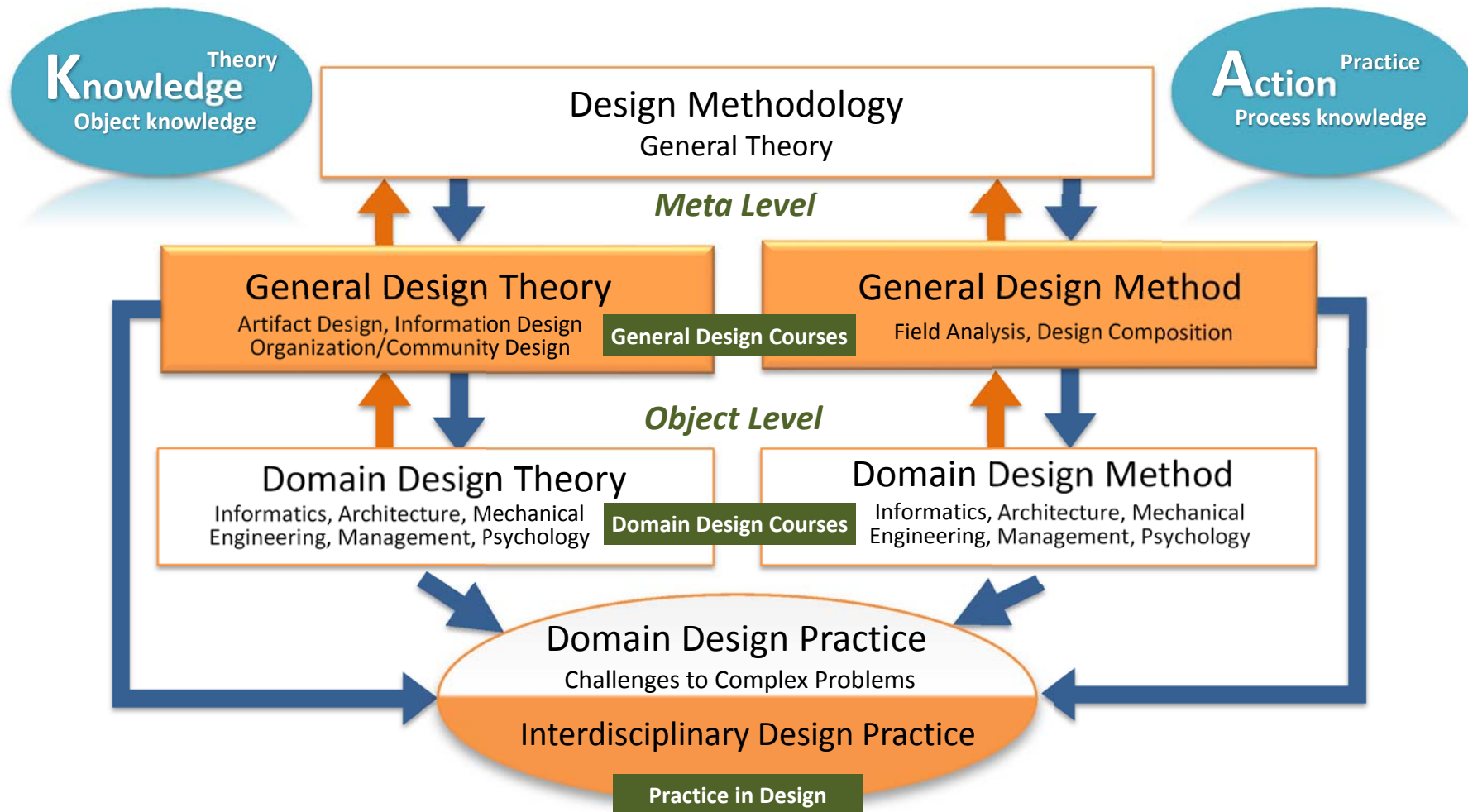# Introduction to
