

Super Science High School (SSH)

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Japan Science and Technology Agency

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Agenda

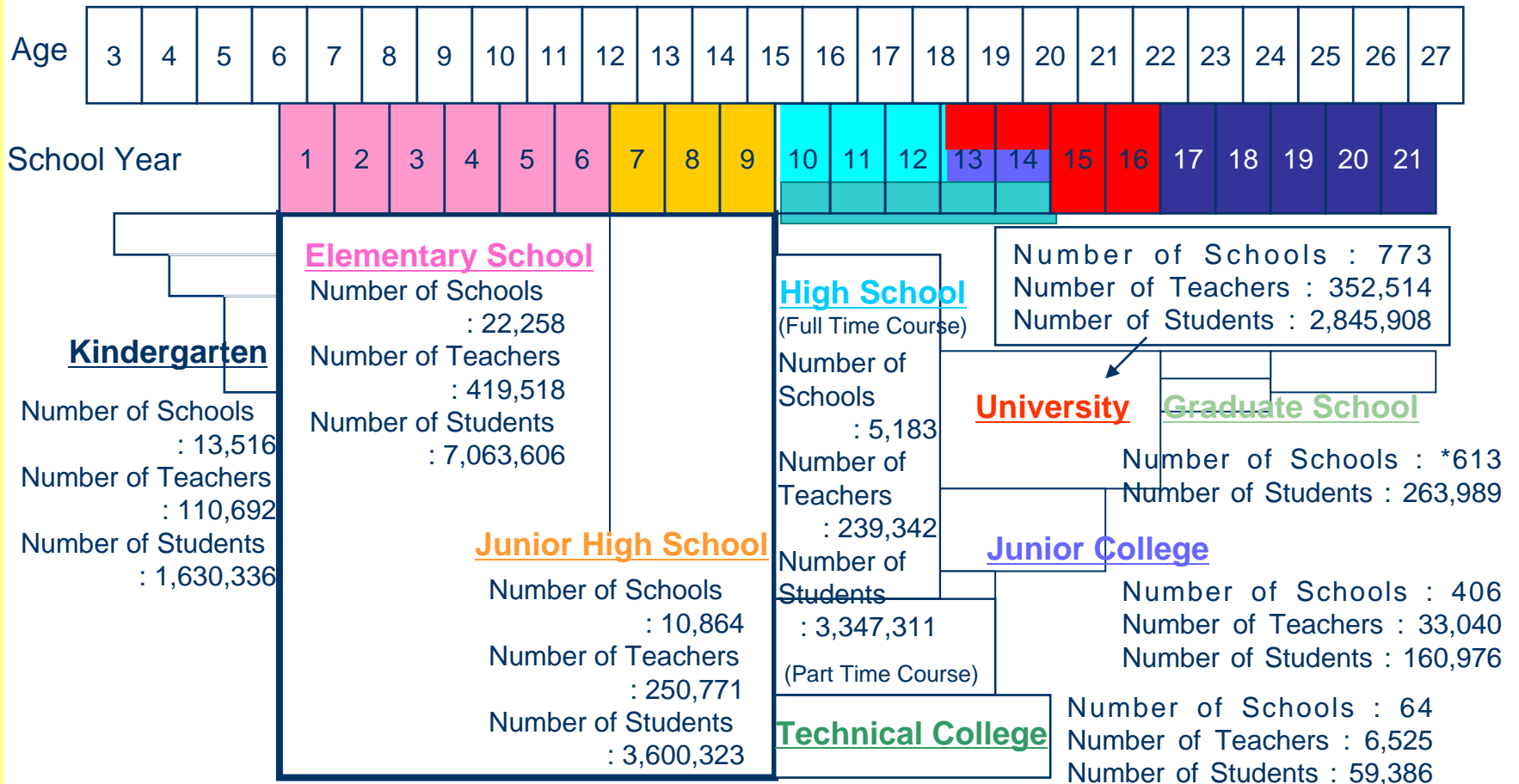
- ◆ Background
 - School System, Necessity of Learning Math and Science
 - The 3rd Science and Technology Basic Plan
 - The Related Policy (MEXT and JST)

