

Effective Measures to Prevent Improper Overseas Drain of Advanced Technologies in University

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Faculty of Science and Engineering, Chuo University

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My Personal Motive

Researching and developing various **FPGA IP-cores** (intellectual properties) — chiefly those related to error correction, such as **fast Viterbi decoders** for next-generation high-speed communications, **public key encryption processors** centered on **RSA encryption**, and **Reed-Solomon code** — as well as software and hardware to increase processing performance related to transmission and recording of digital data.

“**IP core for a high-speed, ultra-compact decoder for digital communication,**” a product for which I provided development cooperation to **Machine Learning Laboratory, Inc. (ML-LABO)** on the basis of the results of a commissioned project of **the IPA Exploratory Software Project** of 2000, received an Encouragement Prize in the 20th **Kanagawa High-Tech Grand Prix**. ML-LABO’s customers include manufactures, universities, research institutes of the Ministry of Education, Culture, Sports, Science and Technology, etc.



Inquiries
from
overseas

How about
control at
university?

Measures of All Stages

- 1.** Development of **X**, a shared Web tool for applicability determination that individual researchers can use without assistance
- 2.** Establishment of links to **X** from portal sites for faculty member
- 3.** Development of regulations to ensure use of **X** procedurally for each international exchange project
- 4.** Incorporation into FD/SD from standpoints of information disclosure, accountability, legal compliance, and risk management
- 5.** Development of an information hub to transmit messages continuously

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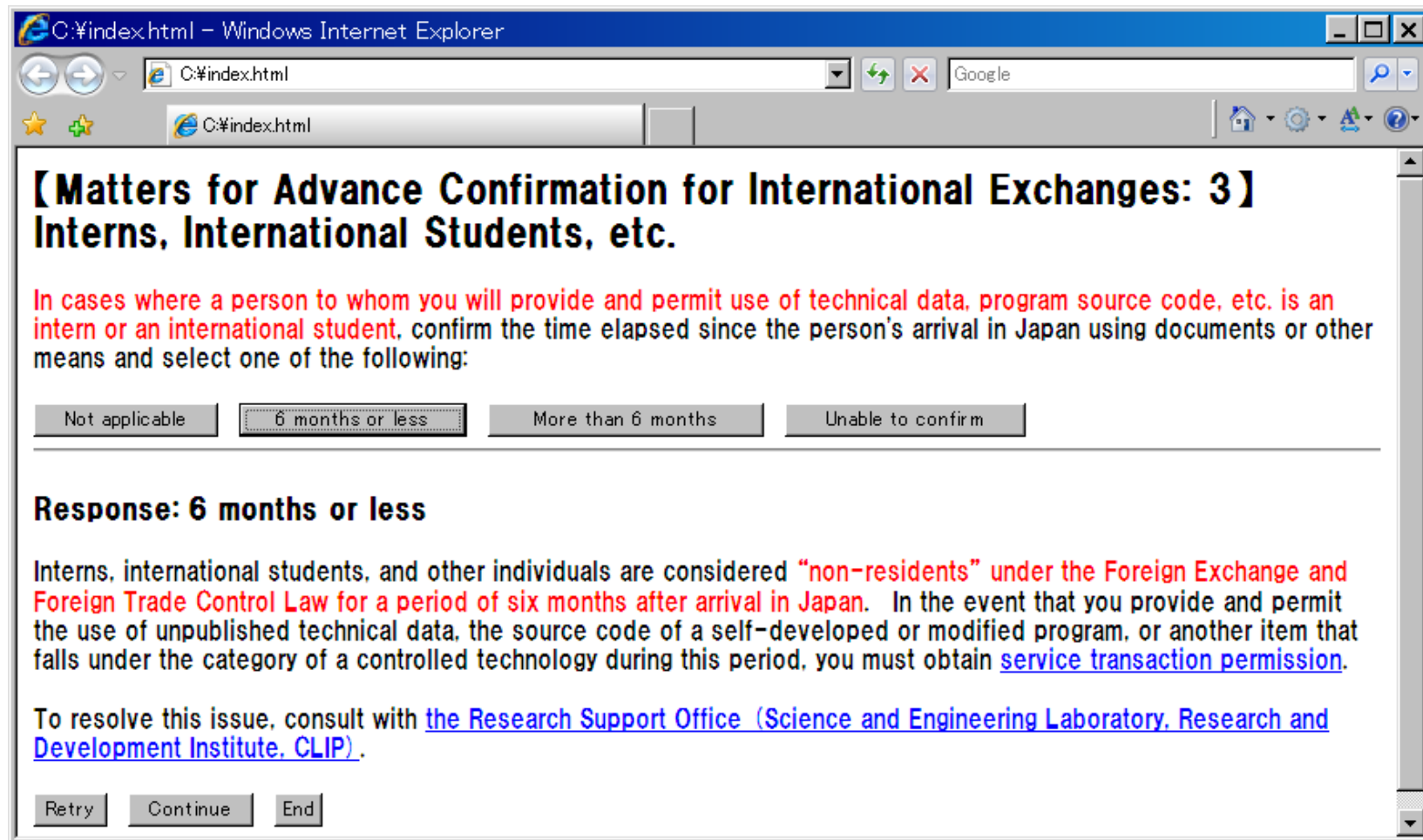
Take a Step forward...