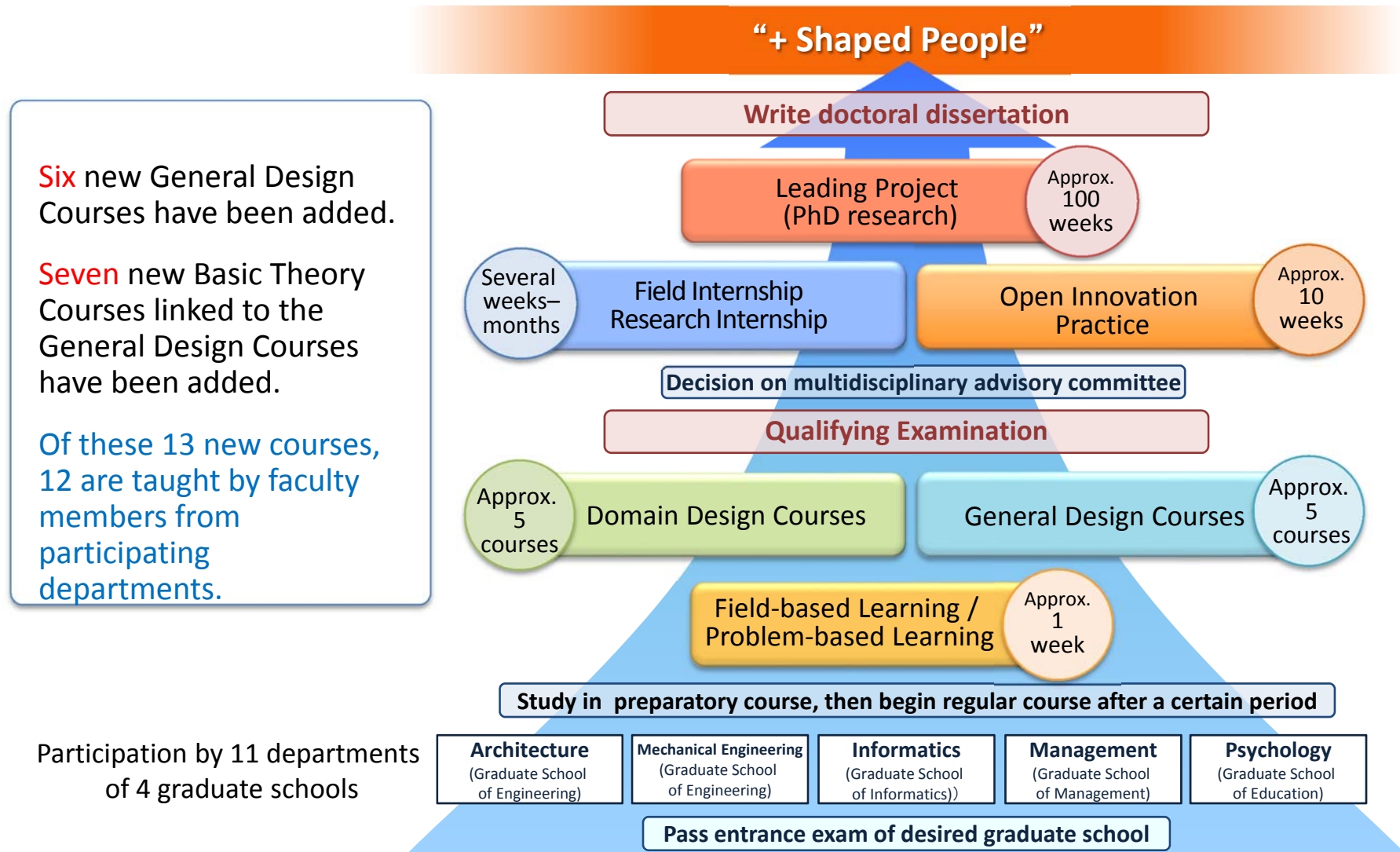# Kyoto University Design School