- ◆ SSH
 - About SSH
 - Activities of SSH
 - Results of SSH
 - Prospects of SSH

Background

School System in Japan

(FY2009)



Background

The present conditions of learning will (surveyed by TIMSS(2007))

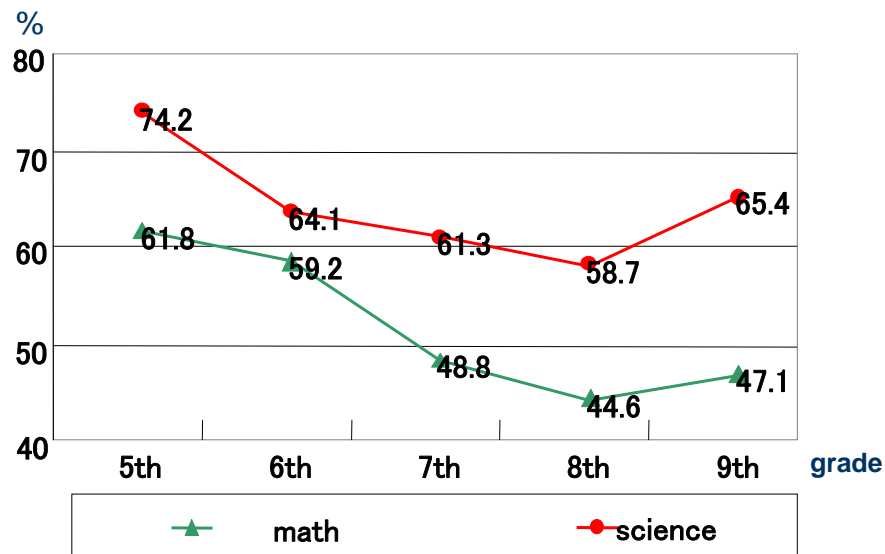
The ratio of students who think study as fun.

	Math	Science
Japan (Junior high school students)	39%	58%
International average	67%	78%

Compared with the average, “The ratio of students who think study as fun.” is remarkably low in Japan.

Background

Students who like studying math and science



The ratio of students who like studying math and science tends to decline as the grade gets higher.

[source] MEXT, FY2003

The ranks of Japanese students are moving down in the lists of PISA and TIMSS on scholastic ability of arithmetic / mathematic and science, though they are still high.

* MEXT: the Ministry of Education, Culture, Sports, Science and Technology

Background

The 3rd Science and Technology Basic Plan (FY2006-FY2010)

- I Expanding the horizons and scope of human resources who will build future S&T
 1. Developing children with exuberant intellectual curiosity
 2. Developing the individuality and abilities of talented children
- II Improving the public awareness of S&T

Human Resources Development in the Scientific and Technological Field

To develop human resources,
a pair of strategies has been implemented in
Japan.

- expanding the horizons of students who like science and technology
- providing talented students with opportunities to develop their talent further

Background

Systematic promotion for human resources development enabling the abilities to advance continuously according to the developmental stages

 : in schools

 : out of schools

Fostering Human Resources in S&T

Development Programs for Talented Students in Universities

Improvement of University's S&T education

"Super Science High Schools"

Supporting International Contests in S&T

Providing Talented Students with Opportunities of advanced studies and extracurricular activities

Advanced Programs for Talented Pre-University Students

Reinforcement of Hands-on and Problem-solving Learning

"Science Partnership Project"
Promoting Cooperation Between schools and S&T people

"Training Programs for Science Teachers"

"Science Education Assistant Allocation Project"
Activating Experiments in elementally schools

Reinforcement of infrastructure for Science and Mathematics education

Providing schools with better science facilities /
Distribution of Digital Contents for Science and Technology Education

