UNIVERSITY EDUCATION IN JAPAN

From the Viewpoint of Quality Assurance, Evaluation and Accreditation toward the Post Corona

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Auditor, Japan Accreditation Board for Engineering Education (JABEE);
Member, Committee on Certified Evaluation and Accreditation of Universities in National Institution for Academic Degrees and Quality Enhancement of Higher Education (NIAD-QE), Japan.

Personal Background

- 1980 Dr. Eng. (Civil Engineering) University of Tokyo
  Structural Dynamics, Bridge Eng., Wind Eng., Structural Health Monitoring

University education career at national universities

- 1980-1981 University of Tokyo
- 1982-2013 **Saitama University**
  - ＊1990-1992 Asian Inst. Technology

University management career at Saitama University

- 2008 Dean, Faculty of Engineering
- 2010 Dean, Graduate School of Science & Eng.
- 2012 Executive Director/Vice President
- 2014 President (up to March 2020)

JABEE

NIAD-QE
Certified Evaluation and Accreditation of Universities

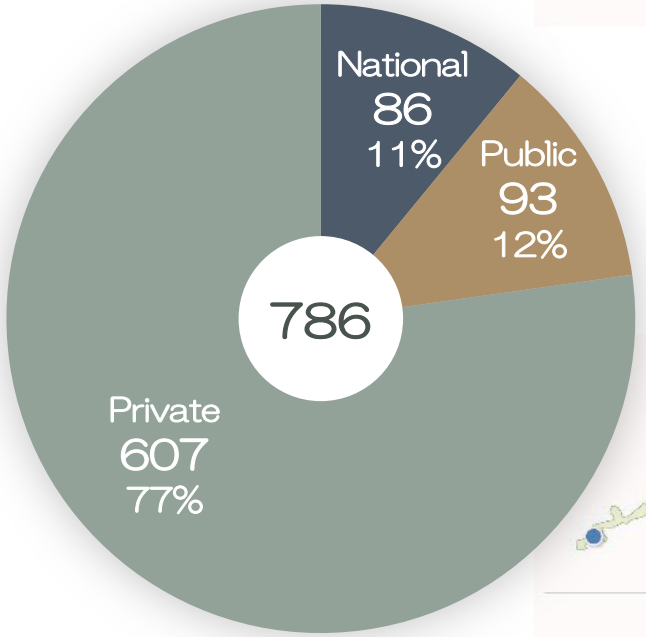
Currently

- Senior Managing Director, The Japan Association of **National Universities**
- Auditor, **JABEE**
- Member, Committee on Certified Evaluation and Accreditation of Universities, **NIAD-QE**

Contents

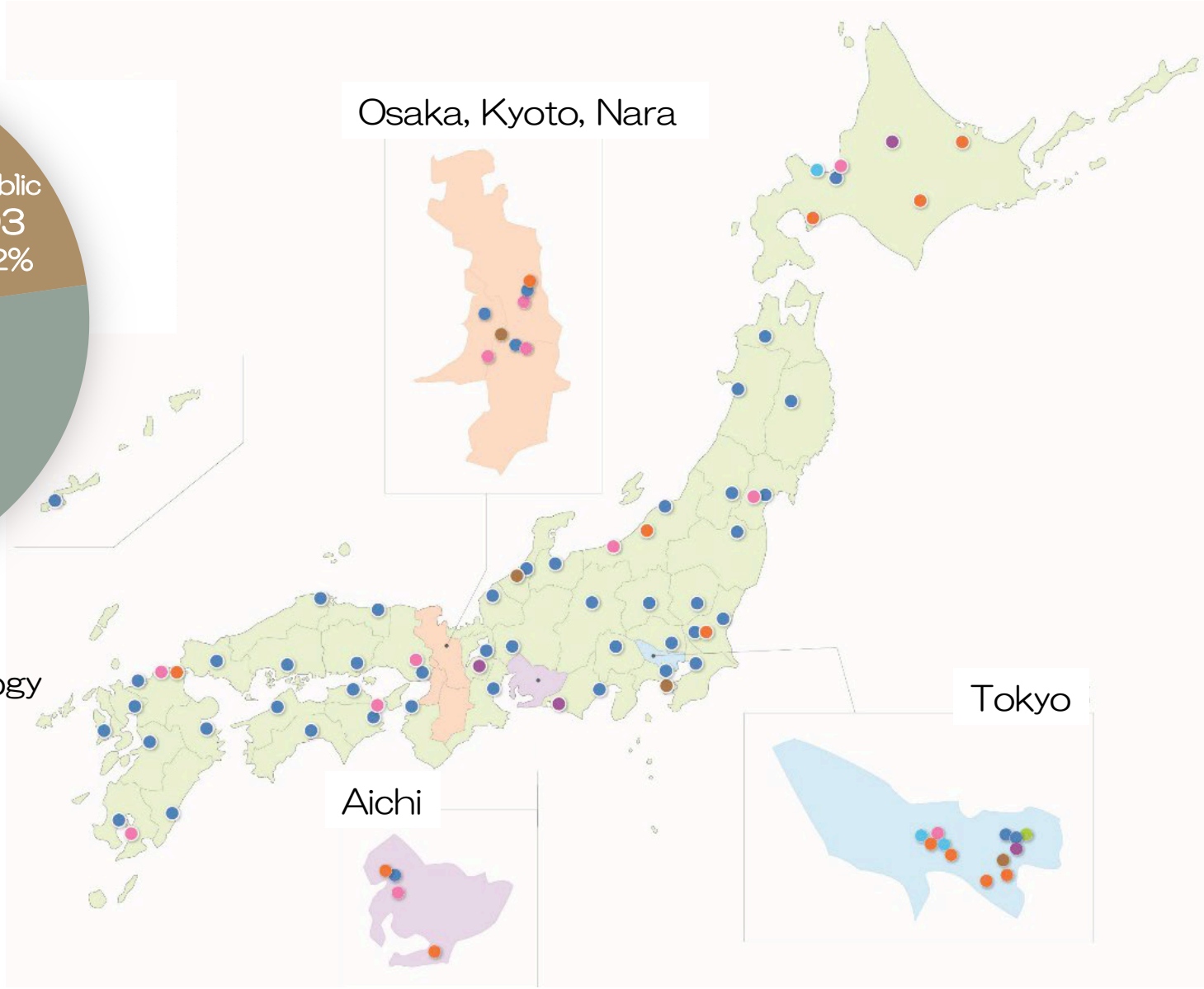
Overview of National Universities in Japan

Number of universities (2019)

