, Japan's government was beset by endemic corruption and incompetence. When the American Admiral Matthew Perry's "Black Ships" appeared in 1853, Japan was wholly unprepared to resist Perry's demands that Japan open for trade on terms favourable to the West. The tottering Tokugawa regime was overthrown in 1868 by a rebellion led by lower-ranked bureaucrats rebelling against the incompetence of the dying regime. The emperor was restored to the throne in the Meiji Restoration.

The Meiji Restoration: 1868 to 1912

During an interview for this report, Robert Fish of the Japan Society described the leadership goals at the time of the Meiji era:

> They were determined to do whatever was necessary to establish a relationship of equals with the Western nations that had entered and humiliated Japan. The new government sent an enormous delegation to the Western nations to rewrite the unequal treaties that had been imposed on Japan. When nearly half of the leadership of the new government crossed the seas, they were astonished at what they saw. Realising that advanced education, science and technology had made possible the industrial strength that had made the "opening" of Japan to the West possible, these Japanese officials came back to Japan determined to match the achievements of the West in education, science and technology and upgrade their military. (Interview conducted for this report)

With almost total consensus across leaders from all sectors, the Japanese determined to modernise their country in order to survive in the new world order. In the field of education, the Japanese scoured the West for ideas that they could adapt to the pressing needs of Japan. Today they continue to compare themselves to their competitors, making national benchmarking arguably one of the most important reasons for their great success in education. The so-called "temple schools" found all over Japan at the end of the Tokugawa era, as well as the elite schools created for the children of the Samurai bureaucrats, provided a strong base on which the new leaders could build the world-class education system to which they aspired.

Meiji Japan borrowed the administrative scheme for its new education system from the French, which could be characterised as centralised and very orderly. From Germany they adopted the idea of an educational system built around a few elite national universities. England provided Japan with a model of schools founded on strong national moral principles (such as "public" schools like Eton and Harrow). And the United States provided a powerful pedagogical paradigm in the teachings of John Dewey – an American philosopher, psychologist and educational reformer – that resonated deeply with the Japanese notion that a school should be responsible for developing the whole child (Dewey, 1902).

The new government, moving quickly to make a modern nation state, decreed universal, compulsory education and abolished the rigid class distinctions in the education system that they believed had crippled the old regime. They needed every Japanese citizen to be as well educated as possible. Therefore, there was to be no tracking or segregation of students by ability or social class in Japanese education. This turned out to be a critical decision, laying the basis for what would become possibly one of the world's most meritocratic societies.

The Imperial Rescript: 1880s to 1940s

In the 1880s there was a reaction against the Meiji government's determination to implement ideas from elsewhere in the world. It aroused deep fears that the essence of what it meant to be Japanese would be lost. The *Imperial Rescript of Education*, released in 1890, was a ringing declaration of the primacy of Japanese values in guiding the evolution of the new compulsory education system. Emphasising the Confucian virtues of loyalty, respect for one's elders, the importance of relationships with other family members, one's spouse and friends, it reminded its readers of the importance of modesty and moderation, the obligation to educate oneself to the fullest, and the duty to obey the constitution and laws. Ever since the *Rescript* was issued, Japanese education policy has been anchored at one end by benchmarking Japan against the world's best education systems and, at the other end, by a firm grounding in traditional Japanese values.

The Second World War to the present day: An emphasis on merit and values

After the Second World War, under American occupation, Japan made nine years of education compulsory (Figure 6.1), provided financial assistance for those students who needed it, and made it possible for every high school graduate to take the college entrance examinations. Previously, only a limited number of special high school graduates had been allowed to take these examinations. These policies reinforced the drive towards the highly meritocratic system that had already begun.

■ Figure 6.1 ■

Japan's education system organisation

Age	Grade	Educational institutions				
3-4		Kindergarden				Special Education
4-5						
5-6						
6-7	1	Elementary School (Compulsory Education)				
7-8	2					
8-9	3					
9-10	4					
10-11	5					
11-12	6					
12-13	1	Junior High School/Lower Secondary School (Compulsory Education)				
13-14	2					
14-15	3					
15-16	1	High School/Upper Secondary School			College of Technology	
16-17	2					
17-18	3					
18-19		University – Undergraduate	Specialised Higher Education	Community College Vocational School		
19-20	Associate					
20-21						
21-22	Bachelor					
22-23		University – Master				
23-24	Master					
24-25		University – PhD	Medical School			
25-26			Veterinary School			
26-27	Ph.D		Dentistry School			
27-28	Ph.D		Pharmaceutical School			

As noted earlier, Japan's challenging environment and living conditions may have shaped the high values placed by the Japanese on the welfare of the group over that of the individual and on group harmony (White, 1988). This sense of being enveloped by the uncritical love of a group is called "*wa*" – a vitally important concept in Japanese society. Critical to happiness, *wa* is sought at every stage of life: first with one's mother, then with the rest of one's family, friends at school and college, and colleagues and superiors at work.

In this environment, individuals gain esteem by doing things that the group values; if a person's actions threaten group harmony, social sanctions follow with wide-ranging repercussions. If one loses the respect of one group, establishing *wa* with other groups can be more difficult. This cultural factor explains why the Japanese work hard to maintain good relations with the groups to which they belong. It also lies behind the good educational performance in Japan.

In Japan a school's reputation depends on the academic performance of the students and on their behaviour. Society holds the school responsible for both aspects in a way that has no parallel in the West. For example, if a student violates the law, the law enforcement authorities call that student's homeroom teacher as well as the mother and all faculty members apologise for the student's behaviour. It is not surprising therefore that Japanese students tend to develop a strong sense of obligation to the faculty and strive to perform well academically and to stay within the limits of the law when not in school. Indeed, the same idea applies to a student's relationship to the other students at school. To fail is to let the group down. Therefore most members of this society will work very hard to do as well as possible, and are always working towards higher goals, because that is the way to earn acceptance and gain status.

The same values permeate the workplace. It is often said that people work very hard in Japan largely to earn the respect and admiration of their colleagues. They do not work hard for personal distinction, but rather for the good of the group. Workers do not "slack off" in Japan, not only because the boss is watching, but also because their peers or staff members of a lower rank are watching. If an employee gives their all, the firm – as with a family – is expected to give back. Japanese firms frequently provide housing, trips, education and even funeral expenses to their employees as part of a remuneration package.