Toru Ishida

Overview of Design Studies

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

Knowledge — Theory / Object knowledge

Action — Practice / Process knowledge

Design Methodology
General Theory

Meta Level

General Design Theory
Artifact Design, Information Design
Organization/Community Design

General Design Courses

General Design Method
Field Analysis, Design Composition

Object Level

Domain Design Theory
Informatics, Architecture, Mechanical
Engineering, Management, Psychology

Domain Design Courses

Domain Design Method
Informatics, Architecture, Mechanical
Engineering, Management, Psychology

Domain Design Practice
Challenges to Complex Problems

Interdisciplinary Design Practice

Practice in Design

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.

Write doctoral dissertation

Leading Project (PhD research) — Approx. 100 weeks

Several weeks–months — Field Internship Research Internship

Open Innovation Practice — Approx. 10 weeks

Decision on multidisciplinary advisory committee

Qualifying Examination

Approx. 5 courses — Domain Design Courses

General Design Courses — Approx. 5 courses

Field-based Learning / Problem-based Learning — Approx. 1 week

Study in preparatory course, then begin regular course after a certain period

Participation by 11 departments of 4 graduate schools

Architecture (Graduate School of Engineering)	Mechanical Engineering (Graduate School of Engineering)	Informatics (Graduate School of Informatics))	Management (Graduate School of Management)	Psychology (Graduate School of Education)

Pass entrance exam of desired graduate school

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.
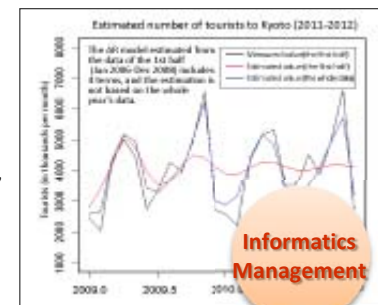

Artifact Design as Semiotic Process
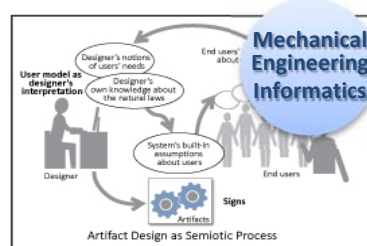
Source: Modified from Hollnagel and Woods, *Joint Cognitive Systems*, 2005.

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.

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")

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.
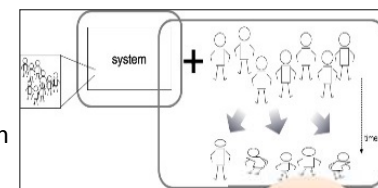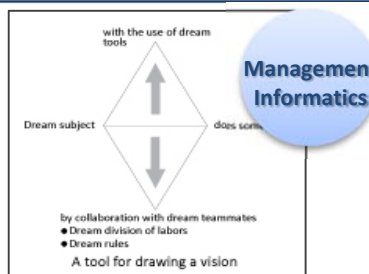

Elements of design

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.
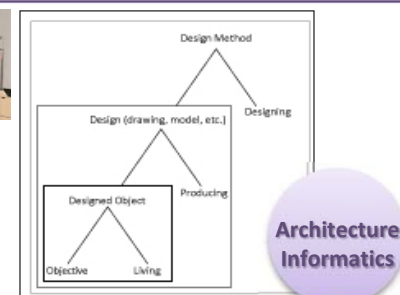

Tool for drawing a vision

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

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.

Student Participation

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

>2 times 12%
2 times 25%
1 time 39%
No 24%

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

1 time 4%
2 times 59%
3 times 33%
>3 times 4%

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

Hong Kong
30%
70%

Okinawa
33%
67%

Yes
No

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.

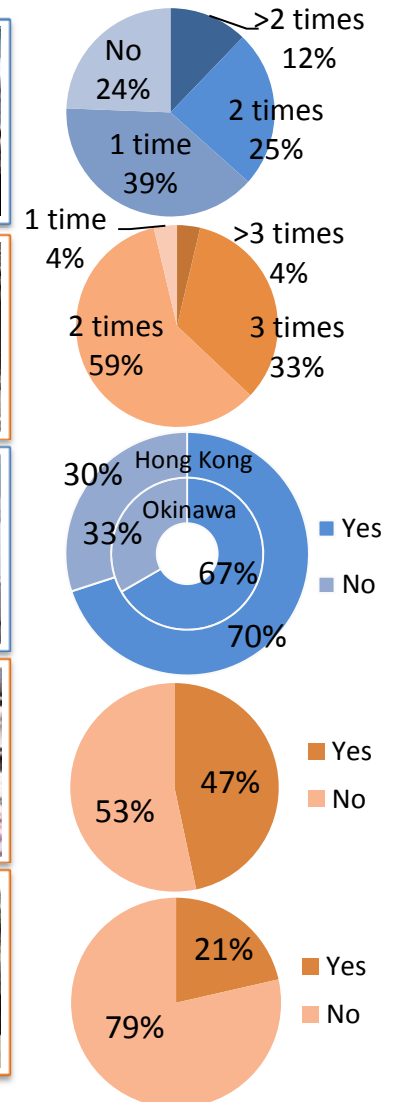3rd–5th-year
4 credits

47%
53%

Yes
No

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

21%
79%

Yes
No

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: **151**   KU: 69 Other universities: 33 Industries: 49

