

Create a New Circle of Science, Engineering and Design

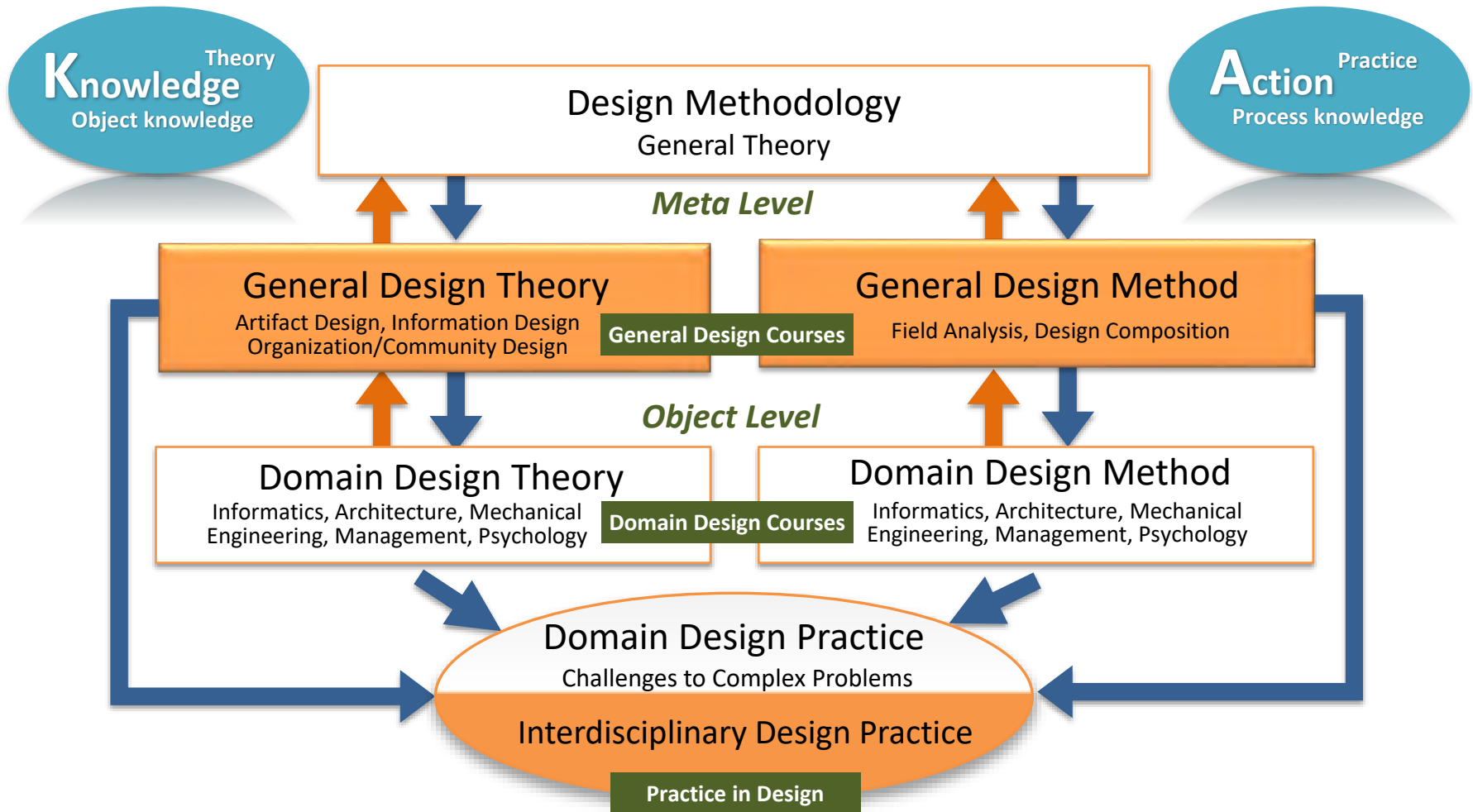
Introduction to [Kyoto University Design School](#)



Toru Ishida, Kyoto University

Overview of Design Studies

Introducing interdisciplinary design theory, method, and practice to seamlessly connect domain design theory/methods to general design methodology.



Design School Curriculum

Cultivating people with outstanding ability to get things done

who can design **social systems and architectures** in collaboration with experts from diverse fields

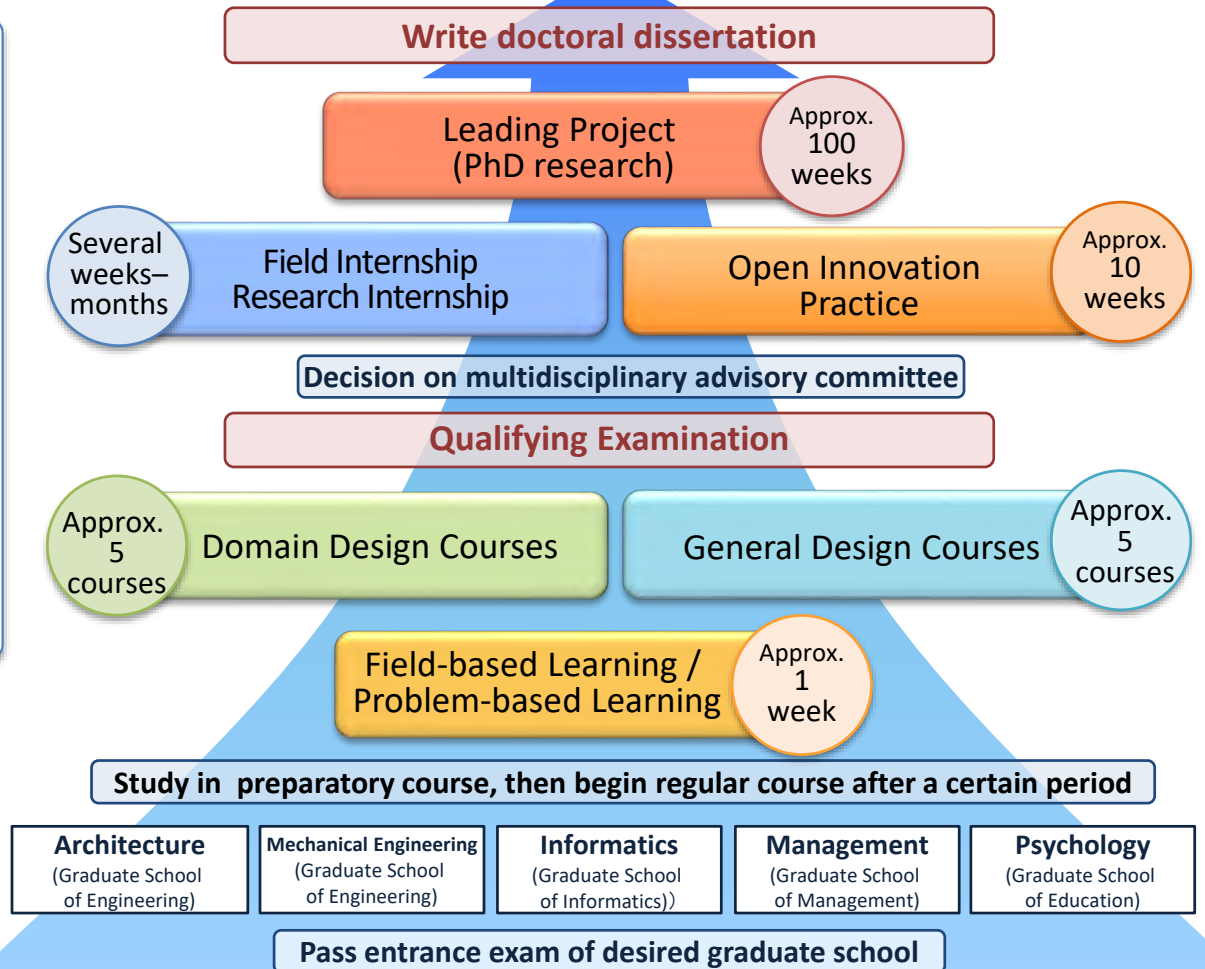
“+ Shaped People”