Unlike many societies where advancement depends mainly on connections and clans, Japan is more steadfastly meritocratic according to many observers (Stevenson and Stigler, 1992; White, 1988). While children from wealthier families are statistically more likely to get higher paying jobs than less wealthy children, in Japan this seems to be due

to greater financial investment in a child's education and less due to social connections. Typically, people work their entire adult life for the same firm they joined after school or university, although this is beginning to change. A person's employment in a particular firm is usually a function of the high school or university they attended prior to joining that firm; this is unusual elsewhere. In turn, the high school or university a person attends is based entirely on how a student does in entrance exams.

A mother is judged on her success in supporting the education of her children. In practice, a mother is judged first by the high school that her son or daughter gets into, and then the university to which her child is admitted. Though the trend is changing, few Japanese mothers work outside the home as commonly as mothers in Western countries. Sociologists describe how Japanese mothers are expected by society to make sacrifices for their children who, in return, are expected to perform well in school (White, 1988).

Thus advancement in Japan is a function of merit and determined by examination. This ought not to work, because there are many other important skills which are not measured by Japanese examinations. The exams emphasise memorising and accumulating facts and mastering procedures, rather than analytical thinking, creativity or the capacity for innovation. However, it does work because Japanese employers are mainly interested in three things: applied intelligence, the capacity to learn, and the capacity to work hard and persist in the face of difficulty.

Because Japanese firms generally believe that they will employ people for a long time, there is a strong willingness to invest heavily in the continuing education and training of employees. It is not uncommon for a Japanese firm to send new university recruits overseas during their early years of employment to pursue a foreign graduate programme or as an intern in a foreign plant. Research shows that Japanese firms value candidates who are not just highly intelligent, but ready to learn whatever they need to learn.

Japanese employers want to know not just whether a candidate is smart, but whether he can do something with his intelligence. Employers are interested in *applied intelligence*. Japanese exams are designed to find out how much applied intelligence students can demonstrate and the degree to which they can use their intelligence to do something of value. It is impossible to do well in Japanese exams without working very hard, over long periods of time. This takes discipline and persistence. Many countries talk about the importance of "learning to learn." Japan has done much more than talk about it; the country has built an education system around it.

In summary, from this historical and social background, three points emerge that help to frame the Japanese education context:

- In this persistently meritocratic society, the high school entrance and university entrance exams represent gateways to status in Japanese society.
- The Japanese widely believe that how well one does in these exams depends much more on studying hard than on innate intelligence.
- Exam success does not only reflect on the individual, but also on their mother, the other family members and teachers. This constellation of support shares the responsibility for failure and creates pressure to succeed.

With this background in mind, the chapter will now look more closely at the specific features of the Japanese education system for more clues to the reasons behind its outstanding performance.

THE KEY FEATURES OF JAPAN'S EDUCATION SYSTEM TODAY

A standard and demanding national curriculum

Ryo Watanabe, Director of International Research in the National Institute for Education Policy Research, believes that "Japanese students have done so well on PISA because of the curriculum. Japan has national curriculum standards, or courses of study that define the content to be taught by grade and subject, and every ten years they re-devise this curriculum. Throughout the country, teachers teach based on the national curriculum standards." (Interview conducted for this report)

In theory the curriculum is set by the Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT) with advice from the Central Council for Education. In reality, the key figures involved in setting the curriculum are university professors and ministry staff. While the curriculum defined by MEXT is only for "guidance", the prefectures (a unit of government in between the county and province level) are also funded by MEXT and so generally closely follow the guidance. The guidance curriculum is long and detailed, so MEXT also publishes explanatory booklets, subject by subject, by school level. The curriculum is revised following a regular schedule.

Until recently, there was very little flexibility in the Japanese curriculum, and very little time in the school day for anything but the official national curriculum. In most Japanese high schools, roughly 70% of total available time was devoted to just five subjects: Japanese, social studies, mathematics, science, and foreign language (mostly English). The remaining hours were devoted to gym, music, art, homeroom and other elective subjects.

Even with the recent liberalisation (see section on "How Japan's education system is changing"), there is still less choice for students in the Japanese curriculum than is typically the case in any Western country. This curriculum, combined with the fact that Japanese students spend much more time at school, means that Japanese students have much more time to go into greater depth in these core subjects than in most other countries. They are also very focused on the core subjects in the curriculum because they are not distracted by subsidiary courses.

The curriculum is very demanding. It is also highly coherent, in the sense that it progresses step by step in a very logical fashion from year to year, concentrating in each year on the topics that must be mastered in order to understand the material presented in the following year. Essential subjects are given plenty of time. Each topic is carefully developed and in great detail. In mathematics and science, the emphasis throughout is on the fundamental underlying concepts, which are presented clearly and straightforwardly. Secondary school students routinely master topics in mathematics and science that are beyond secondary school students in other countries. The curriculum could be characterised as being narrow but very deep.

The curriculum requires students at all levels to master a great deal of factual material, such as the different kinds of coal mined or location of rivers in countries on the other side of the world, or the dates of events that occurred long ago outside Japan.

The faithful implementation of this curriculum in every corner of Japan makes it much easier for everyone to hold the system accountable for results. The fact that *all* students are expected to master this very challenging curriculum, and at the same pace, adds to this transparency.

Textbooks in Japan are very lean and compact compared to their counterparts in other industrialised countries. They are very inexpensively produced paperbacks. There is a separate book for each semester, each under 100 pages. The central feature of these textbooks is their attention to the central concepts underlying the course. Teachers do not pick which parts of the text they will use. They are expected to teach the entire textbook, which is the surest sign that all Japanese students are expected to learn to the same standards. Until recently, MEXT had to approve all textbooks used in Japanese schools. Its role in textbook review has recently been significantly curtailed; now it only makes sure that the texts are neutral in content and that they treat the correct topics for the grade level for which they are written. However, given the clear, detailed and coherent nature of the Japanese curriculum, it is not surprising that the textbook publishers still stick very closely to it.

Teaching approaches: An emphasis on student engagement

At first glance, the Japanese approach to instruction violates the most common sense principles. The classes are large by Western standards – 35 to 45 students in a class – and most instruction is for the whole class. There is less instructional technology than in many other countries and fewer instructional aids of other kinds. Students are not separated into ability groups; there are no special classes for the gifted, nor are students pushed ahead by a grade or more if they are perceived to be exceptionally able. Similarly, students are not held back if they are having difficulty. Many students requiring special education are also assigned to the heterogeneous regular classrooms. The job of the teacher is to make sure that all students keep up with the curriculum and they manage to do this. Teachers meet frequently with one another to discuss students who are having difficulty and provide as much individual attention to those students as they can within the regular school day. It is not unusual for students who are not doing well in certain subjects to get extra instruction after school.