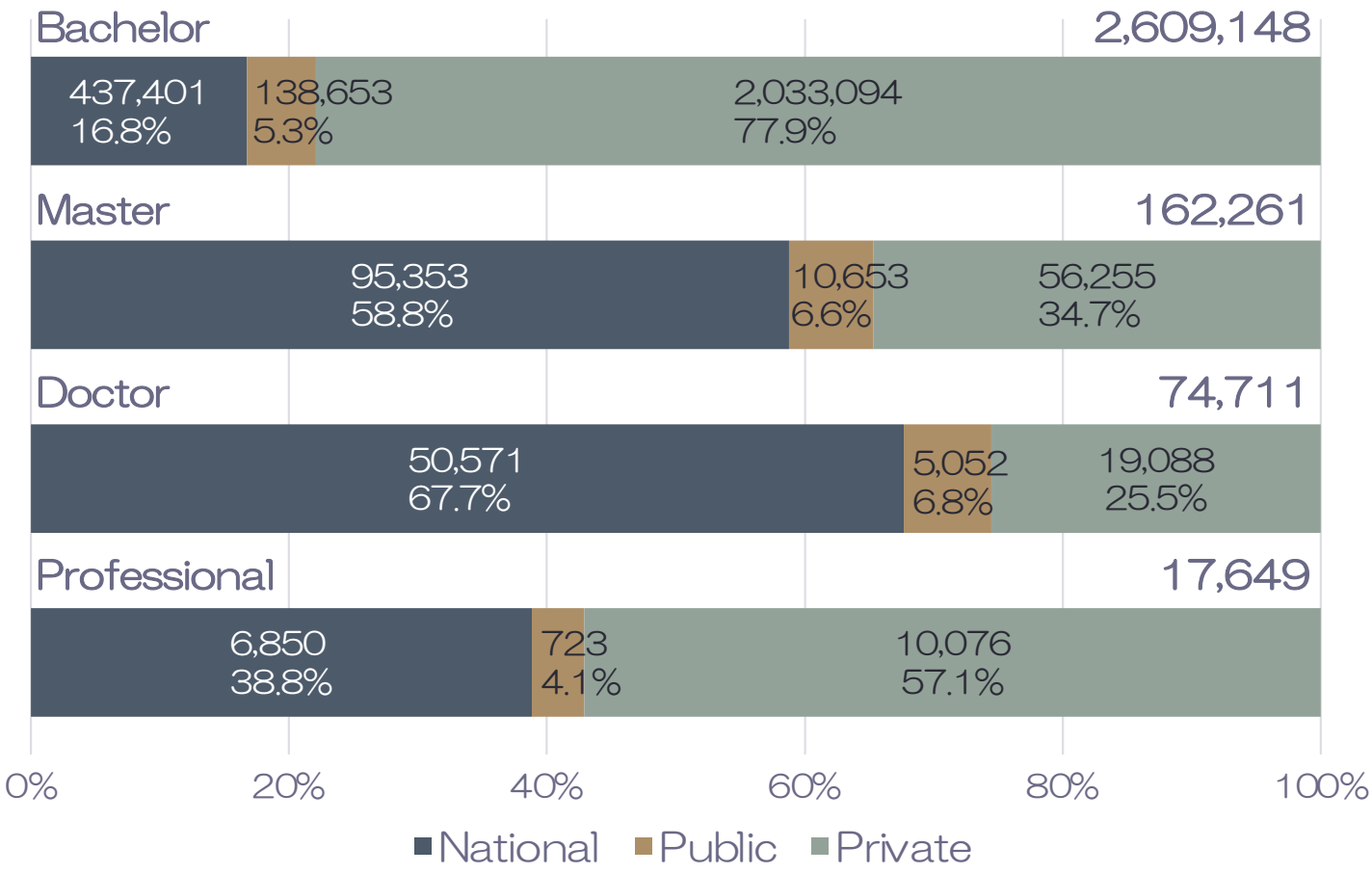


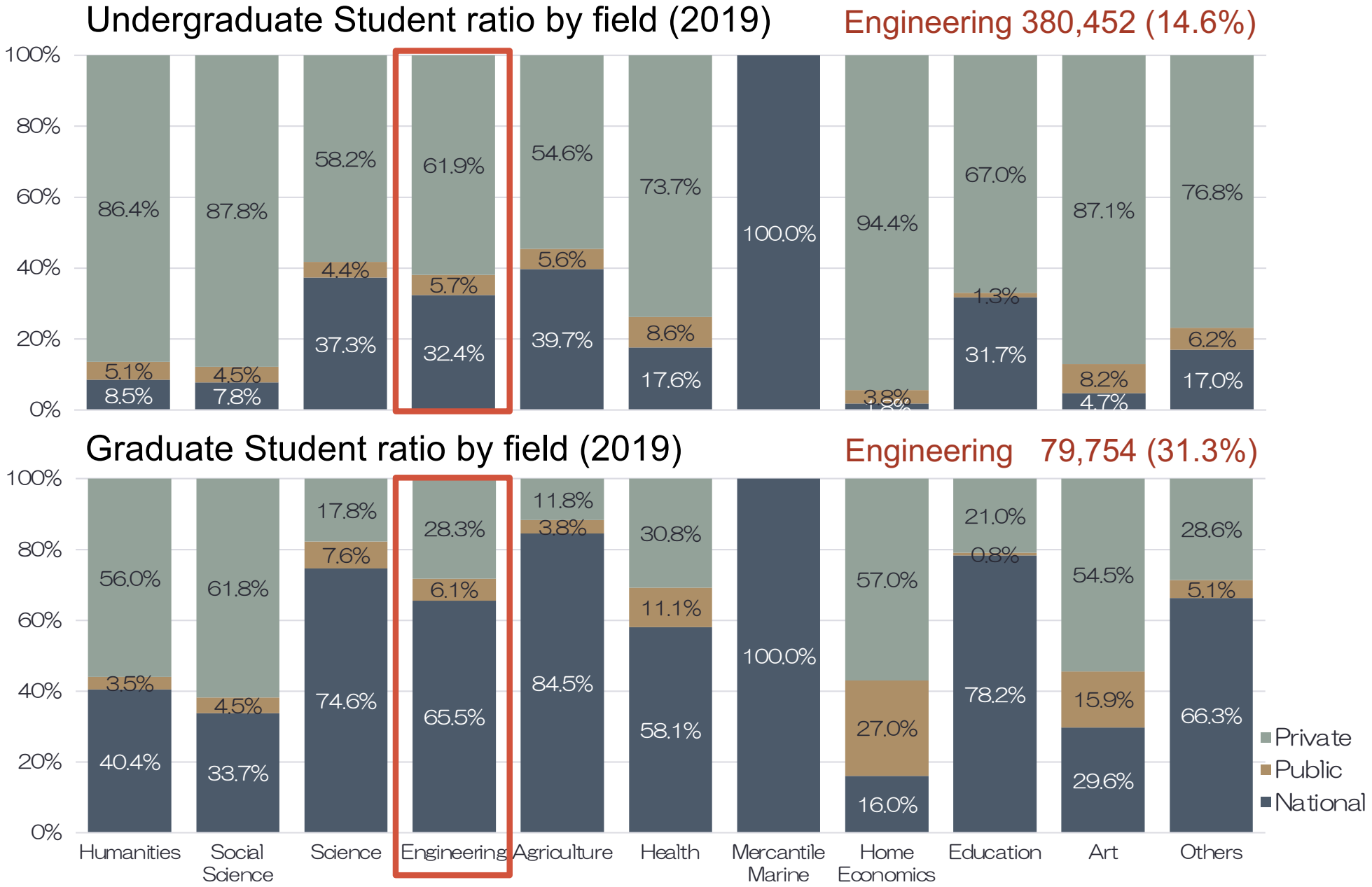
- Comprehensive
- Science and Technology
- liberal arts
- Medical
- Education
- Graduate university
- Art