Six new General Design Courses have been added.

Seven new Basic Theory Courses linked to the General Design Courses have been added.

Of these 13 new courses, 12 are taught by faculty members from participating departments.

Participation by 11 departments of 4 graduate schools



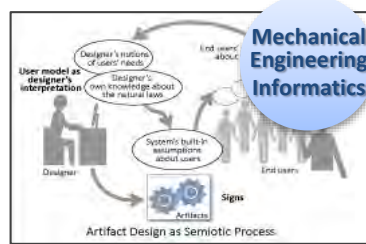
General Design Courses

Six new courses in interdisciplinary design theory, methods and methodology

Artifact Design



Study of methodologies for functional design, which aims at achieving an intended purpose, and for usability design, which takes into account the users' situation/perspective, in the context of artificial systems.



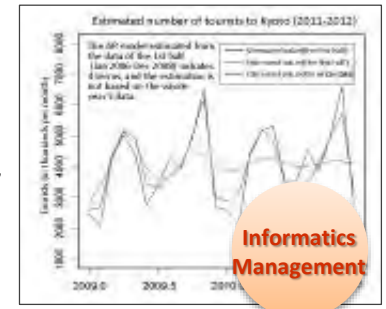
Source: Modified from Hollnagel and Woods, *Joint Cognitive Systems*, 2005.

Mechanical Engineering Informatics

Methods for Field Analysis



Study of field analysis methods required in the design of products, services, businesses, etc., including survey methods for ethnography, questionnaires, etc, as well as study of statistical analysis and other methods for quantitative data analysis.



Informatics Management

Information Design



Study of techniques and methods of information design for not only areas such as graphic design and infographics, but also information structuring/visualizing, linguistic expression, video expression, and interface design.



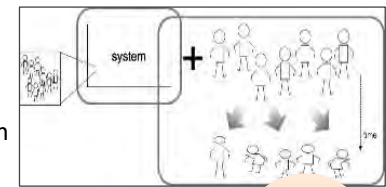
Example of easy-to-understand presentation of information (source: Wikipedia, "Infographic")

Informatics

Design Composition Theories



Study of the processes that make up human and environmental systems involved in the design processes, based on understanding of cognitive/social attributes of humans: expression, thought, sensory characteristics, communication, and mutual understanding.



Elements of design

Informatics

Organization and Community Design



Study of design that avoids hypostatizing society as a "thing," with reference to the state of real-life organizations and communities, and based on understanding of various sociological theories.



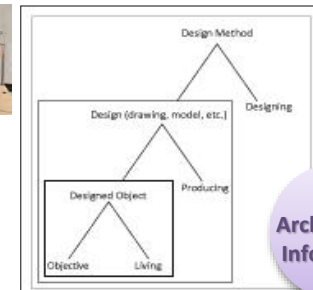
Tool for drawing a vision

Management Informatics

Design Methodology



Explanation of the new science of design and design methodologies for creating complex systems, grounded in an overview of the history of design studies since the 1960s.



Structure of design

Architecture Informatics

Lineup of Practical Training in Design

Five steps for practical training in design that combines coursework with workshops.

Problem finding/solving across the domain expertise.

STEP 1 Summer Design School (taking an interest)

Three days of tackling problems based on industry-academia-government collaboration. 2015: 28 themes, 250 participants.

Open to all
No credit



STEP 2 Field-based / Problem-based Learning (learning methods)

Cooperation with experts in other domains, industries, etc. Application of design methods learned in the classroom.

1st-year students
1 credit × 2 times



STEP 3 Design School in Okinawa/Hong Kong (collaborating)

Three-day joint workshops held with other universities.: facilitation in Okinawa, and problem solving in Hong Kong.

1st/2nd-year
No credit



STEP 4 Open Innovation Practice (managing workshops)

Companies provide challenges to be tackled by team of experts and students. The students are requested to manages the team.

3rd-5th-year
4 credits



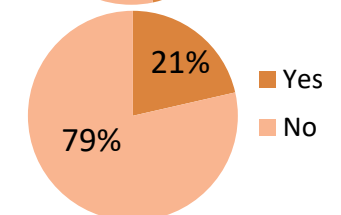
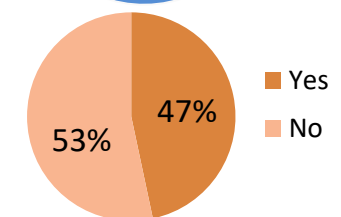
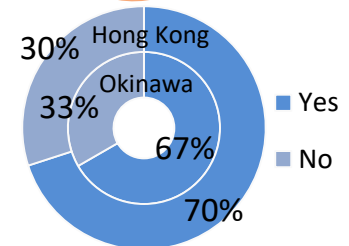
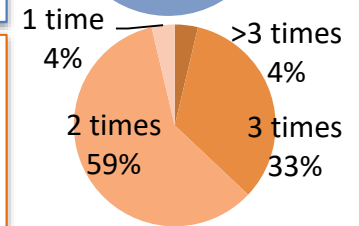
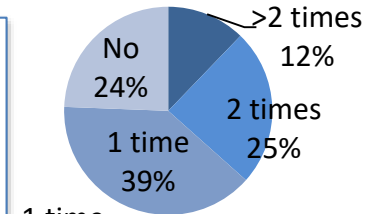
STEP 5 Field Internship (applying expertise)

Challenging practicum forces students to contribute to the team based on their expertise in an unfamiliar environment.