Information

For supporting members	
→ Supporting members' corner	Log in
Information on supporting members	
General databases	
→ Japanese laws and regulations corner	Log in
→ CHASER corner	Log in
→ Applicability determination corner	Log in
Information on General databases	
Agreement on use of General databases	



Tool **X** for Researcher Use (Example)



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Development of Procedures (Example)

Foreign National Intern Acceptance Application

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I performed the prescribed confirmation using the applicability determination tool.

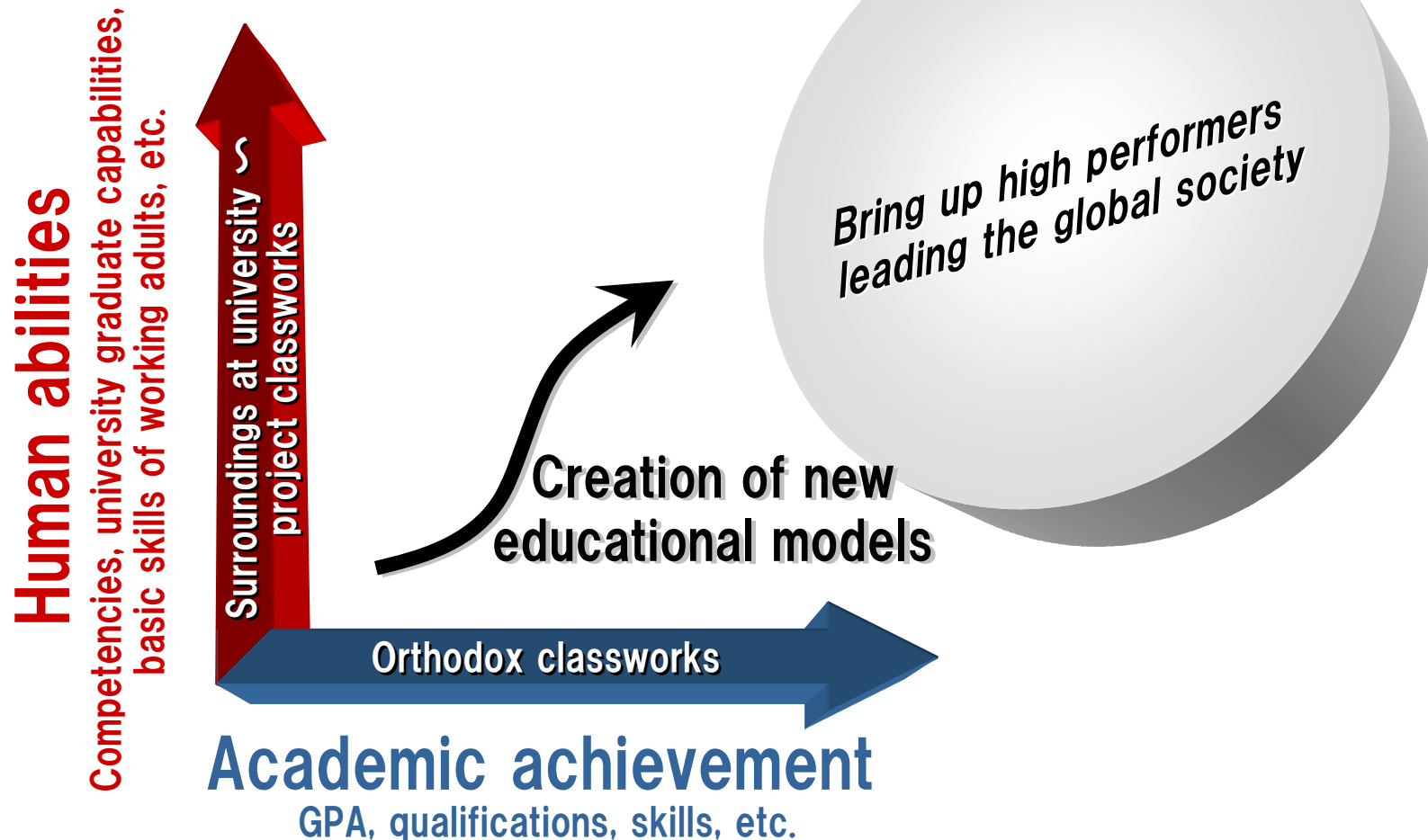
Yes

...

Measures of All Stages

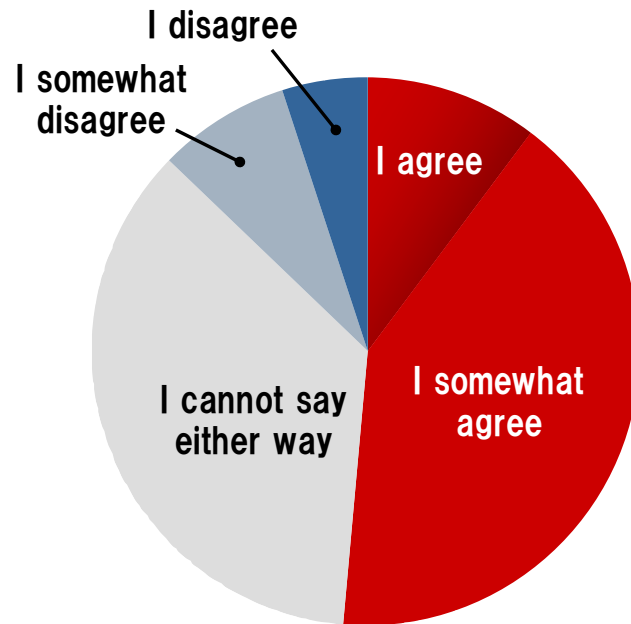
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The Mission of the 21st Century Universities That Seek to Change the Consciousness of People and Society

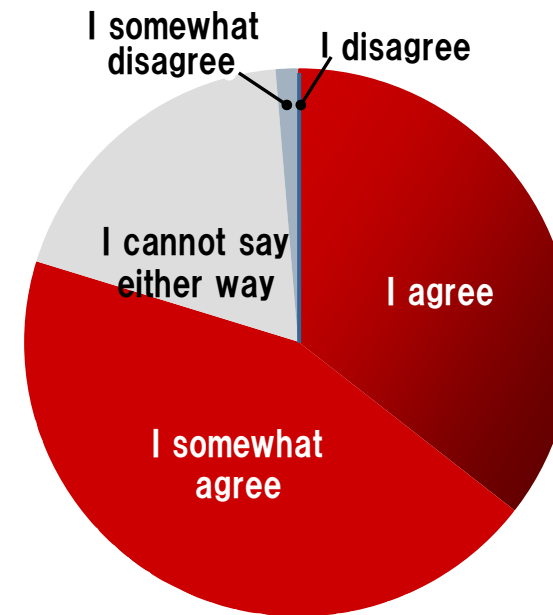


Satisfaction at Education of Academic Achievement

I currently have the ability to apply the specialized knowledges and skills that I acquired in the department to problems in the course field.