Nationwide placement of national universities



Number of students (2019)




Undergraduate Student ratio by field (2019)
Engineering 380,452 (14.6%)
100%
80%
60%
40%
20%
0%
86.4%
5.1%
8.5%
87.8%
4.5%
7.8%
58.2%
4.4%
37.3%
61.9%
5.7%
32.4%
54.6%
5.6%
39.7%
73.7%
8.6%
17.6%
100.0%
94.4%
3.8%
67.0%
1.3%
31.7%
87.1%
8.2%
4.7%
76.8%
6.2%
17.0%
Graduate Student ratio by field (2019)
Engineering 79,754 (31.3%)
100%
80%
60%
40%
20%
0%
56.0%
3.5%
40.4%
61.8%
4.5%
33.7%
17.8%
7.6%
74.6%
28.3%
6.1%
65.5%
11.8%
3.8%
84.5%
30.8%
11.1%
58.1%
100.0%
57.0%
27.0%
16.0%
21.0%
0.8%
78.2%
54.5%
15.9%
29.6%
28.6%
5.1%
66.3%
Humanities
Social Science
Science
Engineering
Agriculture
Health
Mercantile Marine
Home Economics
Education
Art
Others
Private
Public
National

National University Corporation and Its Evaluation

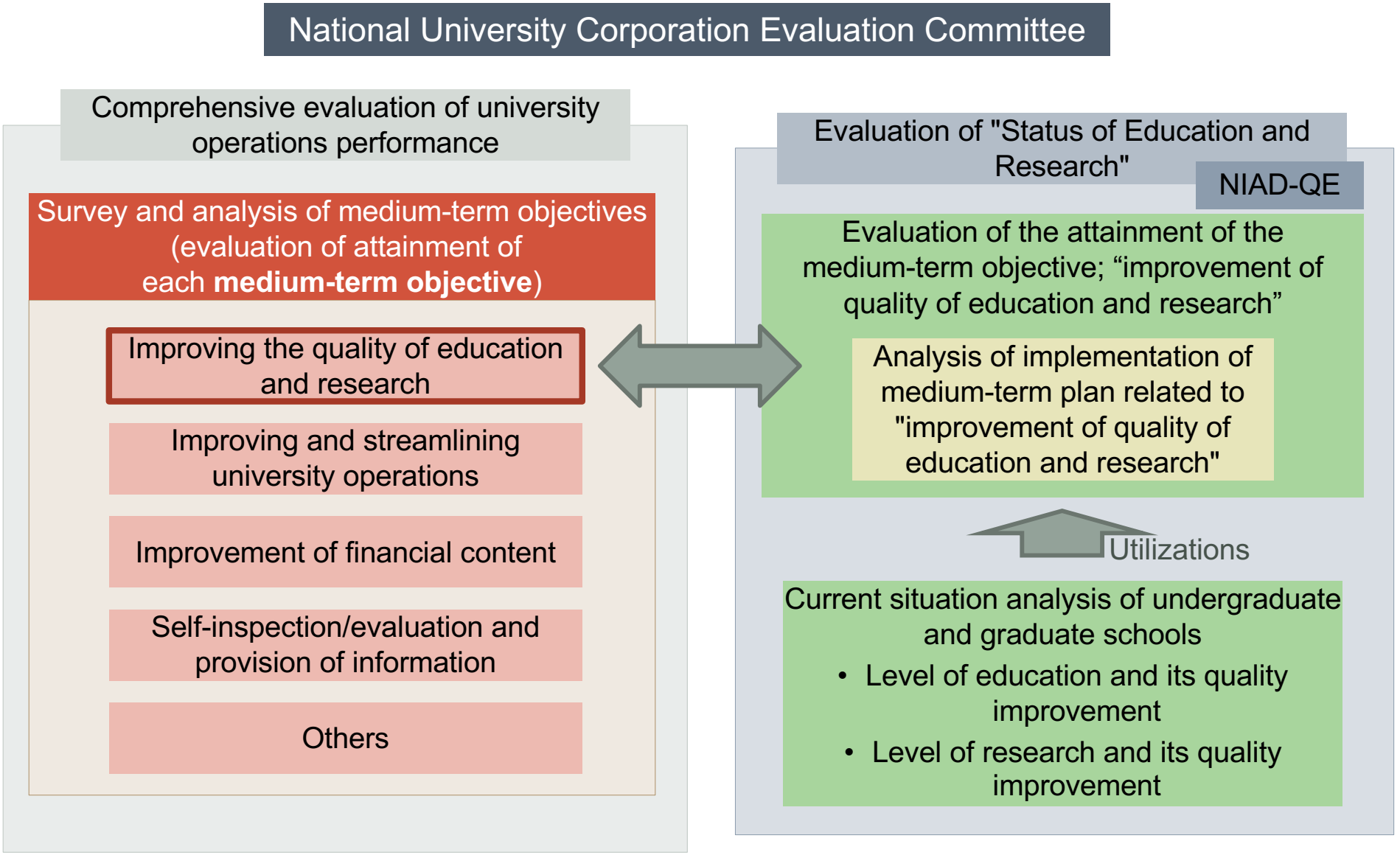
National university corporations

- Since they were incorporated in 2004, **national universities** have endeavored to strengthen their own **functions**, such as promoting advanced research, systematically fostering human resources, contributing to regional revitalization and ensuring equal opportunities for higher education.
- The Ministry of Education, Culture, Sports, Science and Technology (**MEXT**) offers support meticulously and intensively based on evaluation of respective universities' initiatives for strengthening their own functions.
- MEXT will advance reform of management of personnel affairs and salaries, **reform of** evaluation and allocation of resources, and reform of governance including collaboration and integration so that national universities will properly fulfill their roles in fostering human resources and creating innovation.

National University Corporation Evaluation

- The **National University Corporation Evaluation** is a performance-based evaluation based on their medium-term objectives and plans **for education, research and management**.
- The evaluation is a mandatory scheme under the National University Corporation Act.
- The National University Corporation Evaluation Committee, set up in MEXT, is entirely responsible for this evaluation.
- Medium-term objectives evaluations are conducted every six years. Yearly evaluations are conducted every fiscal year.
- NIAD-QE has been commissioned by MEXT's Committee to undertake the evaluation of attainment of medium-term objectives for education and research.