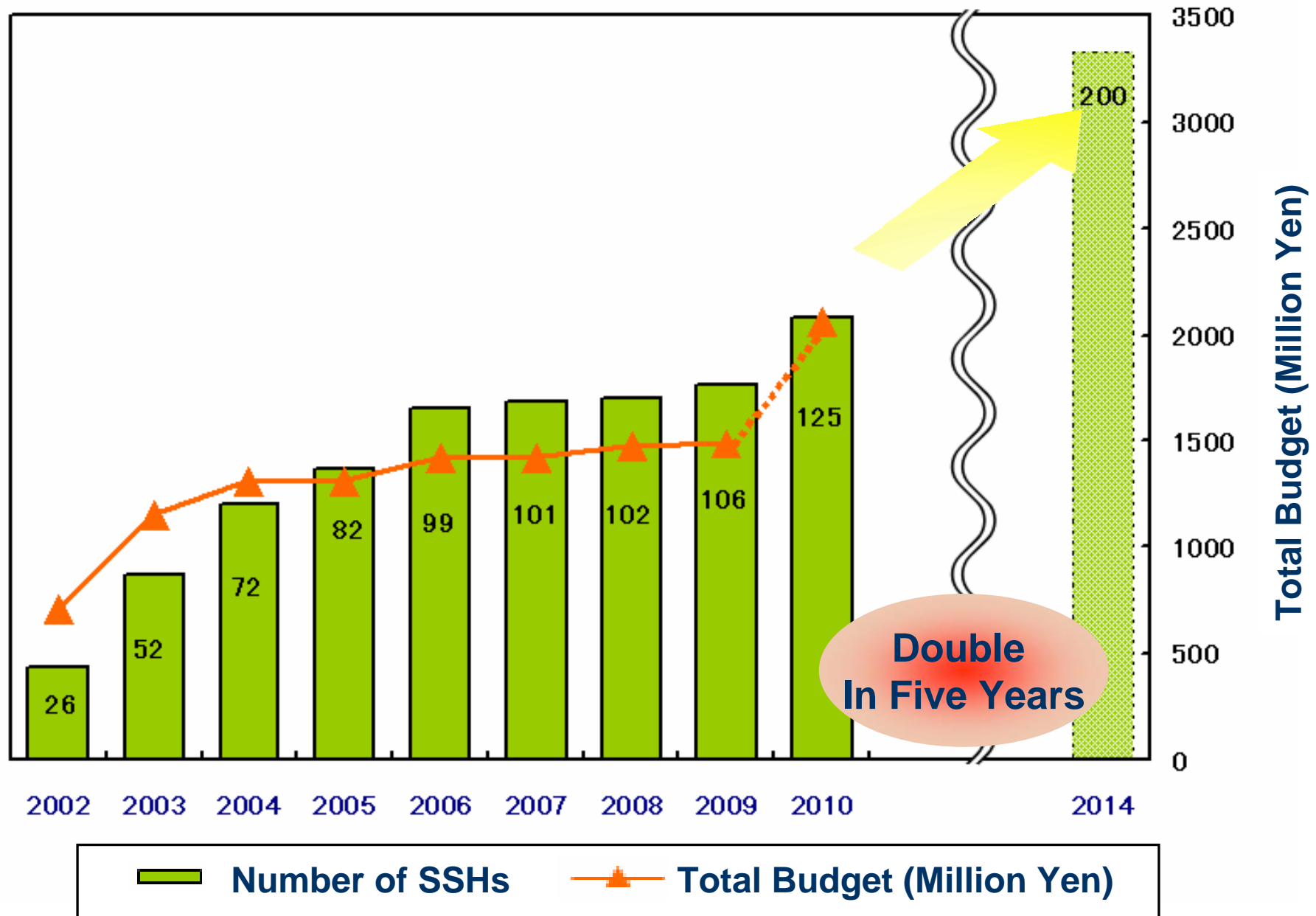


Super Science High School (SSH)

- SSHs provide advanced mathematics and science education to develop human resources in the future scientific and technological field.
- 125 SSHs are designated by MEXT at the end of FY 2010, which account for 2.4% of total high schools.
- Designated period is 5 years.
- 66 million yen are funded to the initial designated school for 5 years.
- Total budget is 1,500 million yen in FY 2009 and 2,100 million yen in FY 2010.