20 Design School students participated and led the overall program.

Theme proposers: **103**   KU: 34 Other universities: 19 Industries: 50

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

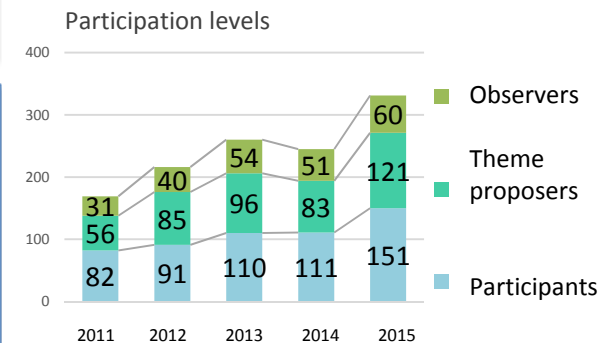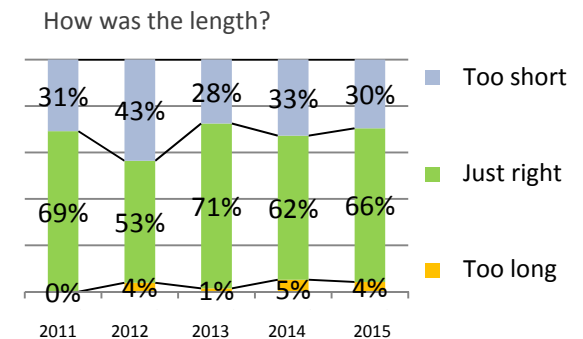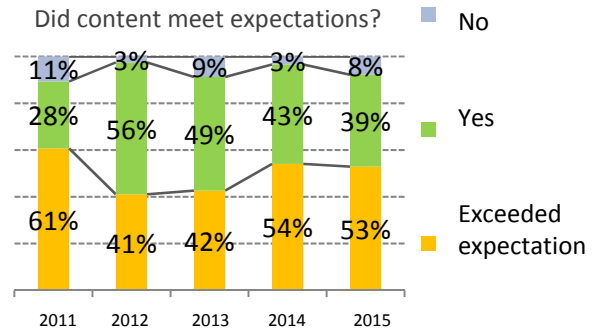28 themes drawn from industry-academia-government collaboration

Service design for creating city attractions centered around wholesale markets

Using cognitive psychology to design a second tour of Kyoto

"Using" personal information in design that creates healthcare and nursing care services

Save the world's endangered languages!

Consortium members proposed 8 themes. DS students also proposed themes.

Discussion

Brainstorming

Prototyping

Video Ethnography

Did content meet expectations?

No

Yes

Exceeded expectation

	2011	2012	2013	2014	2015
No	11%	3%	9%	3%	8%
Yes	28%	56%	49%	43%	39%
Exceeded expectation	61%	41%	42%	54%	53%

How was the length?

Too short

Just right

Too long

	2011	2012	2013	2014	2015
Too short	31%	43%	28%	33%	30%
Just right	69%	53%	71%	62%	66%
Too long	0%	4%	1%	5%	4%

Participation levels

Observers

Theme proposers

Participants

	2011	2012	2013	2014	2015
Observers	31	40	54	51	60
Theme proposers	56	85	96	83	121
Participants	82	91	110	111	151

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.
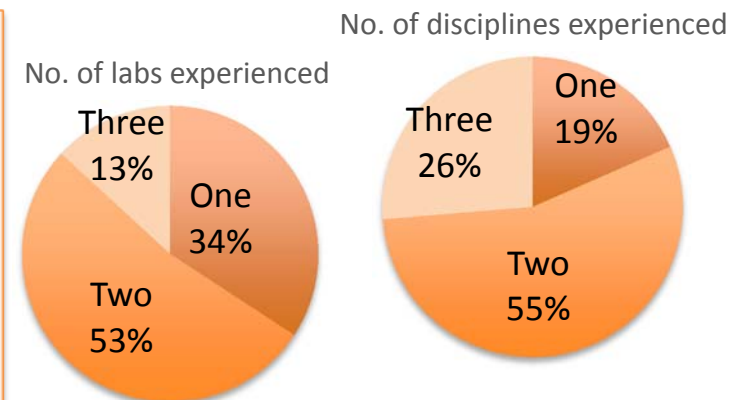Ten projects conducted in 2015.