Overview of national university corporation evaluation



National university corporation education and research evaluation

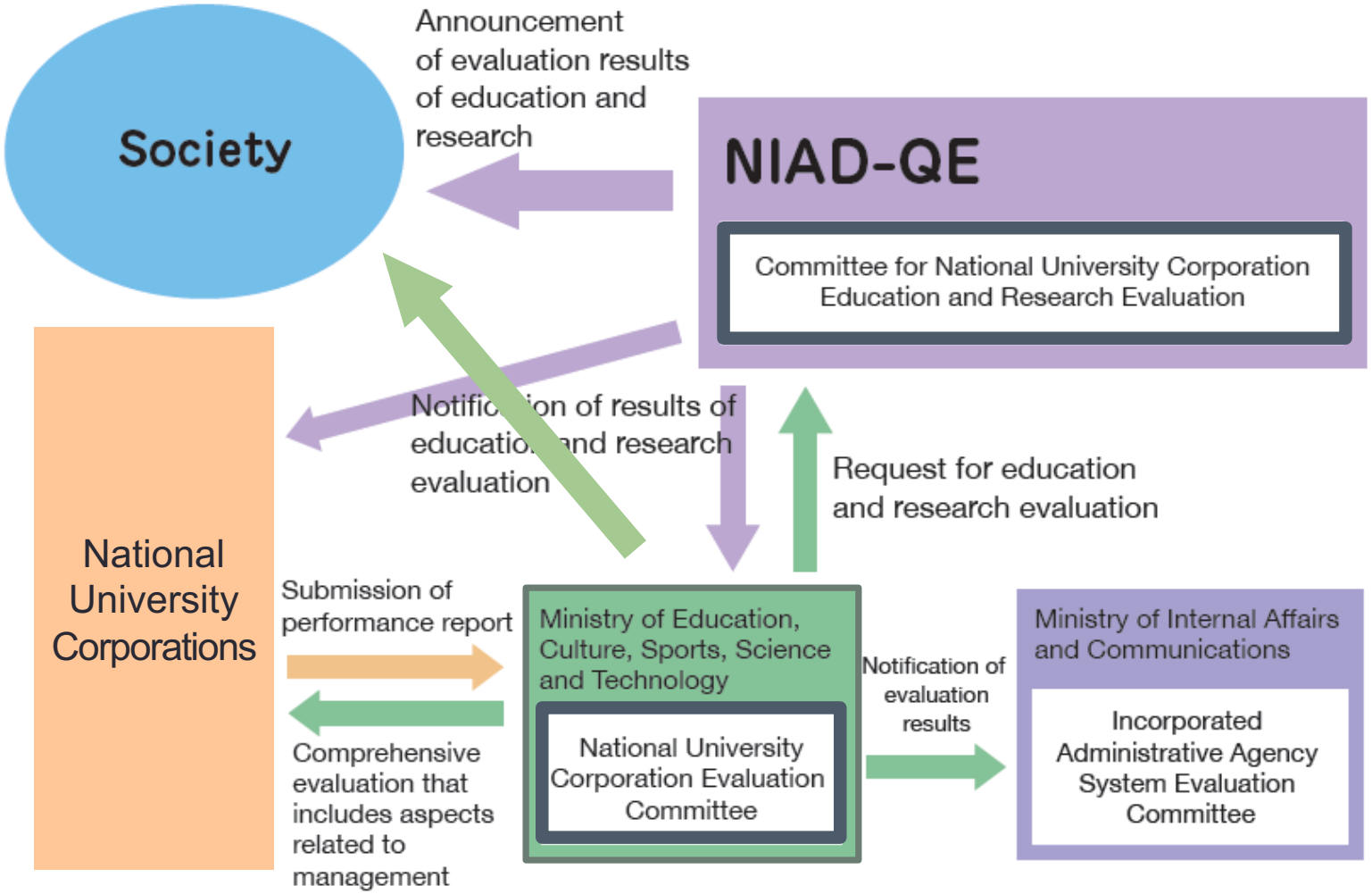
- NIAD-QE's evaluation of the attainment of medium-term objectives takes into account the results of an analysis of the present condition (i.e. level of education, level of research, and progress in quality improvement in both) of **the faculties and academic units of graduate school** that make up the subject corporations.

- Attainment is graded for each item in the medium-term objectives. Evaluation results are reflected in the content of **the next period of medium-term objectives and plans**.

- The education and research evaluation is conducted based on the "Achievement Report on Education and Research Evaluation" prepared by national university corporations through **self-evaluation**.

System of national university corporation evaluation

- National university corporation evaluation must demonstrate the duty of **accountability to society** by presenting the status of the corporation.



Certified Evaluation and Accreditation of University Education

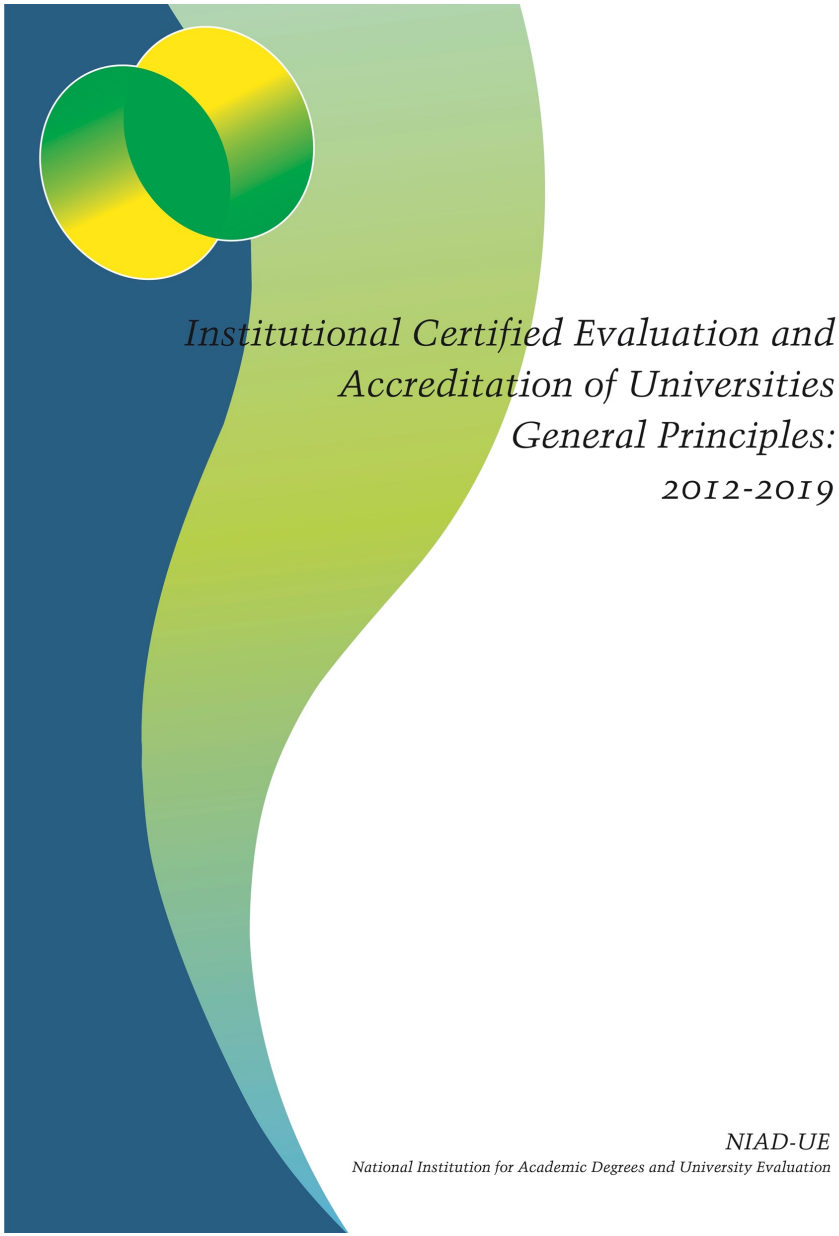
Differences between Certified Evaluation and Accreditation and National University Corporation Evaluation