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Progress of SSH



Activities of SSH

- Implementing enriched curricula in science, technology and mathematics
- providing hands-on and problem-solving learning through observations and experiments
- conducting project based study by an individual student or a group
- enhancement of language and presentation skills required in international activities
- participation in the international science and technology contests positively
- studying the pedagogy for promoting creativity and originality

Support - MEXT and JST -

- ◆ MEXT evaluates each SSH through interviews at the third and final year of the each SSH designation.
- ◆ JST networks all SSHs through providing good practice of the activities and holding the SSH Students Fair every summer.
- ◆ JST pays all expenses of SSH activities instead of SSHs.

* MEXT: the Ministry of Education, Culture, Sports, Science and Technology



SSH students conducting project based study



Presentation in the Annual SSH Students Fair

Case Studies

- ◆ *Project based study*
- ◆ *Curriculum development*
- ◆ *Cooperation among high schools and universities*
- ◆ *The Annual SSH Students Fair*

Case: Project Based Study

Project Based Study is one of the core activities of SSH, which most SSHs conduct.

◆ *Odate Homei High School (Akita pref.)*

- *Some of the project based studies were conducted in cooperation with other organizations inside and outside Akita pref.*
- *Some students representing the school gave a presentation on their project to Seoul High School in Korea and has been kept communicating with them since 2007.*
- Examples of the project
 - Making Bio-ethanol by using defatted rice bran
 - Research on the rotation and orbit of badminton shuttlecock
 - Genetic analysis of Indonesian coelacanth

Presentation in Seoul High School in Korea



Case: Curriculum Development

At senior high school, classes are conducted based on the national curriculum standards established by MEXT.

However, SSHs are qualified to conduct extracurricular activities.

◆ ***Meiji Gakuen Junior and Senior High School (Fukuoka Pref.)***

- *To develop curriculum of science and mathematics in collaboration with elementary, junior high and senior high schools and interdisciplinary curriculum consisted of English, science, and information,*
- *To have an effective connection between the junior and the senior high schools through a new subject, “Basic Science” which includes senior-high-school-level experiments and observations for the 9th graders.*



Case: Cooperation between High School and University

A large number of SSHs cooperate with their neighboring university on project based studies. Some SSH students conduct their project in the university lab.

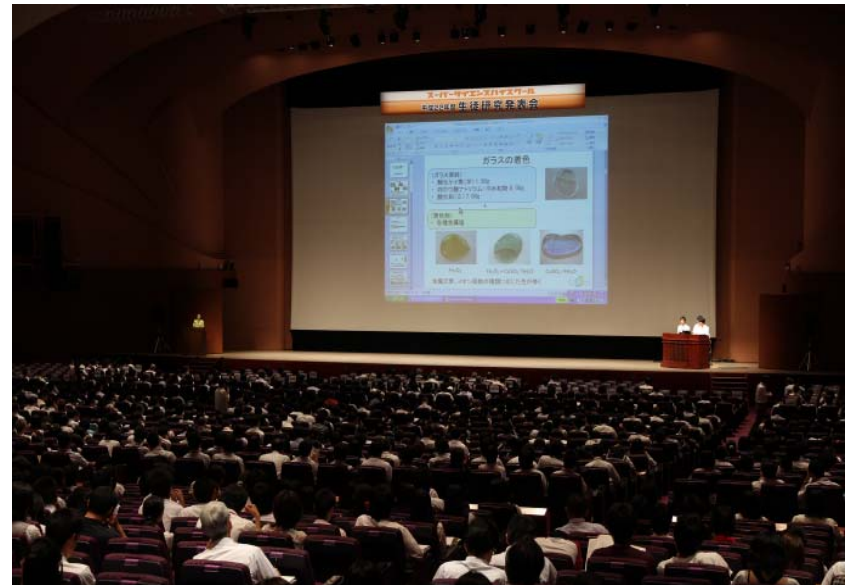
◆ ***Tsu High School (Mie Pref.)***

- *SSH students conduct advanced research in cooperation with Mie university under supervision of the professor.*



Case: The Annual SSH Students Fair

- ◆ *The SSH students who represents their school give a presentation on their project to the other SSH students and public in the Annual SSH Students Fair.*
- ◆ *The number of attendance was about 3,000 in FY2010.*



Dissemination and Development of the Results of SSH ~ Core SSH ~

Core SSH activities include :

- cooperation with the neighboring high schools as the center of the region,
- interregional collaborative projects,
- cooperation with the teachers of SSHs,
- exchange with foreign math-and-science focused schools.