Some of the highest student performances in the world emerge from these classrooms. How do they do it? The primary goal of Japanese teachers is student engagement. Many people outside Japan imagine Japanese schools as quiet, intense places where students quietly copy down everything the teacher says. But that is not the reality. Visitors to Japanese elementary schools report that the level of noise is often well above that found in Western classrooms and the sound of laughter and intense conversation fills the school. Students can often be heard excitedly talking with one another as they tackle problems together. The visitor walks down the halls of these schools seeing students acting in plays, playing musical instruments alone and in ensembles or working through a tea ceremony.

The more engaged the students and the more students who are engaged, the happier are Japanese teachers. One might wonder how it could be possible for one teacher to engage 35 or more students in a wildly heterogeneous classroom when it is so hard for teachers in many other parts of the world to engage 25 students in more homogeneous classrooms. The answer is a major key to the success of Japanese education.

Maximising student engagement is central to the Japanese approach to classroom instruction. Japanese teachers put a great deal of thought into their lesson planning. For example, the lesson will often begin with the presentation of a practical problem (Box 6.1). Japanese teachers spend little time on drill or lecturing to their classes. The drilling is done at home or in cram school.

Box 6.1 **Engaging attention**

Harold Stevenson and Jim Stigler, in their classic and still relevant book *The Learning Gap* (1992), describe the beginning of a fifth grade Japanese mathematics class this way:

> The teacher walks in carrying a large paper bag full of clinking glass. Her entry into the classroom with a large paper bag is highly unusual, and by the time she has placed it on her desk, the students are regarding her with rapt attention…. She begins to pull out items… She removes a pitcher and a vase. A beer bottle evokes laughter and surprise. She soon has six containers lined up on her desk. The children watch intently. The teacher…poses a question: "I wonder which one would hold the most water?"

The rest of the class is devoted to answering that question. The students decide that the only way to answer it is to fill the containers with something, and they decide on water. They fill up buckets with water and the teacher asks what they should do next. Eventually the students decide that they should identify a small container and then find out how many small containers full of water it will take to fill each of the containers the teacher brought to class. They settle on a drinking cup. The teacher then divides the class into smaller groups. Each group fills its cups, measures how many cups it takes to fill the containers and records the results in a notebook. The teacher then records the answers in the form of a bar drawn to scale under each of the containers she brought to class. The bars form a bar graph when she is done. She never defines terms. She did not use the class to illustrate a concept or procedure she had already put on the blackboard.

As Stevenson and Stigler say:

> The lesson almost always begins with a practical problem [either of the sort just described] or with a word problem written on the blackboard….It is not uncommon for a…teacher to organise an entire lesson around a single problem. The teacher leads the children to recognise what is known and what is unknown, and directs the student's attention to the critical parts of the problem. Teachers attempt to see that all the children understand the problem, and even mechanics, such as mathematical computation, and are presented in the context of solving the problem. Before ending the lesson, the teacher reviews what has been learned and relates it to the problem she posed at the beginning of the lesson.

The point of a Japanese teacher's questions is not to get the right answer but to make her students think. The point of the lesson is not to cover the ground for the test – there is no test – but to stimulate real understanding.

Source: Stevenson, H. and J. Stigler (1992), *The Learning Gap*, Summit Books, New York.

Another very important feature of Japanese instruction, which also has implications for the use of whole group instruction, is the approach to mistakes. In many Western countries, mistakes are something to be avoided. Students who produce right answers quickly are rewarded and those who do not are often ignored or punished.

In Japan, a teacher will present a problem and ask her students to work on it. As they do so, she walks up and down the rows looking at the approaches taken by the students to the solution of the problem she posed. After a while, she will call on several children to go to the front of the classroom and copy their work onto the blackboard. Some of those that she picked will produce the right answer and some will not. She will ask the class to offer their views on the approach picked by the student at the board. If a student thinks it will not work, that student is asked why and must give an

answer that is grounded in mathematical reasoning. The students discover that some answers are wrong for interesting reasons and these reasons are discussed at length. Sometimes they discover that there is more than one approach to answering the question posed and they discuss why some solutions are more efficient than others, but others might be more interesting. In this way, they arrive at a much deeper understanding of the mathematics that underlie the solution to the problem and become much more adept at using mathematics to solve problems.

School-home communication

Japanese students have a homeroom teacher and spend an hour a day in homeroom. The homeroom becomes that student's family in the school. Japanese homeroom teachers at elementary schools teach all subjects except specialised subjects like music and crafts. These homeroom teachers typically follow their classes through the grades for several years. They are required to regularly visit their students' families. Students often go to their teachers' homes on their teachers' birthdays. In the upper grades, the teachers are expected to provide academic and career and job counselling.

Teachers at elementary schools maintain communication with parents by means of a notebook that students shuttle between school and home. Even if a student has a non-academic problem, the teacher will communicate the nature of the problem to the parents, who are expected to provide appropriate support at home. If that is not sufficient, the teacher will advise the parents to consult other services available at municipal offices.

This entire approach is aided by the belief that effort and not ability is what primarily explains student achievement. If a student falls behind, it is not because he is not good at school work; it is because he is not working hard enough and the system has a solution to change this. It is also aided by the idea that many people, not just the student, are responsible for the poor performance of that student and poor performance student reflects badly on those people, too. This motivates both parent and teacher to do everything possible to make sure the student gets back on track.

During the American occupation of Japan after the Second World War, the Americans required Japan to start Parent-Teacher Associations of the kind that are common in the United States. In the ensuing years, while these organisations have grown less strong in the United States, in Japan they have grown stronger, providing parents with a real voice in education policy and local practice. They are not only organised at school level, but also at prefectural and national levels, with a seat on the Central Council on Education.

Long schooling hours and additional schooling

Time is an important factor in the good academic performance of Japanese students. Until recently, Japanese children went to public school six days a week. In addition, Japanese school children have several hours of homework a day. They have six weeks of vacation during the summer, which is less than students in many other parts of the world. Students often do their own research during vacations. The majority of Japanese students also spend considerable time in various forms of private instruction after the regular school day. These private schools range from offering help to students who are behind to catch up, to offering more advanced study than is available in the public school, to offering extracurricular activities or one-to-one or small group tutoring for some combination of these purposes.

The combined effect of all this additional study is that Japanese students have the equivalent of several more *years* of schooling by the time they finish high school than, say, the typical American student. And because of the briefer summer vacation, they retain much more of what they have learned as they go into the next year.

However, it is not all work and no play for Japanese students. Not all these extra hours are for instruction. Observers believe that one reason Japanese students seem more engaged when they are in class than students in many other countries is that they are given more breaks from instruction (*e.g.* see Stevenson and Stigler, 1992). Several times a day, students go outdoors, play, do exercises and let off plenty of steam. Nonetheless, they do hit the books more than students in many other countries and it shows.