- 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)

No. of disciplines experienced

No. of labs experienced

No. of labs experienced:
Three 13%
One 34%
Two 53%

No. of disciplines experienced:
One 19%
Three 26%
Two 55%

Robots and Society

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

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)

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)

デザイン学概論

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	Female	International	Non-KU graduate	Adult	Notes (JSPS fellowships, etc.)
3rd	15	4	1	7	4	DC1 Fellow: 1 DC2 Fellow: 4 Other: 1 student under review
2nd	16	4	2	3	1	DC1 Fellow: 5 MEXT Scholarship: 1
1st	14	3	6	8	4	MEXT Scholarship: 2
Total	45	11 (24%)	9 (20%)	18 (40%)	9 (20%)	

- **International student origins**
  China: 3; South Korea: 2;
  France: 1; Russia: 1; Lebanon: 1;
  Cambodia: 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.

Design School students' self-assessment at **beginning** of doctoral studies

Skill	Value
Ability to collaborate with people in other fields	64% (1)
Ability to facilitate	55% (1)
Ability to collaborate in English	45% (1)
Communication skills	45% (1)
Ability to deliver effective presentations	36% (1)
Acquisition/implementation of knowledge of design	45% (2)
Broadening of one's perspective	36% (3)

Non-Design School students' self-assessment of versatility at **conclusion** of doctoral studies

Skill	Value
Brilliance at execution	40% (1)
Internationality (ability to disseminate Japan)	34% (1)
Communication skills	31% (1)
Leadership	21% (1)
Collegiality (teamwork)	18% (1)
Toughness (ability to solve problems)	46% (2)
Broad refinement/knowledge	50% (3)

"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

Student S (3rd year)

PhD research: Cultural value of interpersonal services

Qualitative analysis + quantitative analysis

Slightly shifted back to qualitative analysis

3 weeks at Aalto Univ
1.5 months at Palo Alto Research Center

Attended Summer Design School 3 times

Strategic Communication Seminar (English)