3rd-5th-year
2 credits



Student Participation



STEP 1

Open to all/no credit

Summer Design School

Students experience industry-academia-government collaboration for solving real-world problems of society.

A look at the 2015 program (3 days in September)

Participants: **186** KU: 72 Other universities: 72 Industries: 42
 14 Design School students participated and led the overall program.

Theme proposers: **148** KU: 50 Other universities: 16 Industries: 82

A new form of interactive learning with a faculty/student ratio of almost 1:1



37 themes drawn from industry-academia-government collaboration

A town where Japanese and foreigners live together - Kyoto in 2025 -

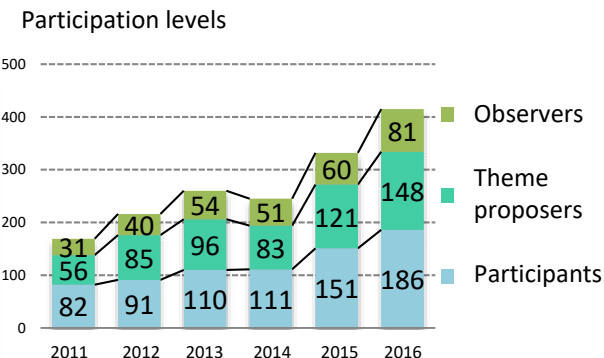
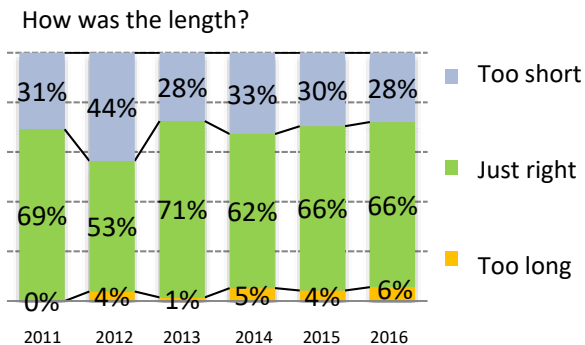
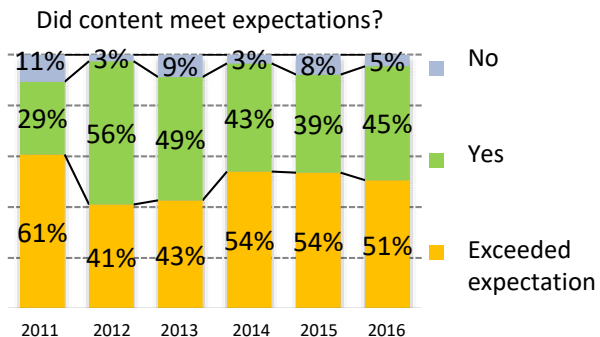
If the world looks the same even in different languages

Revitalize Nishi-jin area with arts and crafts

Design disaster culture in Kyoto

How to utilize empty houses in the future

Consortium members proposed 14 themes. **DS students also proposed themes.**



Discussion

Brainstorming



Prototyping

Video Ethnography



STEP 2

1st-year students/1 credit × 2

Field-based / Problem-based Learning

New program based on experience of Summer Design School

Laboratories select themes. Carried out with experts in other fields, industries, etc.
Ten projects conducted in 2015.

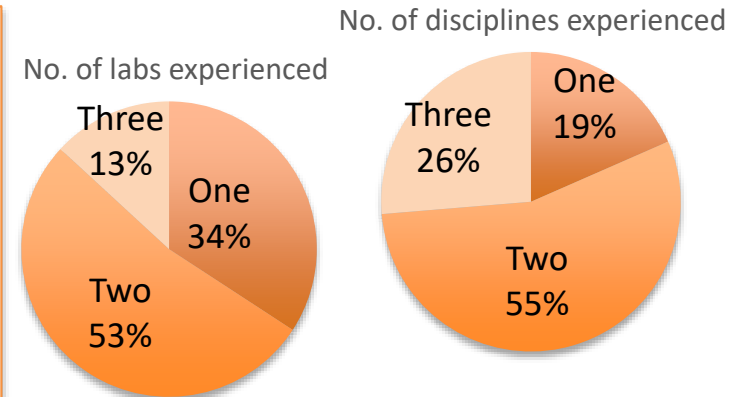
- Virtual Team Design Using Crowdsourcing (Informatics)
- Plan Design for New Business Types (Informatics)
- “ANSHIN” Design Training (Mechanical Engineering)
- Know about Kyoto Prefecture through an Online Survey (Psychology)
- Townscape Design Based on Community Governance (Architecture)
- Design for New Residences in a Rural Community (Architecture)
- Examining, Representing and Communicating Treasurable Artifacts for Designing Inspiring Museum Experience (English: Informatics)
- Let’s Design New Stationery with 3D CAD and 3D Printer (Mechanical Engineering)
- Designing Experience with Benefit of Inconvenience (Informatics)
- Foreign Language Education++ (English: Informatics)

Participants' feedback



Student: I was inspired by the knowledge and thinking of members from other disciplines.

Instructor: Students and faculty members representing diverse disciplines pooled their experiences to solve problems together, and through both successes and failures we got to see the characteristics of each methodology.



Robots and Society



Faculty: Mechanical Engineering, Architecture, Management
Students: Architecture, Informatics

Design School in Okinawa/Hong Kong

Students experience intercultural collaboration with members of different universities

Program with Ryukyu University

Role of students: **Facilitators**

Participants struggle to identify and solve specific issues faced by Okinawa.

Past focuses: Enhancing the **local townscape and hospitality** (2013), **improving health and employment** (2014), and revitalizing **Okinawa City's commercial district, Koza** (2015)

Participation in 2015: 32 students (KU: 9, UR: 23) and 12 faculty members (KU: 5, UR: 4, +3 others)

Program with Hong Kong Baptist University

Role of students: **Solving problems through collaboration**

A challenging program since the workshop is conducted in **English** and a certain level of expertise is required.