Teacher quality

Surely one of the most important keys to the quality of education in Japan is the quality of its teachers. In many industrialised countries, teaching lies on the boundary between professional work and blue collar work. Having a teacher in the family is an emblem of the family's breakthrough from the lower middle-class to the middle class.

When the Meiji Restoration got underway in Japan and the state modernised the education system, most of the teachers were Samurai from Samurai schools, members of Japan's upper classes. In the Confucian tradition, great honour went to the teacher. As the modern era began and classless schools were created for the first time in Japan, those schools were staffed in significant numbers by members of the upper classes, and from that time forward, teaching has been a desirable occupation in Japan.

According to Teiichi Sato in an interview for this report, "After WWII, as incomes began to rise across the board, the government worried that respect for teachers would decline. Prime Minister Tanaka decided to raise compulsory school teacher salaries to 30% higher than other public servants. While this has gradually eroded, teachers' salaries are on par with other civil servants. This made a difference in the quality of teachers ever since." Teachers are still, by law, among the highest paid of Japan's civil servants. When they start their service, they are paid as well as novice engineers. But it is not the pay alone that attracts competent young people to teaching; it is primarily the high regard in which teachers are held. Teaching is a highly desirable job – there are seven applicants for every teaching position in Japan.

To become a teacher, students must attend a ministry-certified teacher education programme at a university or junior college. Japan also has some national teacher training universities with model schools attached to support teacher training for new teachers. Teaching practice is a common part of all teacher education programmes.

Prefectures, like other employers in Japan, are prepared to make major investments in their new teachers to make sure they have the necessary skills to succeed. They assume that these new employees come to them with the necessary applied intelligence but not necessarily the required job skills. So, similar to other employers, they take responsibility for providing an induction programme that provides a sustained opportunity to apprentice with experienced master teachers before being expected to teach full time. The induction period lasts a full year, and the master teachers are given the year off from their teaching jobs to supervise their apprentices. Once a teacher is inducted into the regular teaching work force, the law requires teachers to take certain additional training (after 10 years of service). Teachers can also apply for paid leave to take masters' degrees at graduate schools. The ministry also offers various training programmes for prefectural trainers at its national centre.

The most interesting aspect of teacher development occurs on the job. In addition to the central importance of the design of the lesson in Japanese instruction, "lesson study" in the development of the Japanese teaching profession is also crucial.

> [From the time they begin their career right to its end, Japanese teachers] are required to perfect their teaching methods through interaction with other teachers….Experienced [teachers] assume responsibility for advising and guiding their young colleagues. Head teachers [principals] organise meetings to discuss teaching techniques…. Meetings at each school are supplemented by informal district-wide study groups… [Teachers work together designing lesson plans.] After they finish a plan, one teacher from the group teaches the lesson to her students while the other teachers look on. Afterward, the group meets again to evaluate the teachers' performance and to make suggestions for improvement…Teachers from other schools are invited to visit the school and observe the lessons being taught. The visitors rate the lessons, and the teacher with the best lesson is declared the winner. (Stevenson and Stigler, 1992)

This practice is entirely consistent with the way teams work in private industry. It also reflects the Japanese focus on relying on groups to get work done. But it has a profound impact on the practice of teaching. Indeed, it is the best hope for the continual, sustained improvement of teaching practice. It brings the work of teaching out from behind the closed door of the classroom and the individual teacher and opens it up for inspection and critique by colleagues. There is very strong teacher accountability in Japan, not in the form of formalised accountability to the bureaucracy, but instead an intimate and very real accountability to one's colleagues. Because they do not want to let the group down, teachers work hard to develop superior lesson plans, to teach them well, and to provide sound and useful critiques when it is their colleague's turn to demonstrate their lesson plans to them.

Carefully-targeted financial resources

The Japanese spend less on their schools than a number of other OECD countries (Figure 6.2), but get better results. One reason is that they spend their money differently. Japanese schools are built to ministry designs – they are perfectly functional but very plain. They are not architectural symbols of community pride and lack many of the special features found in schools in other advanced industrial countries. School administration is typically confined

to a principal, an assistant principal, one janitor and a nurse. There is no cafeteria – students serve the meals from a central kitchen to their teacher and classmates in the classroom. The students are also responsible for cleaning their classrooms. As noted above, textbooks are very simply produced in paperback format and are much smaller than in many other industrialised countries. At every point, the Japanese have made sure that the money they spend on educating their children goes as much as possible on teachers and on instruction, so it is no surprise that a much greater proportion of total funding is spent on these factors than is the case in many other countries (Stevenson and Stigler, 1992).

A focus on equity

It has already been pointed out that there is no tracking in Japanese schools, classes are heterogeneous and no student is held back or promoted on account of ability. Furthermore, all are expected to master the same demanding curriculum. This is a powerful formula for equity in terms of outcomes. What is particularly impressive about this approach is that the expected outcomes are not set at the lowest common denominator, but at the top of the range of possible outcomes worldwide.*

There is a widely-shared belief in Japan that these policies achieve the greatest good for the greatest number and the results bear this out. The system is set up so that high-achieving students can help lower-achieving students within a group, within a classroom and within a school. The research literature shows that all students are helped by this approach, because the students who teach and tutor learn as much or nearly as much in the process of tutoring as the recipient of the tutoring (Cohen *et al.*, 1982). This approach is consistent with Japanese values and contributes greatly to the generally high level of Japanese achievement.

Japanese teachers and principals are often reassigned to different schools by the prefectures. This is done, among other reasons, to make sure that the distribution of the most capable teachers among schools is fair and equitable. As Robert Fish remarked during his interview, "teachers and administrators are transferred regularly every few years so the same people are not in the same schools all of the time – there is a lot of levelling among schools."

All these and many other factors, including school finance, make for a high degree of equity in Japanese education.

A different approach to accountability and tests

The Japanese have virtually none of the trappings of formal Western accountability systems and they do not need them. Ryo Watanabe, Advisor to the Ministry of Education, Sports, Science and Technology, explains that until a few years ago there were no national tests in Japan. When Japan became concerned about the possibility of being overtaken in education accomplishment by the Koreans and Chinese, they instituted a national test of every student at the sixth grade and the ninth grade, but they have since decided to administer the test only to a sample of students to monitor the performance of the system.