	National University Corporation Evaluation	Certified Evaluation and Accreditation
Evaluators	National University Corporation Evaluation Committee within MEXT. NIAD-QE undertakes evaluation of education and research.	Organizations certified by MEXT (certified evaluation and accreditation organizations). NIAD-QE for national universities.
Contents of evaluation	Performance-based evaluation of corporations in respect of the attainment of mid-term objectives for education, research, and management; operational management; and financial condition.	Evaluation of the overall conditions of **education** and research, management, and facilities.
Expressing evaluation results	**Achievement is graded** for each item in the mid-term objectives.	**Decision as to whether the evaluation standards have been met** (whether the institution is in conformity)
Utilization of evaluation results	Evaluation results are reflected in the content of the next mid-term objectives and in **the calculation of management expenses grants**.	Evaluation results are used **for quality assurance of education** and research and to improve the quality of the educational institution.
Evaluation period	**Mid-term objectives period** evaluations are conducted at the completion of the fourth year and the sixth year. Yearly evaluations are also conducted.	Institutional: At least once every **seven years**. Professional graduate schools: At least once every five years

Certified Evaluation and Accreditation (CEA)

- **Certified evaluation and accreditation** was introduced in 2004 to contribute to the further development of Japanese higher education. Organizations which undertake this scheme must fulfill the concept and function required by law but has the discretion to develop original strategies for their quality assurance arrangements.
- At present, there are 13 certified evaluation and accreditation organizations, including NIAD-QE, in all of Japan.
- NIAD-QE is certified as an evaluation and accreditation organization of universities, colleges of technology and graduate law schools by MEXT.
- NIAD-QE establishes different standards and methodologies for universities, colleges of technology and graduate law schools, based upon which it conducts evaluations.

General Principles for Evaluation and Accreditation of Universities



I Purpose
II Fundamental Policies
III Implementation System
IV Standards for Evaluation and Accreditation of Universities
V Methodology
VI Evaluation Schedule
VII Publication of Evaluation Results
VIII Information Disclosure
IX Application
X Supplementary Review
XI Evaluation Fees
XII Procedures for Revising the Standards

- NIAD-UE makes constant efforts to develop a more open and evolving evaluation system through the **necessary revision of the evaluation standards** and other improvements.

CEA: Purposes

- In order to maintain and enhance the quality of higher education and research at universities in Japan and contribute to the development of their individuality and diversity, NIAD-QE conducts the institutional certified evaluation and accreditation of universities for the following purposes and policies.

Purposes

a) To assure the quality of education, research and other activities of universities by regularly evaluating the institutions in accordance with the Standards for Evaluation and Accreditation of Universities set by NIAD-QE

b) To contribute to improvement in the quality of education, research and other activities of universities by providing them with high quality reports

c) To encourage and assist universities to gain public understanding of and support for their status as institutions that serve the public good, by clarifying and publishing the conditions of their education, research and other activities

CEA: Fundamental policies

(1) Standards-based evaluation and accreditation

(2) Focus on educational activities

(3) Contribution to the development of individuality

(4) Evaluation and accreditation based on self-assessment

(5) Peer review

(6) A highly transparent system

(7) Internationally acceptable evaluation and accreditation

CEA: Cycle and implementation system

Cycle

- Japanese legislation obliges all national, municipal/prefectural and private universities to be evaluated at least once every seven years.

  NIAD-QE's cycles: 1st (2005-2011), 2nd (2012-2018), 3rd (2019-).

Implementation System

- The Committee for Certified Evaluation and Accreditation of Universities is the responsible body for organizing the evaluation and accreditation process and making final judgments.
- The Committee is comprised of university presidents and academics as well as experts from different industries.
- Training Programs for External Evaluators: NIAD-QE provides external evaluators with training programs that detail the purpose, contents and methods of CEA to share a common understanding and perform their task in a fair, appropriate, and smooth manner.