Past focuses: **Developing and preserving Lantau Island** (2014) and **tackling Hong Kong's energy problem**(2015)

Participation in 2015: 27 students (KU: 13, HKBU: 14) and 13 faculty members/supporters (KU: 6, HKBU: 7)



Students' feedback



Okinawa:

I learned how tough it is to facilitate and about ways to bridge different opinions. (1st-year student)

Hong Kong:

I gained the confidence to produce meaningful results in collaboration with people from different cultural backgrounds and areas of expertise by gradually expanding discussion with an open-minded approach. (2nd-year student)

STEP 5

3rd–5th-year students/2 credits

Field Internship

A challenging practice in which students contribute to the problem field as an expert.
Cooperation with host organizations in Chizu Village, Indonesia, etc.



Theme in 2015: Sustainable tourism focused on rice terrace scenery

Host: Indonesia Heritage Trust (an NGO focused on cultural preservation)

Period: August 3–7, 2015 (3 DS students)

An action plan proposal to the government for enhancing rural living on Bali while preserving the scenic rice terrace landscape (World Heritage site), based on the perspectives of culture, economy, and environment.



Interviewing a stakeholder (temple)



Collaborating with foreign experts from diverse fields



Local newspaper coverage

External evaluation

- Compared with field work programs that we have hosted in the past, this one had a more specific theme and produced well-organized results, which is something we appreciated.
- The students were very eager to do their work, and naturally compare our field with other regions without our instructions.

Students' feedback



- I learned about how to manage an international team by using the approach of carefully checking member's understanding in English.
- I learned about how to apply my own expertise from other experts' behavior.

Design School Textbook Series

Publication of textbook series as the first step of design education
(Publisher: Kyoritsu Shuppan)



Introduction to Design Studies (March 2016)

Design subjects (2016–2017)

Design Methodology
Design Composition
Artifact Design
Information Design
Organization/Community Design
Field Analysis

Part I: Fundamentals of Design

1. Basic Theory of Design
2. Design and Cognition

Part II: Design Method

3. Artifact Design
4. Information Design
5. Organization/Community Design
6. Field Analysis

Part III: Domains Practice

7. Service Design
8. Urban Design
9. Healthcare Design
10. Disaster Mitigation Design
11. Education Design

Part IV: Design School

12. Designing Design Workshops
13. Physical Prototyping
14. Designing Design Schools

External Evaluation
Report
March 2015

Creativity and ambition shown in **efforts toward theoretical design competency education** with respect to design literacy education at various universities. Aggressively and vigorously taking on extremely challenging issues strongly linked to society's needs.

(External Evaluation Committee)

Bringing Together Exceptional Students

Students of diverse backgrounds study together

Year of study (Leading Project year)	No. of students	No. of students				Notes (JSPS fellowships, etc.)
		Female	International	Non-KU graduate	Adult	
4th	14	3	0	6	4	DC1 Fellow: 1 DC2 Fellow: 4
3rd	13	4	4	3	0	DC1 Fellow: 5 MEXT Scholarship: 1
2nd	12	1	2	6	2	MEXT Scholarship: 1
1st	27	5	3	15	3	MEXT Scholarship: 1
Total	66	13(20%)	9(14%)	30(45%)	9(14%)	

- **International student origins**

China: 3; South Korea: 1;
France: 1; Russia: 1; Lebanon: 1;
Cambodia: 1; Thailand: 1

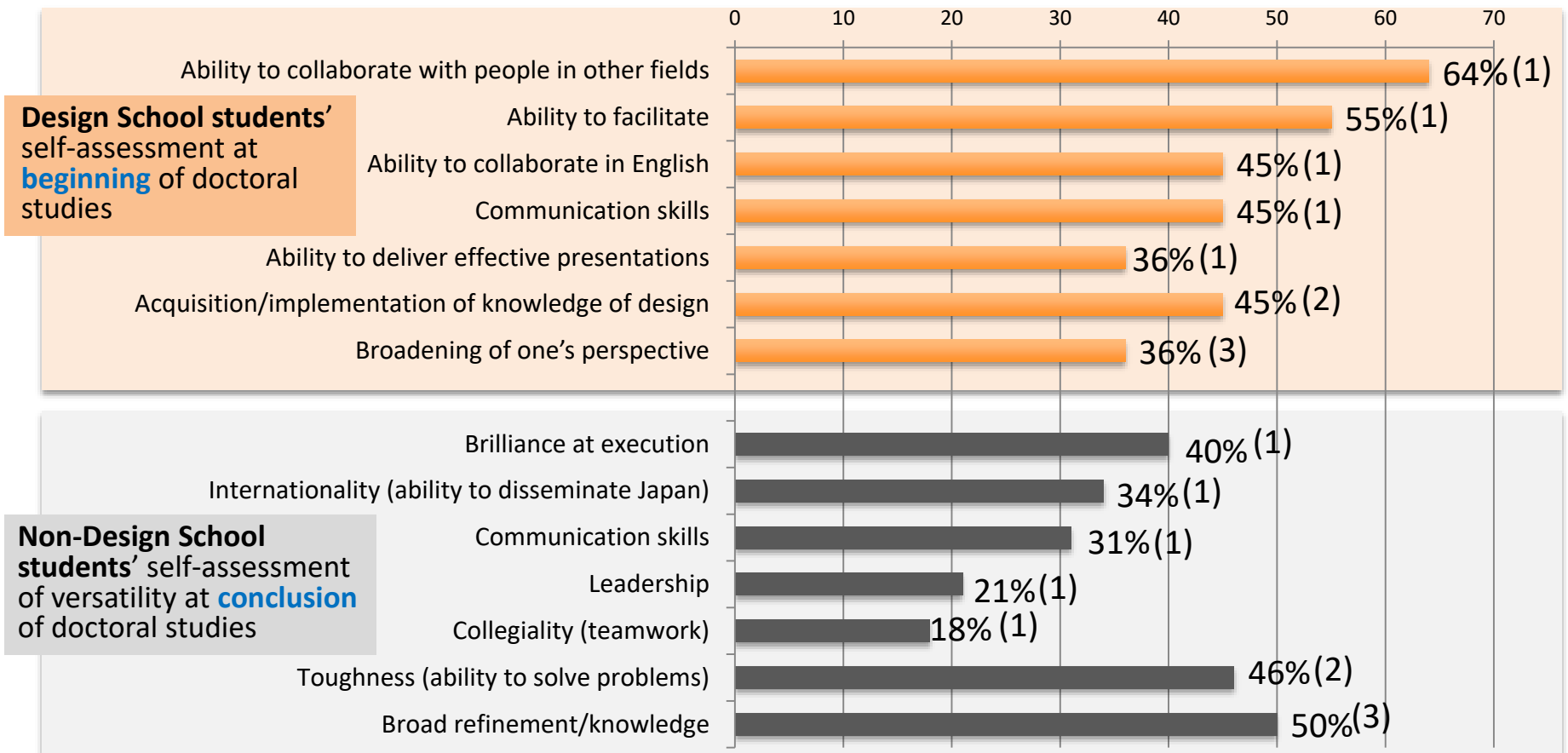
- **Students with industry experience**

R&D, planning/consulting,
junior/senior high school
teaching, local government, etc.