The only tests are the entrance exams for high school and university. Everything hinges on a student's performance in these tests. Because newspapers publish results regularly everyone knows the rankings of these institutions as well as the record of each compulsory and middle school in getting their students into the right high schools and universities. The newspapers are full of statistics for each school, much like the statistics for popular sports teams in other parts of the world. Magazine articles are written about changes in the rankings and what they mean and why they occurred. Other stories are written about students who succeeded against all odds in the exams and others who did not.

But that is only half the story. As pointed out earlier, in Japanese society the burden for the fate of the student is shouldered in part by the family, the teachers, the faculty and even the students' classmates. Teachers' reputations among their peers rest on the success of their students in a way that has no parallel in many Western countries.

The system of homeroom teachers brings another level of accountability. Because these teachers follow the students through the grades, and because they are involved in their students' lives outside of school and are in constant communication with the parents, they are accountable to the parents in a unique way. This cannot be duplicated in countries where teachers do not follow students through the grades and where they are responsible for only one or a few subjects.

* Note that there is no immigration policy in Japan. The very small number of people regarded as immigrants, mostly Koreans and Chinese, are not counted in the national education statistics. They make up less than 2% of the Japanese population. The one group thought of as a minority group is virtually indistinguishable from ethnic Japanese.

"It's always about what students are learning, agreeing on that, and holding yourself accountable and each other accountable by engaging in meaningful reviews of how students are doing," said Jim Stigler during his interview for this report. This is a system with a great deal of accountability, but it is not a system of administered accountability.

Some countries provide very strong incentives to students to take tough courses and to study hard in school, others do not, and many are somewhere in between. Japan is a leader in the first camp, and most observers believe that this factor is a major contributor to Japan's place in the international education league tables.

The Japanese system creates clear, powerful and tangible rewards for student academic success. In the short term, these come from parents, whose praise is highly valued by children. In the medium term, they come in the form of admission to the right high school or university, which is of paramount importance to the student and to everyone around her. And, finally, in this highly meritocratic society, they come from the value that employers and the society at large place on academic achievement.

All of this, of course, contributes mightily to "exam hell", the well-known pressure cooker that young people in Japan go through at exam time. People elsewhere in the world vow never to institute such high pressure exams because of the supposed high suicide rate of young Japanese people going through exam hell. The Japanese themselves say they don't like exam hell and would like to stop it.

Nevertheless, the suicide rate among young people among high school students is significantly higher in the United States than in Japan. And, in the OECD surveys of students, Japanese students tell the researchers that they are happier in school than students in most other OECD countries. It turns out that the image that much of the rest of the world has of Japanese students under relentless pressure to produce and somehow being robbed of their childhood in the process, is not a view that is shared by the Japanese students themselves. It is possible, it seems, to construct a system in which students are highly motivated to succeed in school without depriving them of a happy school experience.

HOW JAPAN'S EDUCATION SYSTEM IS CHANGING TO MEET TODAY'S CHALLENGES

No country's education system stands still for very long. Over the last two decades, there has been a rising chorus of criticism about Japan's education system, especially concerns over a deficit in encouraging creativity and innovation and whether Japan can maintain its top place in the international league table of student achievement. Other concerns centre on an apparent erosion of moral and group values. We will deal with each in turn.

Creativity and the group versus the individual

Many experts from Western nations visited Japan shortly after the 1995 Third International Mathematics and Science Study (TIMSS) revealed that it was among a handful of East Asian nations that topped the charts (Mullis, *et al.*, 1998). The Western experts came to learn more about this success. But Japan was worried that such performance might still not translate into success in the business arena. Where, they asked, are our Nobel Prize winners? Where are the people with the kind of breakthrough ideas that create a new Microsoft or Apple, or even whole new industries? This made them wonder whether they should find out how the Western nations teach creativity.

However, the difference between Japan and the Western nations is not in how or whether they teach creativity. It is that the latter put more value on the individual than on the group, unlike Asian nations.

The idea that the emphasis on the individual is responsible for Western creativity can be uncomfortable to many Asians. They value social order highly and see the high crime rates and general social disorder in many Western nations as simply unacceptable. On the other hand, many people in the West are not willing to pay the price Asians pay for their high levels of student achievement if it means giving up their "personal freedom".

But it is possible that this analysis is much too oversimplified and one-dimensional. It may be true that Asians are less likely than people from some Western countries to make breakthroughs and chart whole new courses for their industry or even create new industries. And this might well be because Asians typically defer to their elders and superiors publicly even if they have private reservations about their judgement, wait to take their moment in the sun until after their superiors are gone, do not like to criticise others openly, prefer to be modest rather than sing out their achievements, and value contribution to the group more highly than solo achievements. In Asia there is a saying that "the nail that sticks out gets hammered down".

Nevertheless, Japan has built one of the best educated, most flexible, fastest learning and uniformly high calibre workforces in the world. The nation is brilliant at the continuous improvement of products and processes and capable of very high quality production on a vast scale. Who is to say which is more important, the occasional breakthrough or continuous improvement of almost all aspects?

And we should unpack a little further the assumption that Japan is short on creativity and innovation. After all, Japan ranks very highly on the Global Innovation Index, falling just behind South Korea and the United States in the latest report (INSEAD, 2010).

In any case, Japan is responding to the criticism by demanding high student achievement, as measured by assessments like PISA, and a greater measure of capacity for creativity and innovation.

Maintaining the social fabric and student enthusiasm

The creativity issue, while important, was not the only education challenge on the minds of the Japanese over the last decade or so. Other concerns centred on signs that the strong sense of family and group values were becoming weaker. Some of these concerns are described below:

> [There is]…a spreading tendency among youth to neglect society. This tendency is not totally unrelated with young people's declining association with society. It can be traced partially to a social trend placing too much emphasis on individual freedom and rights….At home children have their own private room and…mobile phones and other information equipment allow them to avoid getting closely involved with family members… [T]here seems to be increasingly less time spent in peer groups outside and more time spent playing video games at home. This phenomenon of the thinning socialisation of children is thought to be leading to a decline in young people's sense of respect for rules and models and further aggravating their tendency to neglect society or recede into a "world of solitude". (Ministry of Education, Culture, Sports, Science and Technology, 2002)

These concerns combined with perceptions of an alarming decline in the educational functions of the family, leading to bullying, disruptions in the classroom, student absenteeism and even violence in the schools. While the incidence of these kinds of student behaviour was small compared to many Western countries, their increased presence in Japan was being noticed.

Other concerns were to do with:

> [T]he standardisation of education due to excessive egalitarianism and the cramming of too much knowledge into children has tended to push aside education geared more to fit the individuality and capabilities of children…,making classroom lessons boring to children with a quick understanding and difficult for children who need longer to understand. (Ministry of Education, Culture, Sports, Science and Technology, 2002)

And, finally, the Japanese were become alarmed by a threat to their continued dominance in generating and exploiting advanced technologies. They noted that while Japanese students continued to do as well as ever in international comparisons of achievement in mathematics and science, they were appearing to like science less than other students in similar countries the further they went in their schooling (Ministry of Education, Culture, Sports, Science and Technology, 2002).