3rd year

Interaction with students in Psychology/Informatics
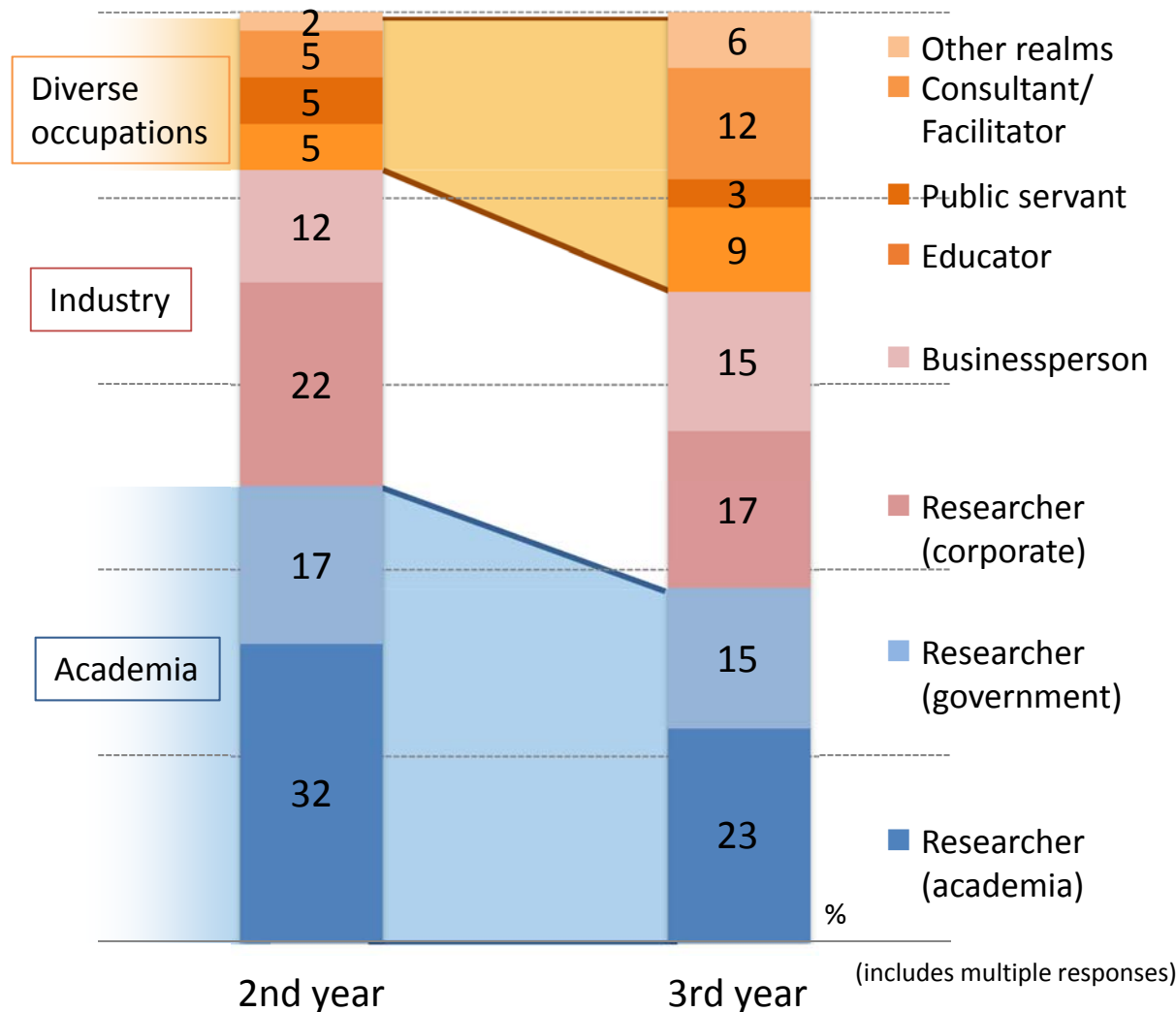
Started feeling I could bring together different disciplines

Became familiar with arts and culture

2nd year

Master's research: Analysis of Tabelog (restaurant review site) reputations

Planned workshop with Tama Art University

Tried out quantitative analysis

Took FBL/PBL 6 times

Joined in workshop with Kyoto City University of Arts

Design School in Hong Kong/Okinawa

Seemed a relatively closed community

Qualitative analysis

1st year

Lab (Management): Ethnomethodology

Student I (3rd year)

PhD research: Programming language for IoT and Robot

I want to incorporate dynamic variables into the programming language

1 week at University of Potsdam
2 weeks at Aalto/Delft

Studying Mechanical Engineering as minor

Started to wander

Master's research: Context-oriented language type systems

Ended up playing lead role in a skit presentation that didn't fit my type

Chose "Robots and Society (Mechanical Engineering)" and "Learning Commons (Education)" for FBL/PBL topics

Not bad.

Lab (Informatics): Program Testing/Type Theory

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.

Diverse occupations

Industry

Academia

2nd year

2	
5	
5	
5	
12	
22	
17	
32	

3rd year

6
12
3
9
15
17
15
23

%

(includes multiple responses)

- Other realms
- Consultant/Facilitator
- Public servant
- Educator
- Businessperson
- Researcher (corporate)
- Researcher (government)
- Researcher (academia)