Self-Assessment of Generic Skills

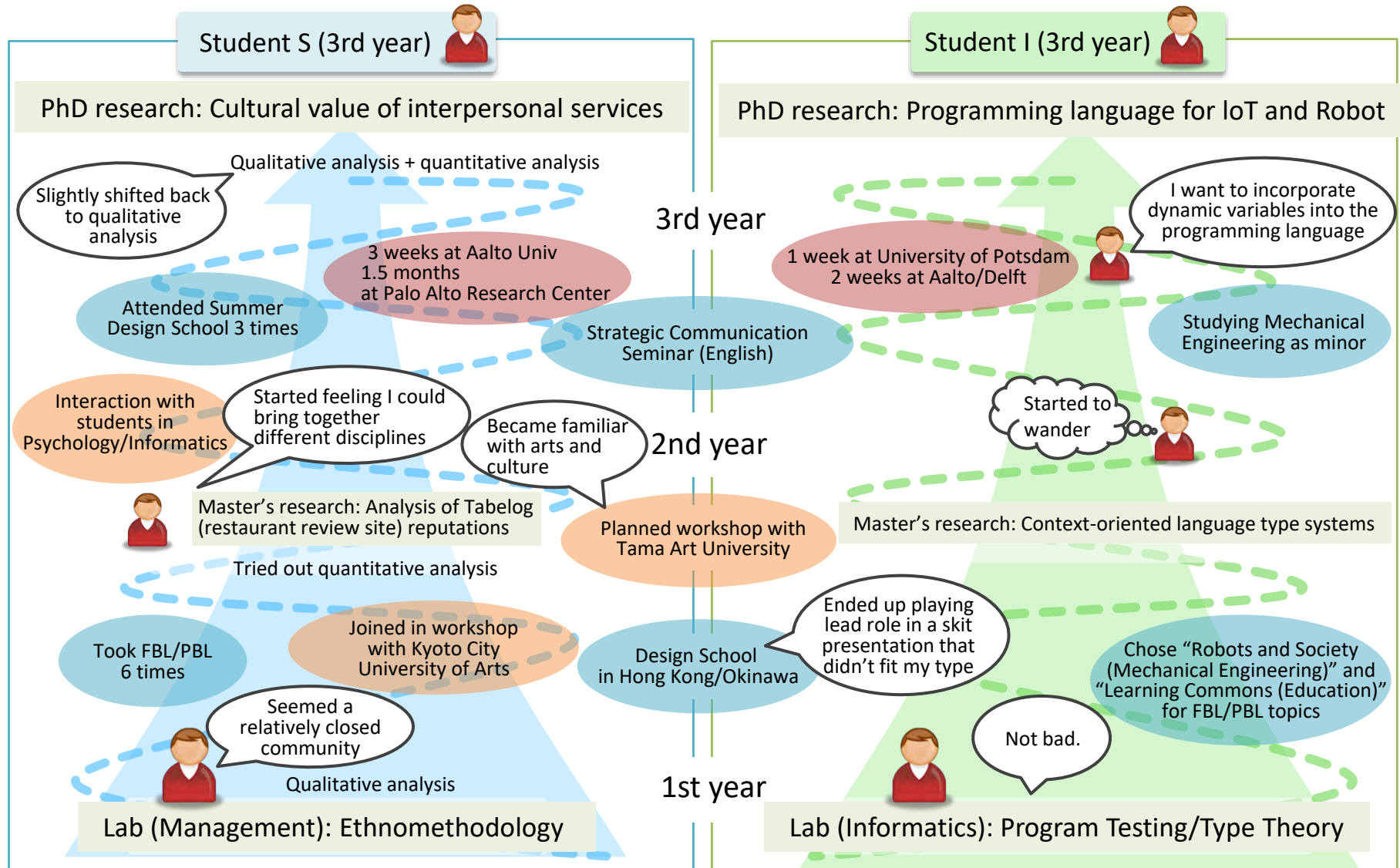
Students at the **beginning** of their doctoral studies gave higher ratings to their **ability to collaborate** than did non-design school students at the **end** of their studies.



“Generic Skill” is defined as (1) the ability to work on the global stage boldly and collaboratively, guided by a firm set of values; (2) the ability to identify challenges that need to be addressed, formulate hypotheses, and creatively tackle those challenges using one’s own knowledge; and (3) the ability to perceive the essence of things by taking a holistic view informed by one’s advanced expertise, internationality, and broad knowledge. (Ministry of Education)