A new reform agenda for the 21st century

These concerns eventually led to major new education policy initiatives in the early years of the 21st century. These included a sweeping piece of education reform legislation dubbed "Zest for Living", as well as the passing in 2006 of a new Fundamental Education Law – the first revision in 60 years.[2]

Zest for Living was a reaction against the Japanese's previously strict insistence on uniformity, specificity and direction from the top. The reform turned some of the functions of the ministry over to lower levels of government, reduced the number of credits that must be earned from required courses from 38 to 31, increased the amount of time given to optional courses, reduced the school week from six to five days (though schools are still open on Saturdays for extra-curricular activities and extra school work for those who want it), and reduced the curriculum emphasis on rote learning and memorisation in favour of experimentation, problem finding and problem solving.

The reform has also made it possible for the best students to enrol in university early and take college courses in high school. It has also allowed the use of criteria other than entrance exams results to determine entrance to Japanese colleges.

Schools were given greater discretion over their budgets and personnel. New measures were taken to evaluate teachers, and, especially, to commend and reward excellent teachers while transferring teachers with questionable track records to non-teaching positions.

Though the set curriculum has been shrunk overall, an important new required course has been added at all school levels, the Period of Integrated Study. The aim of this course is to:

> *i)* foster children's ability and quality to find a theme, think, judge and solve a problem on their own; and *ii)* enable children to think about their own life, urging them to explore subjects with creativity and subjectivity and to solve problems through their own ways of learning and thinking. To this end, the Period of Integrated Study actively introduces experiential learning such as experience in nature, social life experience, observations, experiments, field study and investigation as well as problem-solving learning to learn about cross-sectional, comprehensive subjects like the environment, international understanding, information, health and welfare as well as subjects that interest students. (Ministry of Education, Culture, Sports, Science and Technology, 2002)

In order to maintain enthusiasm for mathematics and science, the Japanese felt the need to *i)* put more emphasis on experiential, problem-solving learning through observations, experiments and project studies; *ii)* reach out to universities, research institutes and museums for help in engaging students' interest in science; and *iii)* make the images of leading scientists and engineers more visible and appealing to students thinking about what careers they might pursue.

Overall, there has been a general loosening up of what many perceived to be a very rigid system. But the overall structure is still very much in place and the move towards more freedom has been made cautiously.

In order to address the fear about the dilution of Japanese values, not just among students, but also in Japanese families where the principal responsibility for Japanese education lies, the Japanese government rewrote the Japanese Fundamental Law of Education. The first Fundamental Law (of 1947) had put forward four principles:

- The idea of education seeking the "accomplishment of character building".
- Equal opportunities of education and equality of the sexes.
- A democratic and single track school system.
- Free, compulsory education under the 6-3 school system (six years of elementary school, three of middle school).

Implementing these principles took many years, but the result was the much-admired system described earlier. The new Fundamental Law on Education, passed in 2006, reflected on how much had changed since the last one. Life expectancy for men had gone from 50 to 79 years, for women from 54 to 85. The fertility rate had dropped from 4.5 to 1.3. The high school attendance rate had gone from 43% to 98%. University attendance had climbed from 10% to 49%. From a context in which 49% of workers were employed in agriculture and 30% in manufacturing and related industries, fewer than 5% were now employed in agriculture and more than 67% in manufacturing and related industries.

While acknowledging how much had changed, the new law reaffirms that Japanese values remained the same. In doing so, it lays out the ways in which education policy could enable Japan to adapt to the needs of the next century. It reaffirms the characteristically Japanese approach – so evident in the Meiji reforms – of learning what those countries with the best education systems are doing to adapt to changing requirements, of bringing attractive ideas back and adapting them to the Japanese context while remaining faithful to Japanese values.

It will take time before the Japanese know whether their new policies will yield the results they hope for. They continue to worry that other nations are catching up and might surpass them. They worry about slipping down the OECD PISA rankings. When it appears that that might be happening, critics want to revoke the reforms, while others advocate for patience.

LESSONS FROM JAPAN

This analysis has helped to identify principles and practices that may be universally instructive. The biggest hazard in borrowing ideas from different systems is the fact that so many system features work the way they do because of a specific context. Keeping a student in school for more hours will not work as well in a system with poor instructional practices as it does in a system with effective instructional practices. Recruiting better teachers will not work very well if they flee schools that are oppressive to work in, and so on.

With these cautions in mind, some observations about what might be learned from the Japanese experience are presented below. It is true that many features of the Japanese system can also be found in other East Asian countries, particularly those that share a common Confucian heritage. However, some are uniquely Japanese. The lessons derived from Japan's experience with education are useful for analytical purposes, but risk obscuring a very important aspect of the Japanese educational system. The deeper purposes of the system appear to go way beyond the development of students' cognitive capacities, to the development of members of a society with values based on ethical behaviour, meritocratic advancement and social cohesion. The entire system is aligned not just to produce high student achievement, but to help the whole country realise the values it holds most dear.

- **Shared belief that education is the key to the country's future**

Japan's total commitment to children is not just rhetoric, but a concrete and enduring priority, for which individuals and the nation as a whole are prepared to make real sacrifices. It is the main reason that Japan has access to a first rate teaching force, that Japanese students are superbly supported at home, and that the schools are well resourced. This commitment is the foundation of the Japanese system.

- **Consistent international benchmarking**

Japan is committed to continuous international benchmarking of education systems. From the Meiji government to the present, Japan has succeeded in no small measure because of its determination to know what the best performers are doing, and to adapt the best of what they find to the Japanese setting, weaving them together into a coherent and powerful whole.

- **Incentives count – not just for teachers, but especially for students**

Japanese students, from the youngest age and all the way through their entire working life, have very strong incentives to take tough courses and to work hard at them. Doing well in exams is a paramount requirement for getting a good job. In some ways, this is the core story of the Japanese education system. If those incentives were not present in Japan, the outcome would be very different. It is worth noting that other countries provide equally strong incentives for their students to take tough courses and work hard in school, but do not have students who are as happy in school as Japanese students are. These two factors together make for a nation full of people who want to learn all their lives.