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
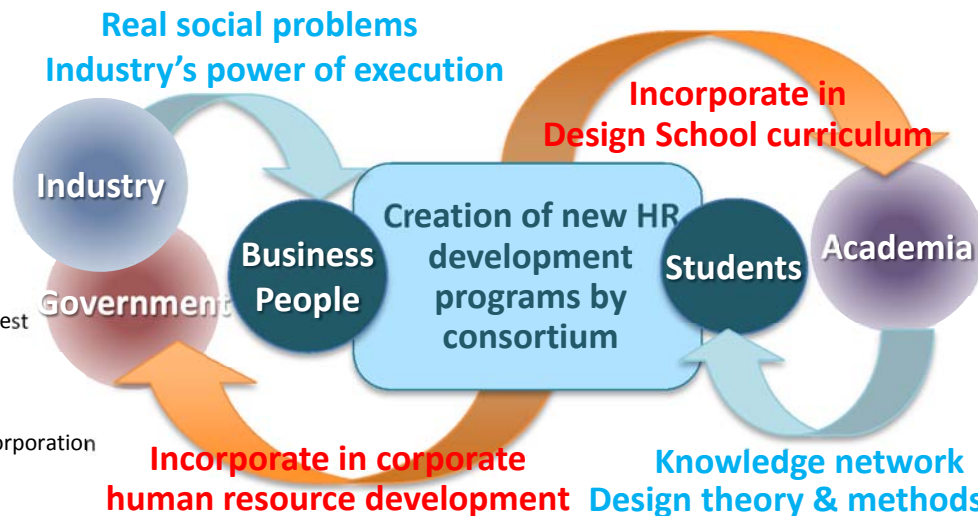
B-Members (annual dues: ¥50,000)

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

Real social problems
Industry's power of execution

Incorporate in Design School curriculum

Industry

Government

Business People

Creation of new HR development programs by consortium

Students

Academia

Incorporate in corporate human resource development

Knowledge network Design theory & methods

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.
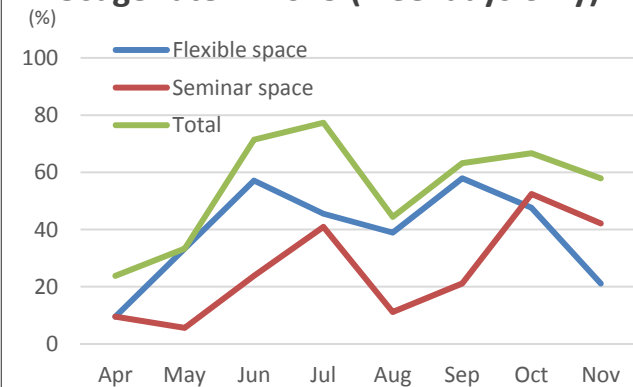

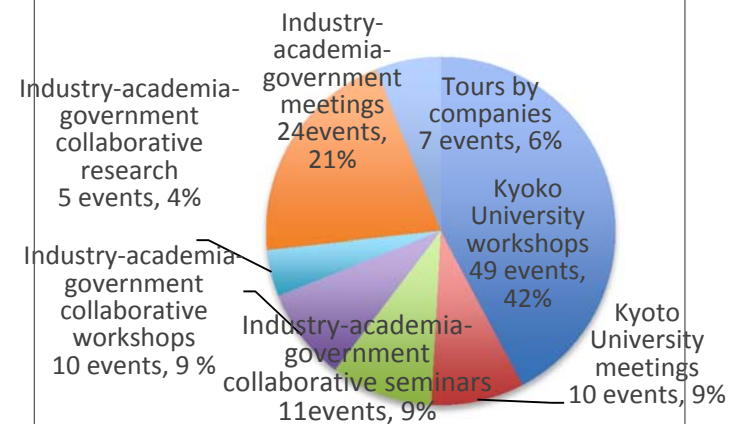Field-based Learning /
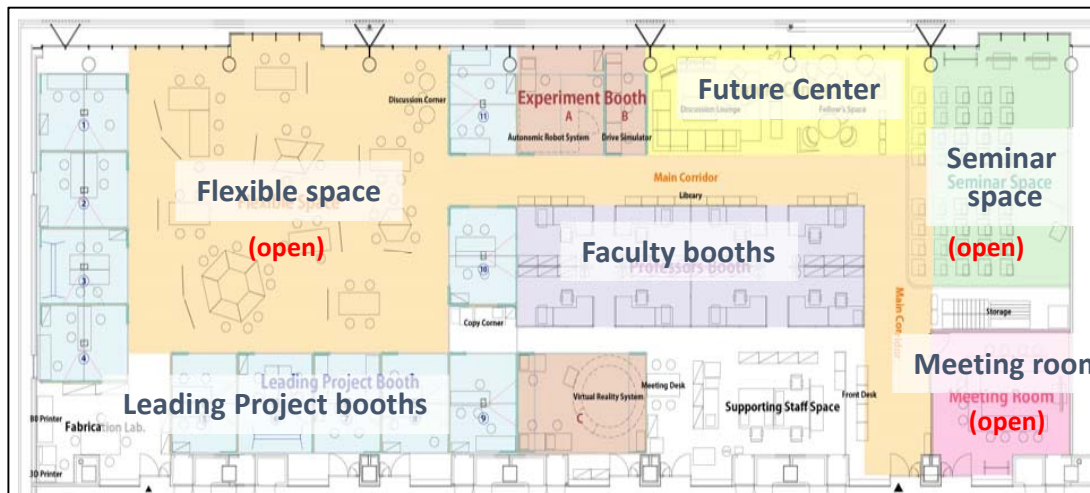Problem-based Learning