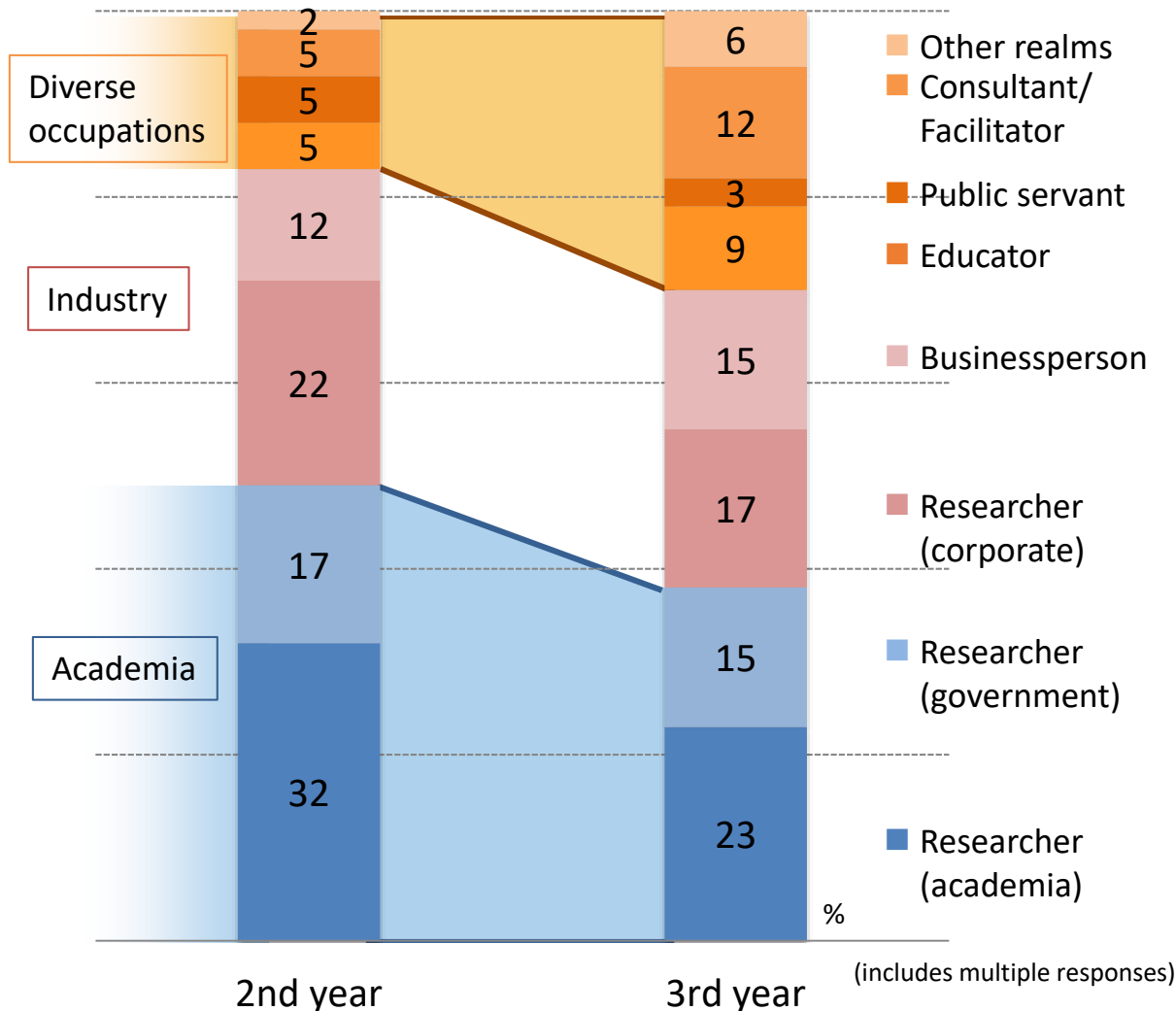
Student Journey Map

Students go through a multifaceted process of growth



Consciousness of One's Career Path

In the course of their studies, many design school students broaden their destinations with respect to career paths that interest them.



Students' feedback



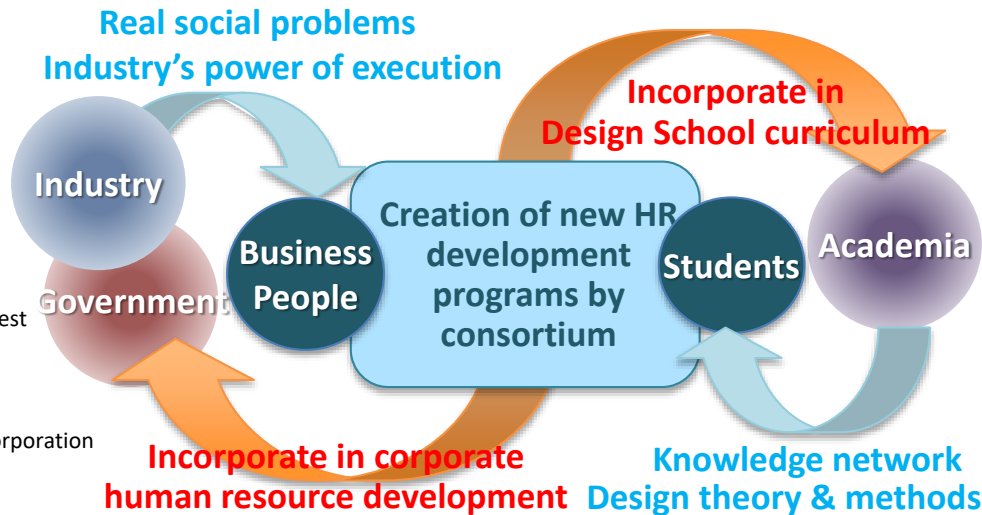
- In my activities at the Design School I have often received strong acclamation for my management skills and ability to propose new projects, so I think that I might be suited for work that involves these competencies.
- At first, I hadn't thought about any career paths other than doing research as a member of a national university's faculty, but recently I've started thinking that it might also be good to make use of the knowledge I've gained in non-research work in the private sector or at a business.
- In addition to the possibility of becoming a researcher, I also want to consider opportunities to put the communication skills I gained at the Design School to good use as an educator or consultant.

Design Innovation Consortium

Design Innovation Consortium was founded to promote human resource development through industry-academia-government collaboration
55 members, comprising corporations, public institutions, etc. (as of Nov. 2015)

A-Members (annual dues: ¥300,000)

Osaka Gas Co. Ltd.
Omron Corporation
Kawasaki Heavy Industries, Ltd.
Kyoto University Unit of Design
Kyoto Research Park Corp.
KDDI R&D Laboratories
Sharp Corporation
Sony Corporation
Daikin Industries, Ltd.
Daiwa House Industry Co., Ltd.
Takenaka Corporation
DMG Mori Co., Ltd.
Toshiba Corporation
Toray Industries, Inc.
Nippon Telegraph and Telephone West
West Japan Railway Company
Nikken Sekkei Ltd.
IBM Japan, Ltd.
The Japan Research Institute, Ltd.
Nippon Telegraph and Telephone Corporation
Nomura Research Institute, Ltd.
Hakuhodo Inc.
Panasonic Corporation
Misawa Homes Institute of Research and Development Co., Ltd.
Mitsubishi Electric Corporation
Yamaha Motor Co., Ltd.
Yokogawa Electric Corporation



B-Members (annual dues: ¥50,000)

Ishimoto Architectural & Engineering Firm, Inc.
NTT Data Sekisui Systems Corporation
Okinawa Kyoiku Shuppan, Inc.
Kajima Corporation
Kyocera Corporation Central Research Laboratory
Advanced Science, Technology & Management
Research Institute of Kyoto
Sakura Color Products Corporation
JFE Steel Corporation
Sumitomo Heavy Industries, Ltd.
Sumitomo Electric Industries, Ltd.
Taisei Corporation
Architects, Regional Planners & Associates, Kyoto
Dentsu Inc.
Tottori Gas Group
Fujita Corporation
Horiba, Ltd.
Sumitomo Mitsui Construction Co., Ltd.
Murata Machinery, Ltd.
Mori Building Co., Ltd.
Wao Corporation
mct Inc.
Rorze Corporation
Tanseisha Co., Ltd.
NEC Corporation

Special Members

Kyoto Prefecture
Kyoto City
Kyoto Chamber of Commerce and Industry
Information-technology Promotion Agency, Japan

Design Innovation Center Fellows



Takenaka



Kyoto
Research Park



Toshiba



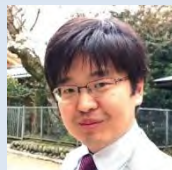
NTT



Osaka Gas



Nomura
Research Institute



Omron



Hakuhodo



Mitsubishi
Electric



Japan
Research Institute

Fellows work together with Design School and help students with diverse career path experiences.