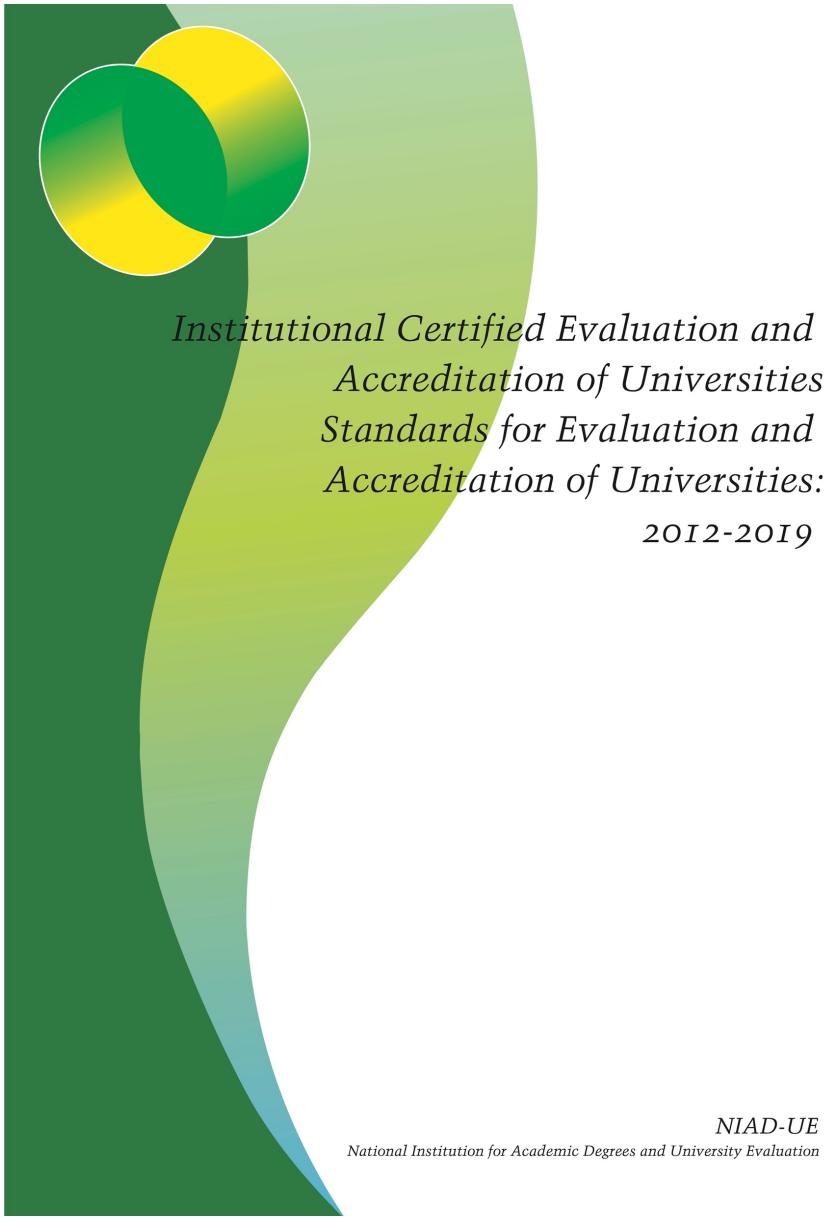
CEA: Standard

- The Standards for CEA comprise 10 criteria. The Standards cover the various requirements that NIAD-QE considers universities should satisfy, including conformity with the School Education Law, the Standards for the Establishment of Universities and other related laws.

1. Mission of the University
2. Teaching and Research Structure
3. Academic Staff and Teaching Supporting Staff
4. Student Admissions
5. Academic Programs
6. Learning Outcomes
7. Facilities and Student Supports
8. Internal Quality Assurance System of Teaching and Learning
9. Finance and Management
10. Public Information on Teaching and Learning

- Each standard is accompanied by viewpoints. Viewpoints are reference points and example data to refer to when implementing self-assessment. NIAD-QE also refers to these viewpoints when judging whether or not an institution's performance meets the standards.

Standards for Evaluation and Accreditation of Universities



Standard 6 Learning Outcomes

6-1 Expected learning outcomes are to be achieved in terms of the knowledge, skills, attitudes, etc. which the students are prescribed to acquire by the educational purposes and visions for the development of human resources.

6-2 Expected learning outcomes are to be achieved judging from the destinations after graduations or completion, etc.

Viewpoints

6-1-i Expected learning outcomes are to be achieved in terms of the knowledge, skills, attitudes, etc. judging from the conditions of acquired credits, progression, graduation (completion), acquired qualifications and licenses at the end of academic year or graduation (completion).

⋮

6-2-ii Expected learning outcomes are to be achieved judging from responses of the stakeholders including graduates (recipients of degrees) and employers.

CEA: Results

- NIAD-QE judges whether the university meets each of the 10 standards, and states reasons for its judgment. In the case where the university's conditions meet the standards but require further improvement and/or where its good practices are identified, they are described in the final report.
- A university judged to meet all 10 standards is given the status of a qualified institution and conferred a certificate. If any one of the standards is not met, the university is judged as an unsatisfactory institution.
- These results are made public.


認　定　証
Certificate
小平大学長　殿
President of Kodaira University
貴大学は独立行政法人大学改革支援・学位授与機構が実施した大学機関別認証評価において大学評価基準を満たしていることを証する
This is to certify that Kodaira University meets the Standards for Evaluation and Accreditation of Universities set by the National Institution for Academic Degrees and Quality Enhancement of Higher Education.
平成　年　月　日
独立行政法人大学改革支援・学位授与機構
機構長　福　田　秀　樹

Japan Accreditation Board for Engineering Education (JABEE) and Accreditation

JABEE & Accreditation

- JABEE accredits education programs in the engineering, agriculture and science departments in higher education institutions fostering professionals. JABEE was established in 1999 to support fostering international professionals.
- Accreditation of JABEE is voluntary and is a third-party accreditation. Evaluations are conducted in cooperation with academic societies of engineering, agriculture and science.
- Accreditation of JABEE is neither qualification of individual students nor certification of education institutions. It is accreditation of professional education programs from the perspective on whether the curriculum and benchmark of the program meet international standards. It is important to ensure international substantial equivalency of professional education.
- The Washington Accord recognizes only one signatory in one jurisdiction and JABEE has uncontested right in Japan since joining the Washington Accord in 2005 as a signatory.

Advantages of JABEE's Accreditation

- JABEE's Accreditation is the third-party accreditation. In the third-party accreditation, the education institution is required to publicize the learning outcomes and to ensure the accountability to the society. Also the responsibility of education is relied on organization such as, the department, but not the individual faculty member. **The first advantage is the fact that the program has been accredited by the third-party.**

- Evaluation focuses on the reform towards outcomes-based education, educational improvement by the PDCA cycle, engineering design education and teamwork education, which are specifically important for professional education. **The second advantage is that the education is improved through accreditation.**

Advantages of JABEE's Accreditation -2

- JABEE accreditation Criteria has been made by taking consideration of the concept of the Washington Accord which is an international framework of engineering education accreditation and JABEE accredited programs are recognized as internationally equivalent. **This is the third advantage.** The international recognition is an effective support for JABEE program graduates to continue studying or to work abroad in the future.

- Non-JABEE accredited program graduates have to take the first step evaluation of national professional engineer evaluation, whereas, JABEE graduates are exempted. It is a big burden to prepare years after graduation while working for the first step evaluation which is composed of academic elements. **Exemption is another advantage.**

JABEE Common Criteria for Accreditation of Professional Education Programs

Applicable inn the year 2019 and later

Criterion 1 Learning Outcomes

- 1.1 Profile of Autonomous Professionals
- 1.2 Learning Outcomes

Criterion 2 Educational Methods

- 2.1 Curriculum Policy & Curriculum Design
- 2.2 Implementation on Education based on Syllabi & Encouragement for Independent Learning
- 2.3 Faculty & Support System
- 2.4 Admission Policies
- 2.5 Educational Environment & Student Support

Criterion 3 Achievement of Learning Outcomes

- 3.1 Achievement of Learning Outcomes
- 3.2 Review on Degree of Achievement of the Graduates from Knowledge and Abilities