* 21 proposals were adopted as Core SSH activities in FY2010.

Core SSH

Case: Regional Cooperation among SSH and non-SSHs

- **Okazaki Senior high school (Aichi Pref.)**
 - *Okazaki Senior High School leads the regional cooperation including six other high schools.*
 - *Students of the schools take the training course in the advanced research laboratories.*



Core SSH Case: Collaborative Project

- **Kinkowan Senior High School (Kagoshima Pref.)**
 - *Kinkowan Senior High School organized a collaborative project as a SSHs' consortium consisted of 19 SSHs and non-SSHs jointly working in FY2010.*
 - *The consortium focused on the theme, “the diversity of daikon radish” and based on it each member school sets up their specific study item such as its shape, constituents, procreation, transmission and adaptation to environment.*



SSHs' consortium focused on the diversity of daikon radish

Core SSH

Case: cooperation with the teachers of SSHs

- **Otemae Senior High School (Osaka Pref.)**
 - specializes mathematics as SSH program,
 - holds workshops and lectures by the teachers of SSHs in Osaka prefecture.



Core SSH

Case: Exchange with Foreign Math-and-Science Focused Schools

- **Shizuoka Kita High School (Shizuoka Pref.)**

held:

- the Taiwan and Japan Science Education Exchange Symposium 2010 attended by 40 students of 9 Taiwanese HSP (High Science Program) schools and 70 students of 10 SSHs,
- poster sessions or contests for students,
- seminars or workshops for teachers.



The Results of SSH

- The student's ability to make a report or a presentation on the study results has been improved. 【84% of teachers responded affirmatively. 】
- The student's interest in and motivation for science and technology have been improved. 【79% of teachers responded affirmatively. 】

Source: The results of questionnaire to the teachers of SSHs

Achievements: SSH Students

How much did you improve those skills through SSH programs?

Source: Questionnaire survey on SSHs (FY2009)

(n=20,868)