Design Innovation Center

Design Innovation Center at Kyoto Research Park (350 tenant companies).

A center for creating new ideas and discoveries through encounters and dialogue among various members of businesses, universities, and public agencies.

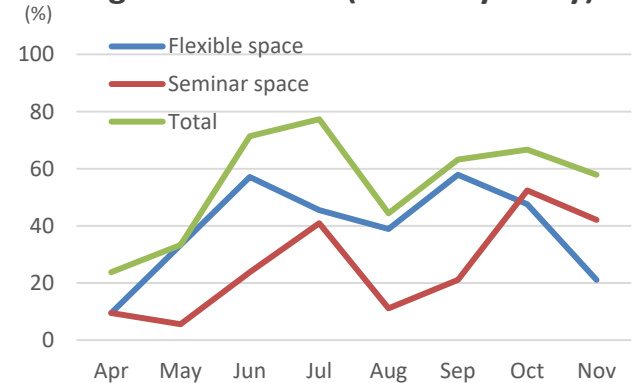


Field-based Learning /
Problem-based Learning

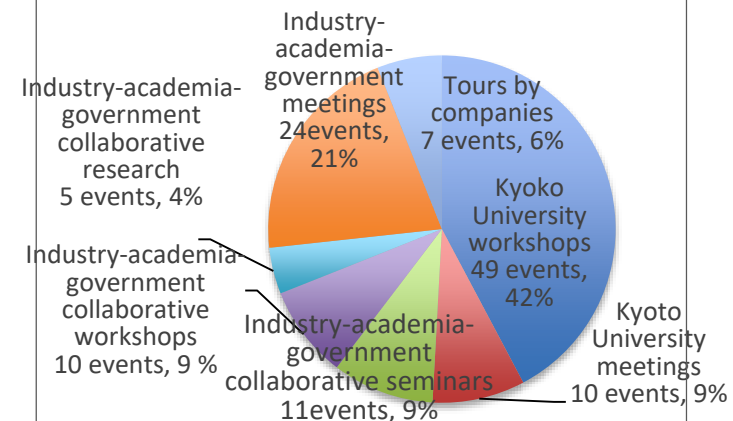


Collaborative seminars

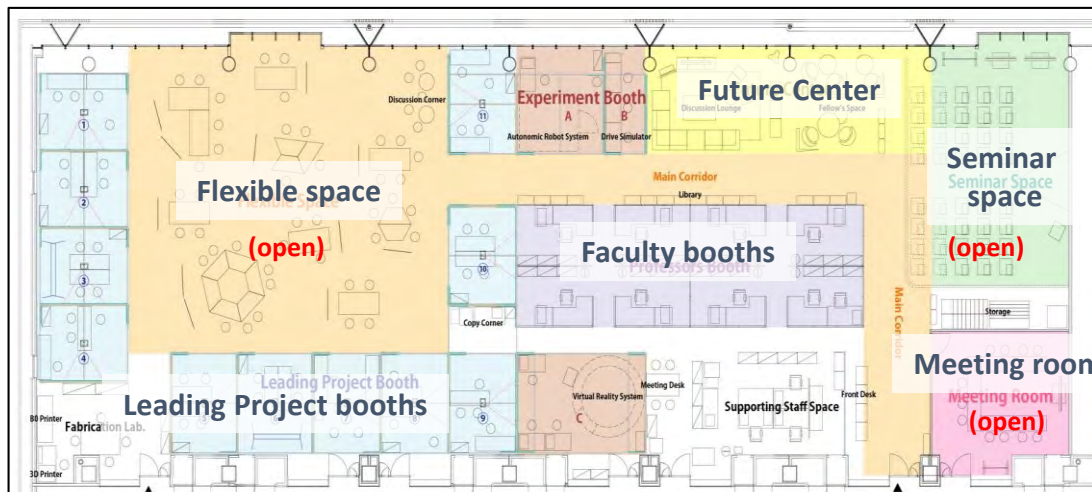
Usage rate in 2015 (weekdays only)



Center Activities in 2015



50-50 split between university and collaborative use



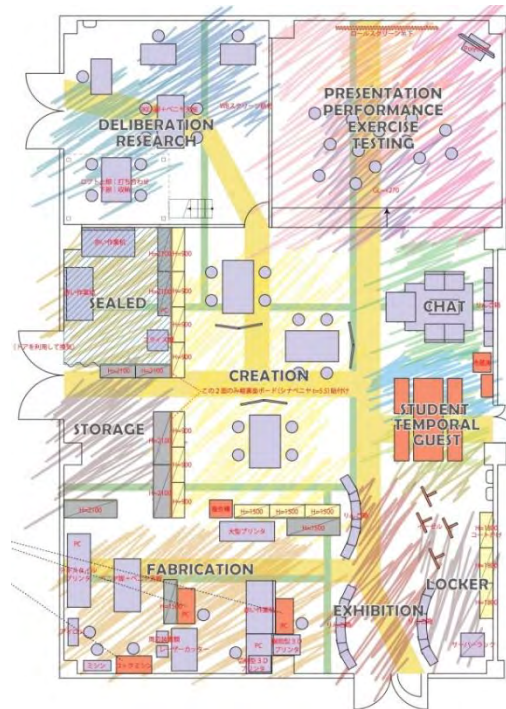
Included in the List of Distinctive Facilities of National Universities

Design Fabrication Center

Consisting of various “studios” which support Design School activities.



fabrication studio
sealed studio
creation studio
deliberation studio
presentation studio
performing studio
testing studio
exercise studio



chat studio
research studio
residential students studio
temporal students working studio
guest studio
exhibition studio
storage studio



*A place where students and researchers work together
with physical representations and bodily expressions*

Network for Leader Development

The Unit of Design is composed of Kyoto University 76 faculty members.

International Advisory Board: 10 members

Barry Katz (IDEO/Stanford University), Bernie Roth (Stanford University), AnnaLee Saxenian (UCB), Pekka Korvenmaa (Aalto University), Maosong Sun (Tsinghua University), Dennis Sylvester (University of Michigan), Wolfgang Wahlster (DFKI), David C. Plaut (CMU), Christer Windeløv-Lidzélius (KaosPilots) and Alison Leggett (University of Bristol).