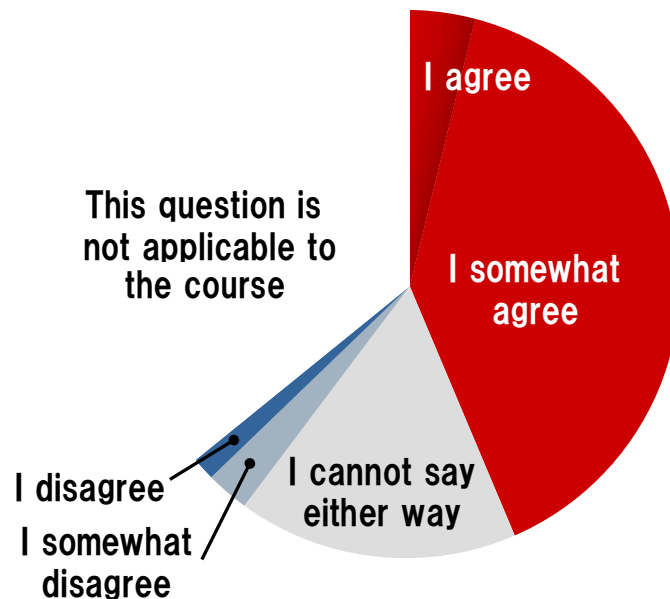
This course contributed to increasing my ability to apply the specialized knowledges and skills that I acquired in the department to problems in the course field.



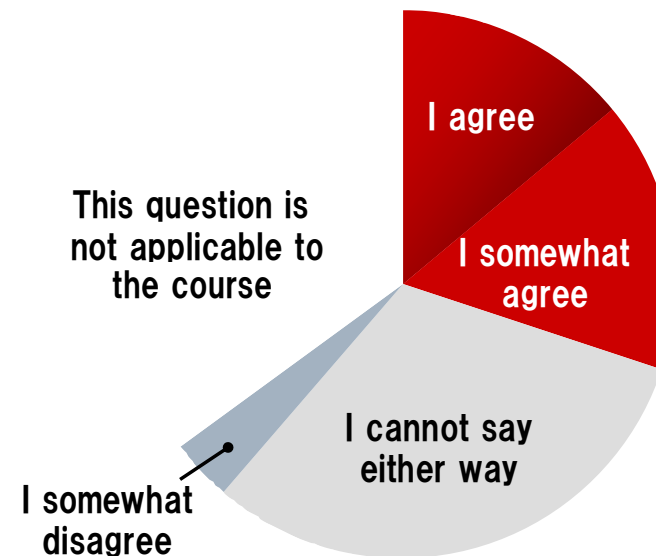
**Source: Chuo University Graduate School of Science and Engineering
2008 first semester course evaluation questionnaire**

Satisfaction at Education of Human Abilities

I currently have the ability to recognize circumstances related to ethics and safety in the course field.



This course contributed to increasing my ability to recognize circumstances related to ethics and safety in the course field.



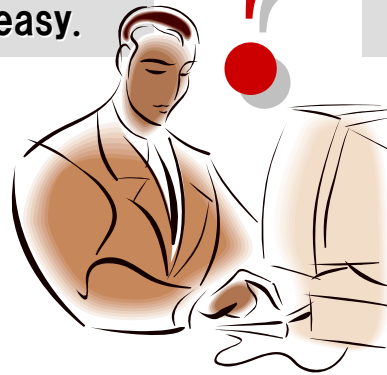
**Source: Chuo University Graduate School of Science and Engineering
2008 first semester course evaluation questionnaire**