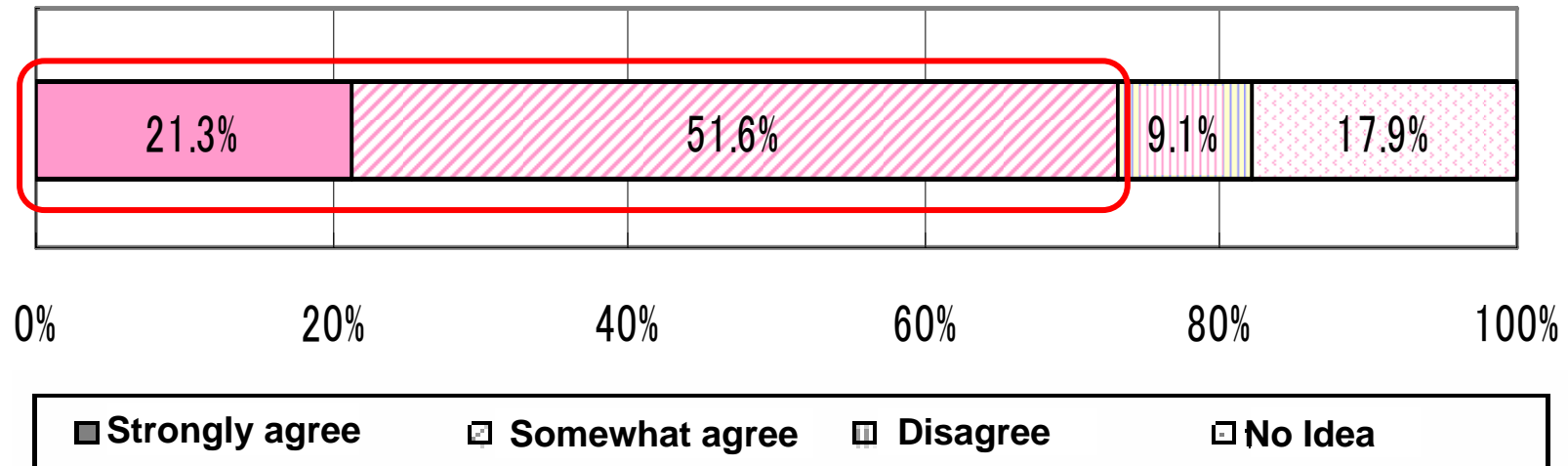


Achievements: SSH Students

Despite a diversity of the student's interests, the SSH activities were effective for encouraging interest in science and technology.

Your interest and motivation in science and technology have been encouraged through the SSH activities.

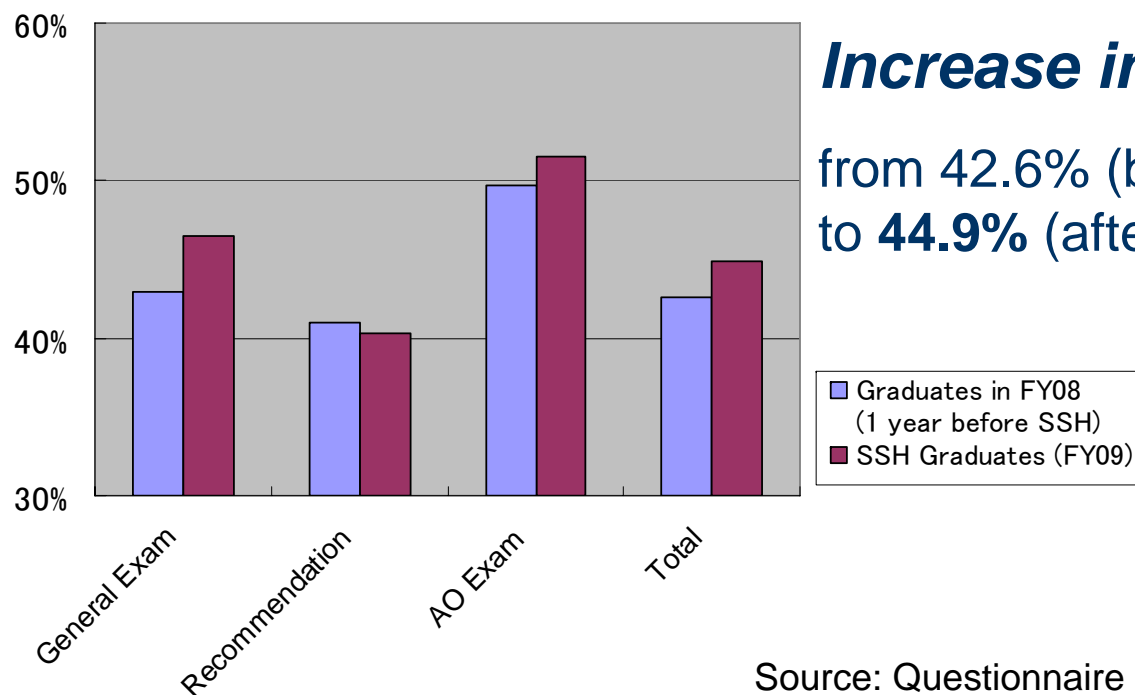
More than 70% students responded affirmatively.



Source: Questionnaire survey on SSHs (FY2009) (N=18,529)

Achievements: SSH Graduates

The ratio of graduates advancing the science-related universities to the total graduates