Criterion 4 Educational Improvement

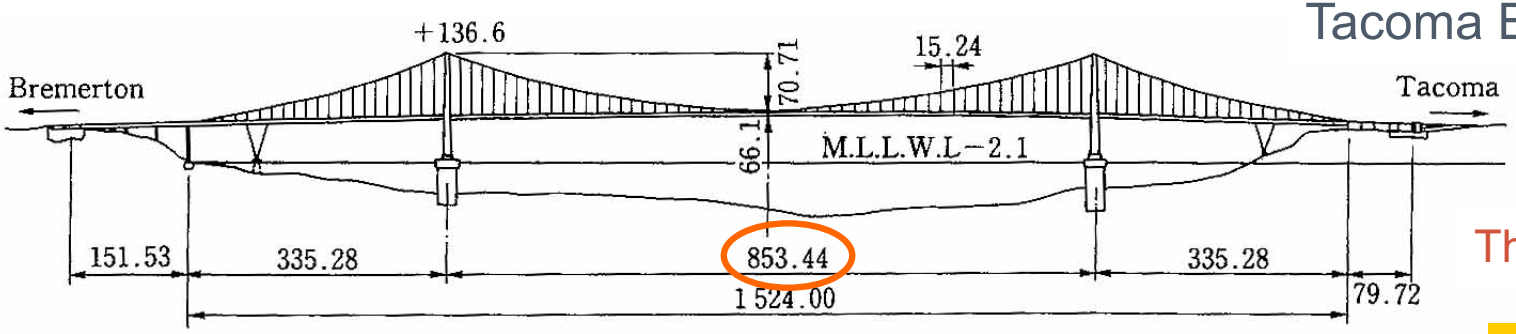
- 4.1 Internal Quality Assurance
- 4.2 Continuous Improvement

Highly Recommended Items by Discipline

Advances in Human Society based on Lessons from Disasters and Accidents

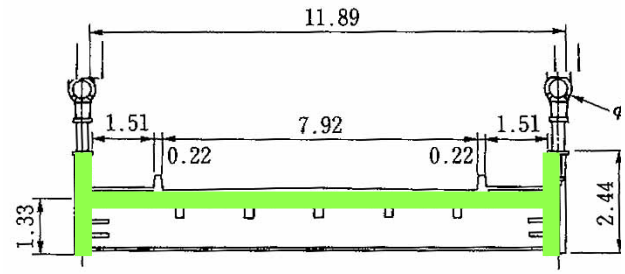
The Tragedy of Tacoma Bridge (1940): The suspension bridge collapsed due to the wind!

Tacoma Bridge (USA, 1940)

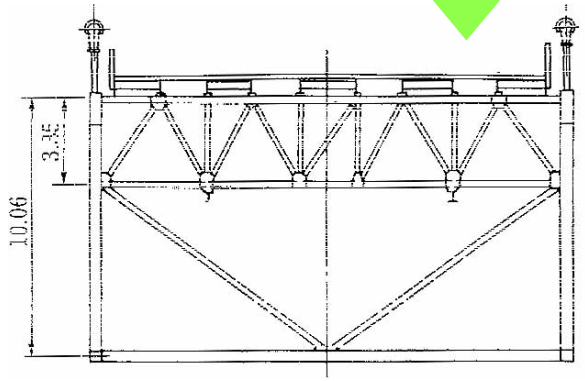


The 3rd World Longest

Wind Speed 19 m/s



Girder Cross Section



Flutter: a wind-induced oscillation

Development of wind resistant design based on the Tacoma Tragedy

Akashi Kaikyo Bridge (1999)
The world longest bridge: 1991m

→ Design of Akashi Kaikyo Bridge
(Truss girder stable against flutter)

Wind tunnel test with 1/100 scaled full bridge model

As a bridge,
Is it really stable
against flutter?

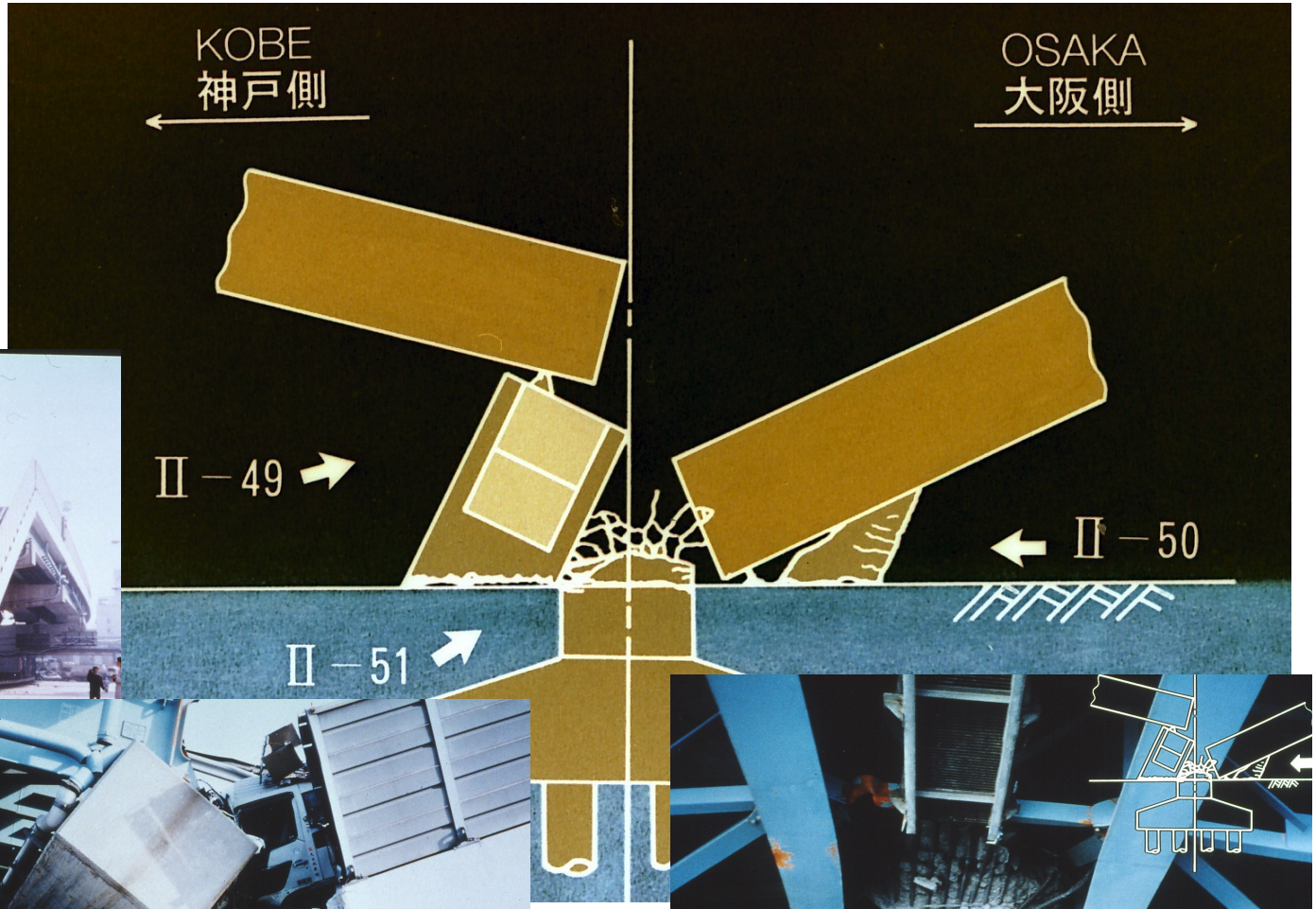
Design Wind Speed:
(Static) 60m/s
(Flutter) 78m/s