- **A coherent and focused curriculum**

The Japanese have paid more attention to the details of the national curriculum than most other countries and they have insisted that this curriculum is actually taught. The curriculum is coherent, carefully focused on core topics and their deep conceptual exploration, logically sequenced, and set at a very high level of cognitive challenge. The result is that Japanese high school graduates have a level of mastery of the subjects that rivals that of college graduates in many Western countries.

- **Effort and expectations**

The Japanese, like most East Asians, believe that academic achievement is more a matter of effort than natural (genetically-endowed) ability. They therefore demand that the effort be made and have high expectations of all their students. Students of whom much is expected – all students – achieve well.

- **Resource allocation priorities**

The Japanese spend less on education than other industrialised nations, but they get more for that money. One of the many reasons for this is the careful way they allocate that money. Compared to other advanced industrial nations, they spend more on teachers and less on school buildings and facilities, non-teaching staff, central office specialists and administrators, full colour glossy textbooks and so on.

- **Organisation of instruction**

Unlike teachers in the rest of the world, Japanese teachers believe student performance is better with bigger classes, at least in certain subjects. This is because more students are likely to come up with a wider range of problem-solving strategies from which other students can learn. And the variety of ideas generated by more students can be used to spark lively discussions. In science classes, for example, there will be a wider range of outcomes from lab experiments that also can be used to explore problem solving strategies and promote deeper understanding of the topics under study. This also makes it possible for Japanese teachers to have more time to plan, to work with other teachers, to work one on one with students who need individual help, and to engage in lesson study, all of which also improve the outcome for students.

▪ High expectations for students of all abilities

Like most East Asian countries, Japan has roughly half the proportion of the student cohort assigned to special education as is the case in some Western countries. Some in the West have decried this as inattention to students who need and deserve extra help. That may be true in some cases, but there is a lot of evidence that many students assigned to special education classes in the West have very low levels of achievement despite being the recipients of much more spending, simply because their teachers have very low expectations for their achievement (see, for example, Gartner and Lipsky, 1989).

The description above of the Japanese approach to classroom instruction makes it clear that Japanese teachers, as in many other East Asian systems, work hard to adjust instruction to individual needs. The underlying assumption is that *all*, or very nearly all, students can learn to high standards. In many Western countries, where the assumption is that student achievement is a function of inherited learning capacity, some students who could be achieving at much higher levels do not do so because they are given a more diluted curriculum. In the case of special education students this can be taken to an extreme.

▪ Professional development of teachers: a powerful engine for student performance

Japan is a laboratory for the idea of continuous improvement of teaching practice. The incarnation of that idea in Japanese schools is lesson study. This practice undoubtedly contributes in important ways to the high quality of instruction in Japanese schools.

▪ Careful attention to school-to-work transition

Japan has an unusual and highly effective system for moving students into the workforce. The idea of lifetime employment makes it worthwhile for employers to invest heavily in the continued education and training of young people joining their workforce fresh from school or university. This system results in low rates of youth unemployment, and works well because students are already accustomed to working hard. It also produces workers who are used to being loyal team members, working collaboratively with others, showing up on time and working to deadlines. It produces students who know how to learn and are eager to learn and come to work with a prodigious set of skills. Other nations interested in workforce development might consider exploring how this system works in detail.

▪ A moral education for life

Again and again, the Japanese have asserted that the most important dimension of their system is the moral dimension: how people should behave and how they should relate to one another. The entire curriculum is suffused with the moral education agenda of the Japanese government. Though there are courses on moral education in primary schools, this agenda extends far beyond them. Even in high schools, where there are no specific courses on moral education, the national curriculum emphasises that all activities should take moral education into consideration. Everywhere in schools there is evidence of efforts to reward hard work and persistence, to praise students who take on a challenge, to engage students in serving their school and fellow students and to take responsibility for helping others, to reward modesty and to give others credit for one's own good work. In many different ways, students are taught to respect their elders and their teachers, to do what is right, to be orderly and organised. It is not hard to imagine how this sort of attention to common moral standards can affect many aspects of social life, from business ethics to health care, sustainable environment to crime. Some countries do this explicitly, some implicitly, but it is worth considering what might happen to a country that ignores this aspect of their children's education.

▪ Social capital as a powerful accountability mechanism

Some outside observers may believe that Japan has no formal accountability system because it does not use national tests to enforce accountability (test-based system of accountability). But there is very strong accountability in Japan. Students are very accountable to teachers and parents. Teachers are accountable to each other in a system in which all the teachers in the school know just how good or bad the other teachers' teaching really is because of lesson study process. Everyone knows how the high schools and universities are ranked and so everyone knows how to rank the institutions and teachers who prepare students for those high schools and universities. The performance of the students on those entrance exams is there for all to see in a world in which those results matter hugely.

WHERE IS JAPAN ON THE EDUCATIONAL CONTINUUM?

Japan is clearly among the world's most advanced industrial economies. It is among the world leaders for the development and application of the most advanced technological systems. This was one of the goals Japan set for itself in the Meiji Restoration; those who launched it realised from the start that those aims would not be achieved without a first rate, highly inclusive, aggressively meritocratic education system.

Japan has not followed exactly the education continuum described in Chapter 1 (Figure 1.1). It skipped the typical slow upgrading of teacher quality, having inherited a system from the Tokugawa era in which the Samurai class staffed the schools. It also bypassed the typical slow progression from a system of school organisation based on the usual feudal orders straight to one that makes it possible for students from every social class to gain access to elite education opportunities.

Japan was also ahead of many other nations in embracing at least some aspects of modern industrial work organisation, especially in how teachers work with one another in teams to improve instruction, and in the professional norms governing the work of teachers.

On the other hand, Japan has been reluctant to devolve authority to schools as aggressively as some other countries, and it also found it harder to create schools that develop independent, creative students than other countries. This may reflect a clash between the demands of a creative culture in which individual initiative is highly valued, and the Japanese culture in which the approval of the group is typically sought before aggressively advancing one's own ideas. Japan has found a distinctive path which is congruent with its values and commensurate with the economic and societal progress it desires to achieve.

While there may be specific features of the Japanese system that are unpalatable, it is a system which bears careful scrutiny. It has contributed to a country with very high levels of school and academic achievement. Its students enjoy school more than most. It has produced one of the world's best-educated and most productive workforces. It has exceptionally low crime rates and a very strong social order. It has high rates of citizen participation and a citizenry that has an unusually sophisticated grasp of political issues. Parents in Japan participate in their children's education and partner with teachers to an unusual degree. The country has one of the world's most admired curriculums. Though the system continues to evolve, the methods used to build this system should surely be considered by any country that wants to match its achievements.