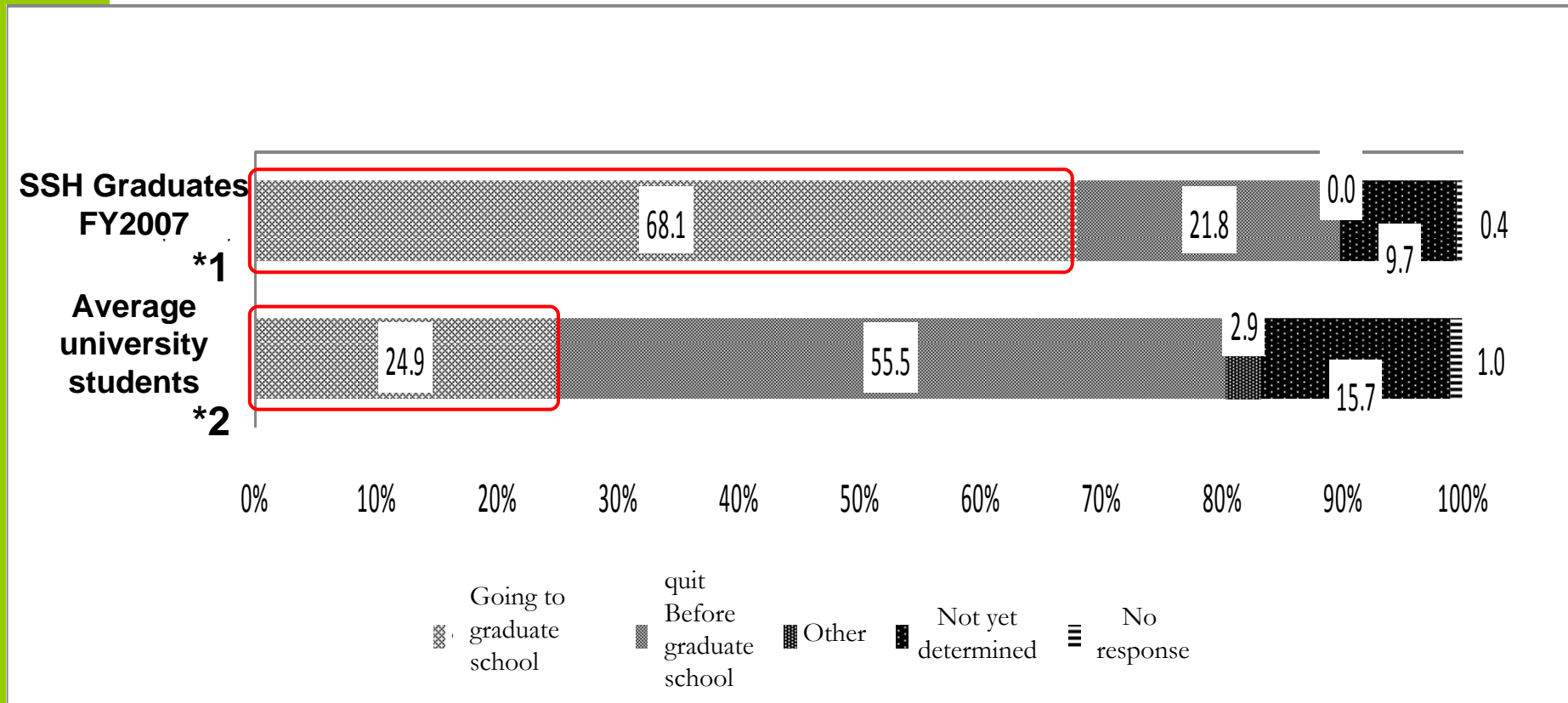
Increase in the ratio:

from 42.6% (before SSH designation) to **44.9%** (after SSH designation)

Source: Questionnaire survey on SSHs (FY2009)

Achievements: SSH Graduates

The comparison of the ratio of students who wish to go to graduate school between SSH graduates and the average university students.



*1 Source: Questionnaire survey on SSHs (FY2009)

*2 Source: Questionnaire survey about career choice on students in university by Benesse commissioned by the Ministry of Economy, Trade and Industry (FY2005)

Prospects of SSH

MEXT has a plan to increase the number of SSH designated schools from 125 at present to 200 in 4 years.

JST will

- classify and analyze the results of SSHs, and
- conduct researches on the sustainable system of SSH which will work effectively in the future circumstances.



Thank you for your attention.
Danke schön.

Japan Science and Technology Agency (JST)

独立行政法人 科学技術振興機構