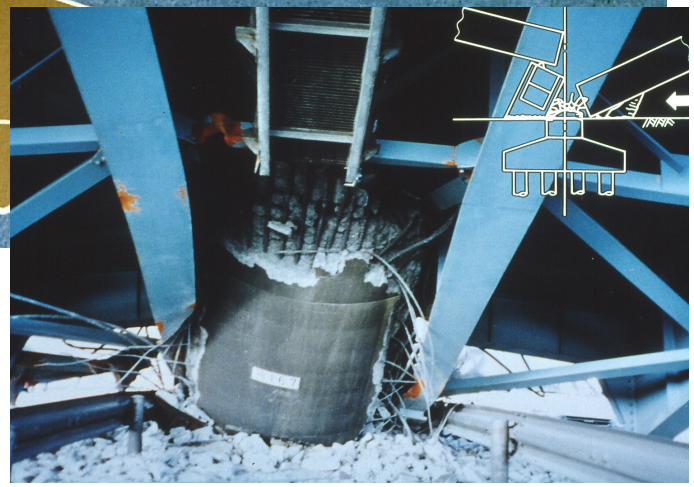
Great Hanshin-Awaji Earthquake (January 17, 1995) M7.3

Those who died: 6,434

Houses that were destroyed: 512,882

Estimated total damage amount: ¥10 trillion





Girder bridge collapse

Seismic design of bridges after the Great Hanshin-Awaji Earthquake

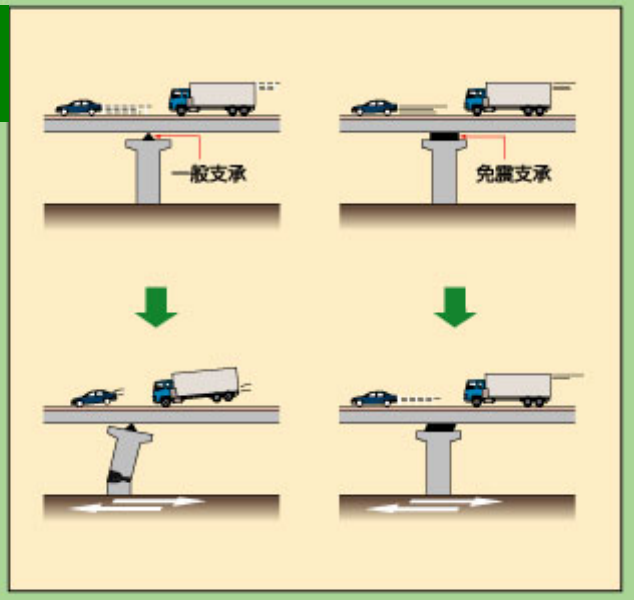
- World-class seismic technology → collapse of Japan's “earthquake engineering myth”
- An honest explanation of bridge engineers: "The Southern Hyogo Earthquake was far beyond what was expected in the design."

- ☐ Improvement of design method against earthquakes (appropriate seismic motion assumed in design)
- ☐ Actively introduce the concept of seismic isolation and seismic control
- ☐ Seismic retrofit for existing bridges

Connecting bridge girders

Reinforcing bridge piers

Replacement with seismic isolation bearing



Lessons from the Great East Japan Earthquake

- Tohoku Earthquake (March 11, 2011), Mw 9.0, Maximum seismic intensity 7
- Almost no damage to the bridge due to the direct action of the earthquake.

↑ Experiences and lessons learned from the Great Hanshin-Awaji Earthquake

- The disasters and nuclear accidents caused by the tsunami were unimaginable!

Concept of "Resilient Society Creation"

What is “Resilient Society Creation”?

To create a community that is flexible and recoverable to natural disasters as well as serious accidents.

The word "unexpected" should not be used easily. However, we have to make some assumptions about the future, and in the sense that the future cannot be predicted with certainty, “unexpected” things happen “within assumption”!

↓

Disaster prevension; pre-risk = natural science based hard measures

This alone is useless when something unexpected happens. In addition to this

Response during disaster; on-risk
Recovery after disaster; post-risk } Humanities/social sciences based soft measures

Liberal Arts of professionals: Intellect paying attention all the directions

- Philosopher, Dr. K. Washida × Anthropologist Dr. J. Yamagiwa

Thought on City and Nature (Shueisha, 2017)

An example of clinical philosophy is a sense of housework such as thinking about what to cook with remaining ingredients, washing dishes and looking after children while preparing meals.

It is important to have a wisdom of worrying about the whole and the others by watching around and by using available things well. Such intellect is now demanded. As academic disciplines have been segmentalized, the person who controls all the intellect has gone and this might have caused the nuclear accident to be enlarged.

Recently it is not necessary to gather even for a meal because people prefer to eat their favorite things anytime and anywhere they like, just as scientists stay in their favorite academic areas without turning their eyes on the outside world.

Now scientist is not a wise man with intellect, but a person just with knowledge. He needs the intellect paying attention not only vertically but also horizontally. If the nuclear power plant accident is reconsidered on the basis of the previous housework idea, for example, it is necessary to foresee the budget, a future risk and cleanup. Isn't it **the liberal arts of professionals** to be able to pay attention to all these directions horizontally?

Importance of dialogue

- Prof. S. Kajitani, the University of Tokyo

What Thinking Means (Gentosha, 2018)

We begin to think only by having a question. Even if we think in our head, it just floats and disappears, so we need to talk. What's more, our thinking would be deeper and richer if someone could respond our talking. Therefore, the **dialogue** is meaningful.

The **dialogue** with others in different standpoints and perspectives naturally broadens and deepens our own way of thinking, and also that we become aware of what used to be our constraints and able to think about the possibilities of something different.

Through dialogue, we may be able to develop knowledge in various horizontal directions.

Engineering education toward the post Corona

The future society is a risk society with rapid and unpredictable changes.

We must gather intellect of diverse experts both vertically and horizontally for the human wellbeing.

Engineers need to master liberal arts of professionals by continuing 'questioning', 'thinking' and 'dialoguing', and to become a well-balanced intellectual professional in the future; post COVID-19.

Quality Assurance, Evaluation and Accreditation