Diversification of Ideology

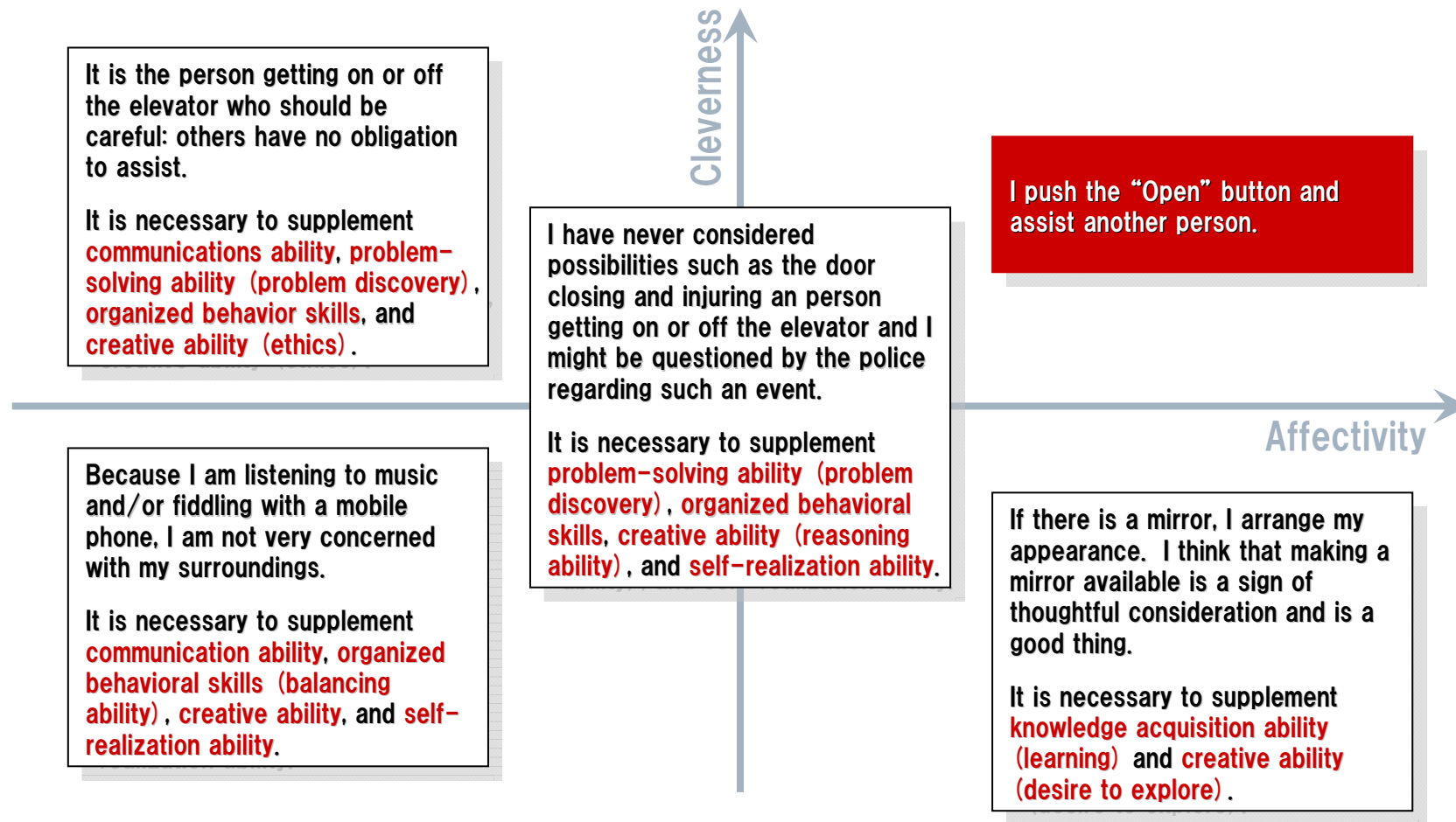
- ❑ In Japanese society, the difference between good things and bad things was clear.
- ❑ Dedication to research and avoidance of worldly things was considered the prestige of universities.
- ❑ Students' senses of values were clear, and teaching was easy.