Advice for the Program

Unit of Design: 76 members (5 foreign nationals, 4 women)

Informatics: 34 (Intelligence Science and Technology, 7; Social Informatics, 14; Applied Mathematics and Physics, 4; Systems Science, 3; Communications and Computer Engineering, 5; Medical Informatics, 1); Engineering: 21 (Architecture and Architectural Engineering, 8; Mechanical Engineering and Science, 6; Micro Engineering, 3; Aeronautics and Astronautics, 2; Electrical Engineering, 1; Neutron Material Engineering, 1); Education: 6; Management: 4; Human Coexistence: 2; Disaster Prevention Research Institute: 2; Kyoto University Museum: 1; Unit of Design: 6

Daily guidance

Adjunct Professors: 3

Tetsuo Tomiyama (Cranfield University), Hideshi Hamaguchi (monogoto Inc.), Ryohei Nakatsu (Hexagon Japan)

Deep empirical knowledge

Different perspectives

Design School students

Art Experts: 6

Takeshi Sunaga (Tokyo University of the Arts); Akira Tsukuda, Toyota Horiguchi, Akihisa Tatsumi (Kyoto City University of Arts); Daijiro Mizuno (Keio University); Koichi Shiraishi (FabLab Kitakagaya)

Corporate Fellows: 10

NTT, Toshiba, Mitsubishi Electric, Omron, Nomura Research Institute, Japan Research Institute, Takenaka, Osaka Gas, Hakuodo, Kyoto Research Park

Real-world problems
Career paths

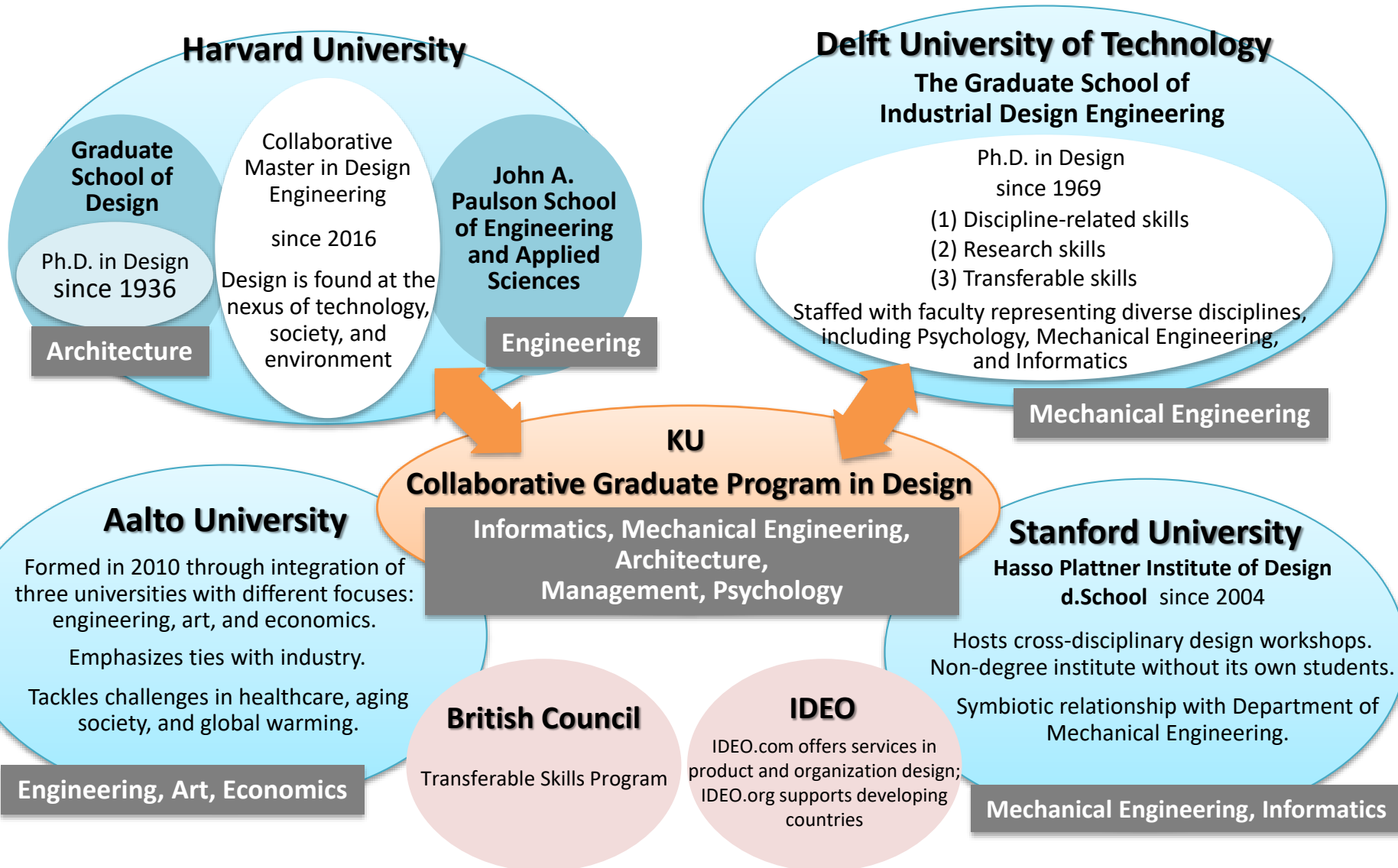
Individual research guidance

International researchers who have coached Design School students

Thomas Malone (MIT); Richard Davidson (University of Wisconsin-Madison); Mitamura, Shibata (Carnegie Mellon University); Munakata, Miyake (University of Colorado); Robert H. Logie (University of Edinburgh); Kari-Hans Kommonen (Aalto University); Oscar Tomico (Eindhoven University of Technology); P. J. Stappers (Delft University of Technology); L.T. Adishakti, Robert Hirschfeld (University of Potsdam); Paola Falini (Sapienza University of Rome); Ryo Okui (University of Rouen); Eva Loth (University of London); Dwita Hadi Rahmi (Gadjah Mada University); Ying-Yi Hong (University of Hong Kong); Jiming Liu (Hong Kong Baptist University); and many others

International Collaboration

Develop a curriculum that meets international standards through collaboration.



Our Goal

Kyoto University has created the circle of Science and Engineering.
Kyoto University Design School will create
a circle of Science, Engineering and Design for future human society.