■ Figure 6.2 ■

Japan: Profile data

Language(s)	Japanese (national language – not official language)
Population	127 567 900[3]
Youth population	13.3%[4] (OECD average 18.7%)
Elderly population	22.1%[5] (OECD average 14.4%)
Growth rate	0.06%[6] (OECD average 0.66%)[7]
Foreign-born population	1.7% (OECD average 12.9%)[8]
GDP per capita	USD 34 132[9] (OECD average 33 732)[10]
Economy-Origin of GDP	Service: 63.9%; Manufacturing: 18.6%; Other: 14.3%; Agriculture and forestry: 3.8% (2008)[11]
Unemployment	4.0% (2008)[12] (OECD average 6.1%)[13]
Youth unemployment	7.2% (2008) (OECD average 13.8%)[14]
Expenditure on education	3.4% of GDP (OECD average 5.2%) 2.5% on primary, secondary and post-secondary non-tertiary 0.6% on tertiary[15] education[16] (OECD average 3.5%; 1.2% respectively) 9.4% of total government expenditure[17] (OECD average 13.3%) 6.8% on primary, secondary and post-secondary non-tertiary 1.7% on tertiary education[18] (OECD average 9%; 3.1% respectively)
Enrolment ratio, early childhood education	86%[19] (OECD average 71.5%)[20]
Enrolment ratio, primary education	100.7%[21] (OECD average 98.8%)[22]
Enrolment ratio, secondary education	98.3%[23] (OECD average 81.5%)[24]
Enrolment ratio, tertiary education	58%[25] (OECD average 24.9%)[26]
Students in primary education, by type of institution or mode of enrolment[27]	Public: 99% (OECD average 89.6%) Government-dependent private: no data[28] (OECD average 8.1%) Independent, private: 1% (OECD average 2.9%)
Students in lower secondary education, by type of institution or mode of enrolment[29]	Public 92.9% (OECD average 83.2%) Government-dependent private: no data[30] (OECD average 10.9%) Independent, private: 7.1% (OECD average 3.5%)
Students in upper secondary education, by type of institution or mode of enrolment[31]	Public: 69.2% (OECD average 82%) Government-dependent private: no data[32] (OECD average 13.6%) Independent, private: 30.8% (OECD average 5.5%)
Students in tertiary education, by type of institution or mode of enrolment[33]	Tertiary type B education: Public: 7.3% Government-dependent private: no data[34] Independent-private: 92.7% (OECD average Public: 61.8% Government-dependent private : 19.2% Independent-private: 16.6%) Tertiary type A education: Public: 24.6% Government-dependent private no data[35] Independent-private: 75.4% (OECD average Public: 77.1% Government-dependent private : 9.6% Independent-private: 15%)
Teachers' salaries	Average annual starting salary in lower secondary education: USD 27 545 (OECD average USD 30 750)[36] Ratio of salary in lower secondary education after 15 years of experience (minimum training) to GDP per capita: 1.44[37] (OECD average: 1.22)[38]
Upper secondary graduation rates	95% (OECD average 80%)[39]

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Notes

1. For example, see Mullis *et al.* (2008).

2. This legislation had its origins in a 1996 Ministry of Education report called *Japanese Education in the Perspective of the 21st Century*. It focused on the need for problem solving capacity in students to think proactively and act autonomously.

3. OECD (2010d). Data from 2008.

4. OECD (2010d). Ratio of population aged less than 15 to the total population (data from 2008).

5. OECD (2010d). Ratio of population aged 65 and older to the total population (data from 2008).

6. OECD (2010d). Annual population growth rate (data from 2005; data not available for 2006-2007).

7. OECD (2010d). Annual population growth rate (data from 2005).

8. OECD (2010d). Foreign-born population as a percentage of the total population (data from 2007).

9. OECD (2010d). Current prices and PPPs (data from 2008).

10. OECD (2010d). Current prices and PPPs (data from 2008).

11. OECD (2009). Measured as percentage distribution of workers.

12. OECD (2010d). Total unemployment rates as percentage of total labour force (data from 2008).

13. OECD (2010d). Total unemployment rates as percentage of total labour force (data from 2008).

14. OECD (2010e). Unemployed as a percentage of the labour force in the age group: youth aged 15-24.

15. The OECD follows standard international conventions in using the term "tertiary education" to refer to all post-secondary programmes at ISCED levels 5B, 5A and 6, regardless of the institutions in which they are offered (OECD, 2008).

16.OECD (2010f). Public expenditure presented in this table includes public subsidies to households for living costs (scholarships and grants to students/households and students loans), which are not spent on educational institutions (data from 2006).

17. OECD (2010f).

18. OECD (2010f). Public expenditure presented in this table includes public subsidies to households for living costs (scholarships and grants to students/households and students loans), which are not spent on educational institutions (data from 2006).

19. OECD (2010f). Net enrolment rates of ages 4 and under as a percentage of the population aged 3 to 4 (data from 2008).

20. OECD (2010f). OECD average net enrolment rates of ages 4 and under as a percentage of the population aged 3 to 4 (year of reference – 2008).

21. OECD (2010f). Net enrolment rates of ages 5 to 14 as a percentage of the population aged 5 to 14 (data from 2008).

22. OECD (2010f). OECD average net enrolment rates of ages 5 to 14 as a percentage of the population aged 5 to 14 (year of reference – 2008).

23. EDStats *http://web.worldbank.org/*, gross enrolment ratio (data from 2008).

24. OECD (2010f). OECD average net enrolment rates of ages 15 to 19 as a percentage of the population aged 15 to 19 (year of reference – 2008).

25. EDStats *http://web.worldbank.org/*, gross enrolment ratio (data from 2008).

26. OECD (2010f). OECD average net enrolment rates of ages 20 to 29 as a percentage of the population aged 20 to 29, year of reference 2008. This figure includes all 20-29 year olds, including those in employment, etc. The gross enrolment ratio (GER), measured by the UN as the number of actual students enrolled/number of potential students enrolled, is generally higher. The GER for Japan in 2008 is 58%. (UIS).

27. OECD (2010f). Data from 2008.

28. Data is not applicable because category does not apply.

29. OECD (2010f). Data from 2008.

30. Data is not applicable because category does not apply.

31. OECD (2010f). Data from 2008.

32. Data is not applicable because category does not apply.

33. OECD (2010f). Data from 2008.

34. Data is not applicable because category does not apply.

35. Data is not applicable because category does not apply.

36. OECD (2010f). Starting salary/minimum training in USD adjusted for PPP (data from 2008).

37. OECD (2010f). Data from 2008.

38. OECD (2010f). Data from 2008.

39. OECD (2010f). Sum of upper secondary graduation rates for a single year of age (year of reference for OECD average – 2008).