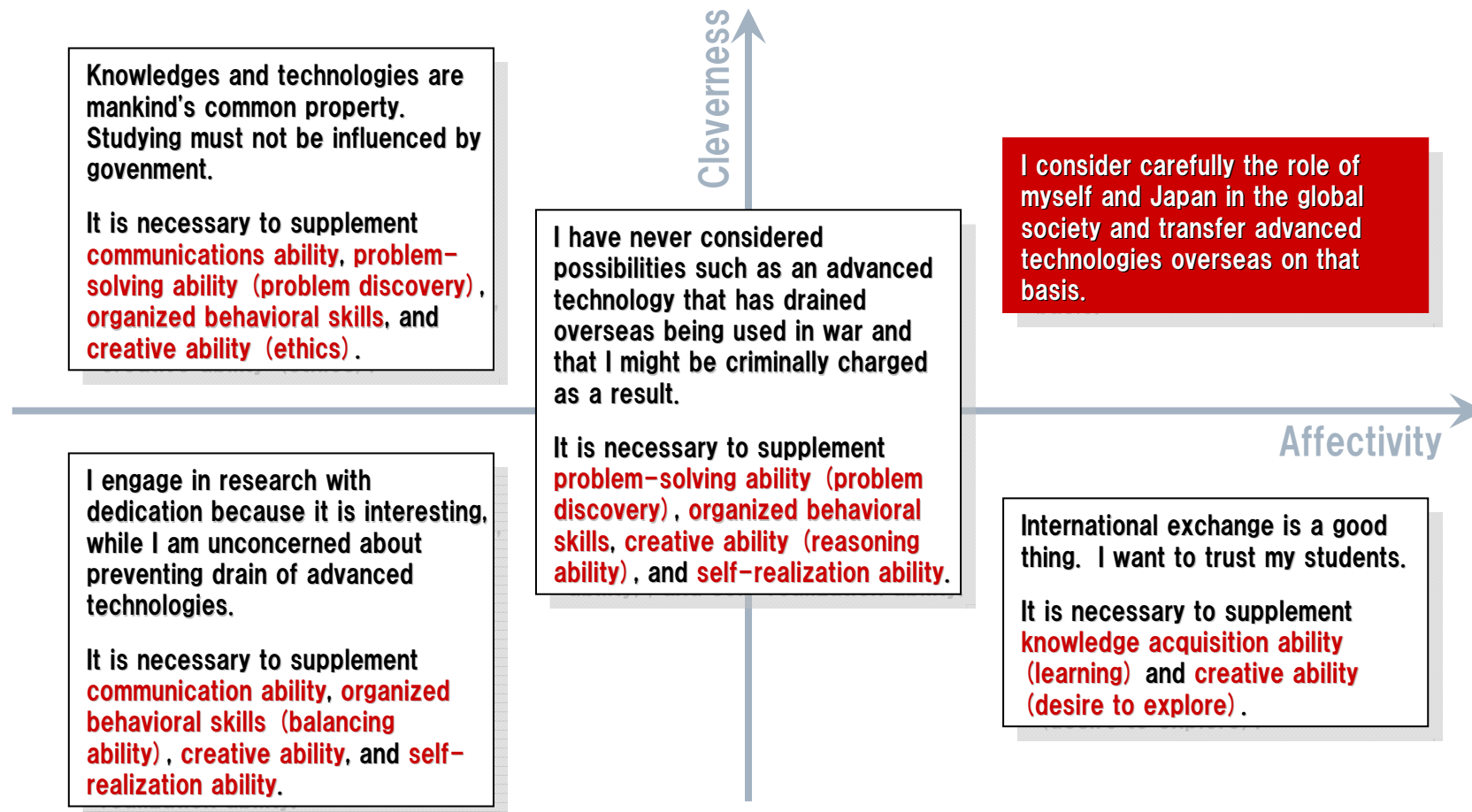
- ❑ In a global society, ways of looking at things are complex.
- ❑ Active publicity of the fact that universities contribute to society is desirable.
- ❑ Students' senses of values are diverse, and teaching is difficult.



Behavior on Elevators

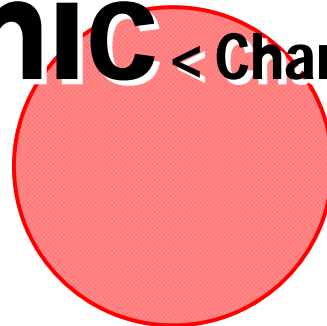


Behavior in International Exchanges

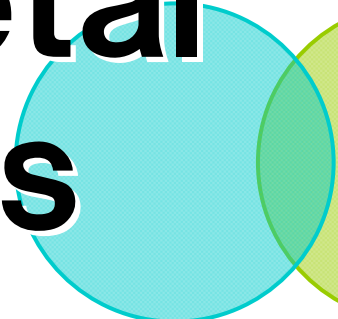


Ethics

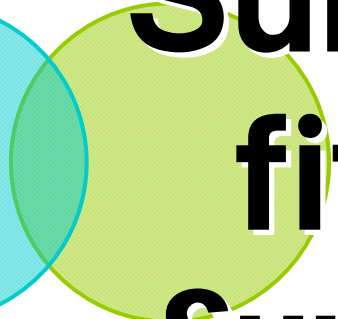
Ethic < Character



Societal
rules



Survival of
fit ones



Moral < Custom

Survival < To live

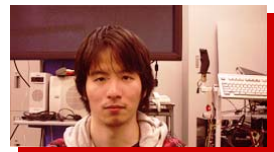
Competencies That Information and System Engineering Students and Faculty Members Should Emphasize (Behavioral Traits Common to High Performers)