Collaborative seminars

Usage rate in 2015 (weekdays only)

(%)

- Flexible space
- Seminar space
- Total

100
80
60
40
20
0

Apr May Jun Jul Aug Sep Oct Nov

Future Center

Seminar space (open)

Flexible space (open)

Faculty booths

Meeting room (open)

Leading Project booths

Center Activities in 2015

Industry-academia-government meetings 24events, 21%

Tours by companies 7 events, 6%

Industry-academia-government collaborative research 5 events, 4%

Kyoko University workshops 49 events, 42%

Industry-academia government collaborative workshops 10 events, 9 %

Industry-academia-government collaborative seminars 11events, 9%

Kyoto University meetings 10 events, 9%

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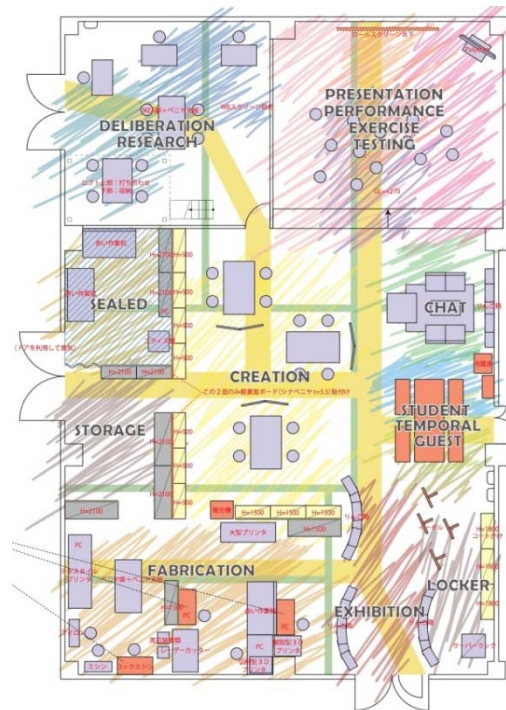
chat studio
research studio
residential students studio
temporal students working studio
guest studio
exhibition studio
storage studio

*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

Different perspectives

Deep empirical knowledge

Adjunct Professors: 3
Tetsuo Tomiyama (Cranfield University), Hideshi Hamaguchi (monogoto Inc.), Ryohei Nakatsu (Hexagon Japan)

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, Hakuhodo, 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.

Harvard University

Graduate School of Design

Ph.D. in Design since 1936

Architecture

Collaborative Master in Design Engineering

since 2016

Design is found at the nexus of technology, society, and environment

John A. Paulson School of Engineering and Applied Sciences

Engineering

Delft University of Technology

The Graduate School of Industrial Design Engineering

Ph.D. in Design

since 1969

(1) Discipline-related skills
(2) Research skills
(3) Transferable skills

Staffed with faculty representing diverse disciplines, including Psychology, Mechanical Engineering, and Informatics

Mechanical Engineering

KU
Collaborative Graduate Program in Design

Informatics, Mechanical Engineering, Architecture, Management, Psychology

Aalto University

Formed in 2010 through integration of three universities with different focuses: engineering, art, and economics.

Emphasizes ties with industry.

Tackles challenges in healthcare, aging society, and global warming.

Engineering, Art, Economics

British Council

Transferable Skills Program

IDEO

IDEO.com offers services in product and organization design; IDEO.org supports developing countries

Stanford University

Hasso Plattner Institute of Design d.School since 2004

Hosts cross-disciplinary design workshops. Non-degree institute without its own students.

Symbiotic relationship with Department of Mechanical Engineering.

Mechanical Engineering, Informatics

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.

Academia

Science Engineering Design

Society