Communication ability After having correctly understood other people's opinions or writings, clearly express one's own opinions about them. Use effective explanation methods or techniques to persuade involved parties.	Problem-solving ability Correctly understand the issues. Devise and implement solutions. Verify the results and reflect them in plan reviews or subsequent planning.	Knowledge acquisition ability On the basis of striving to continuously, deeply, and broadly gather information and rigorous information selection, acquire, apply, and utilize knowledge and expertise.	Organized behavior capabilities Ascertain in a multifaceted and objective way from multiple perspectives what should be done to achieve team or organizational goals, reach appropriate judgments, and act with a sense of ownership. At that time, demonstrate with others mutual respect for each other's ideas and act while developing and maintaining relationships of trust.	Creative ability Demonstrate intellectual curiosity, be interested in things within and beyond one's area of specialization, obtain ideas from those things, and conceive unprecedented ideas. At that time, observe relevant laws and regulations, have a sense of ethics, and fulfill the responsibility engineers have to society.	Self-realization ability To elevate oneself, constantly pursue new goals, consider paths toward those goals, and strive to achieve them. At the same time, always act to improve self-control.	Specialization On the basis of broad and deep knowledge and experience, appropriately use programming and ICT tools, engage in accurate work, and utilize information engineering.
Listening ability Listen to, correctly understand, and respect other people's opinions.	Problem discovery Ascertain the current situation and the goal (the ideal state) and discover problems to be solved from the gap between the two.	Learning Continue to broaden and strengthen your knowledge and expertise in wide-ranging fields, including not only specialized knowledge, but also knowledge concerning the humanities and social sciences.	Balancing ability Act on the basis of appropriate judgments having ascertained matters in a multifaceted and objective way from multiple perspectives.	Conceptual ability Create unprecedented new ideas without being constrained by existing frameworks.	Goal setting Set appropriate goals to develop oneself.	Accuracy Precisely and accurately perform a series of operations.
Reading comprehension Correctly understand the content of writings.	Problem analysis Understand the cause-and-effect relationships of problems and discover true causes (the essence).	Application ability Apply and utilize acquired knowledge and expertise.	Role recognition Understand the role of individuals in achieving team or organizational goals and act with a sense of ownership.	Reasoning ability Conjecture about things with which one has no experience or things that might occur in the future.	Schedule management Devise appropriate action plans to achieve goals and take action to execute the plans, maintaining schedule awareness (memo taking, etc.).	Specialized knowledge Possess knowledge concerning information engineering, understand the details, and use it accordingly.
Descriptive writing power Describe things correctly in writing so that other people can understand them.	Logical thinking Mentally organize the essence of complex phenomena and be able to structure them (so they are readily understandable to all). Be able to logically construct and expand on one's own opinions and procedures.	Information gathering ability On the basis of having obtained and carefully examined necessary information, rigorously select and master the information.	Independence Act on the basis of taking responsibility for one's own intentions and judgments of things.	Ability to feel emotion Receive a powerful impression upon encountering exceptional technologies, arts, or novel ideas and make it the impetus for new activities.	Self-control Implement the control necessary for day-to-day living to achieve goals (time management, hygiene management, health management, money management, etc. and take timely, appropriate action.	Information technology foundation Appropriately prepare a program or use ICT tools to realize your own ideas.
Proposal capabilities Effectively convey one's own opinion after having explained things in an easy-to-understand way using appropriate procedures and techniques.	Executing the plan Set goals and objectives, make plans in systematic order, and execute them.		Cooperation Demonstrate with others mutual respect for each other's ideas for the purpose of achieving shared goals and take action to build relationships of trust.	Desire to explore Have vigorous intellectual curiosity and willingness to adopt new knowledge, whether or not it is in one's field of specialization.	Stress control Skillfully deal with stress and minimize its negative effects.	Mathematics and natural science Possess broad and deep knowledge of mathematics and natural science, understand the details, and use it accordingly.
Discussion ability Set discussion goals and engage in discussion in accordance with the goals.	Verification Correctly assess the results of executed plans and reflect the results in plan reviews or subsequent planning.		Initiative Demonstrate leadership. Set an example and guide others.	Ethics Observe relevant laws and regulations. Understand the impacts and effects technologies have on society and nature and fulfill the responsibility engineers have to society.	Achievement orientation Habitually pursue new goals. Set goals oneself, devise paths to achievement, and strive to achieve the goals. Make efforts to achieve improvements.	Basic academic ability Have interest in and possess knowledge about wide-ranging fields, including language, history, culture, laws and ordinances, and the environment, understand discourse that includes these subjects, and use them accordingly.

Software Project on CG, VR and Image Processing 2



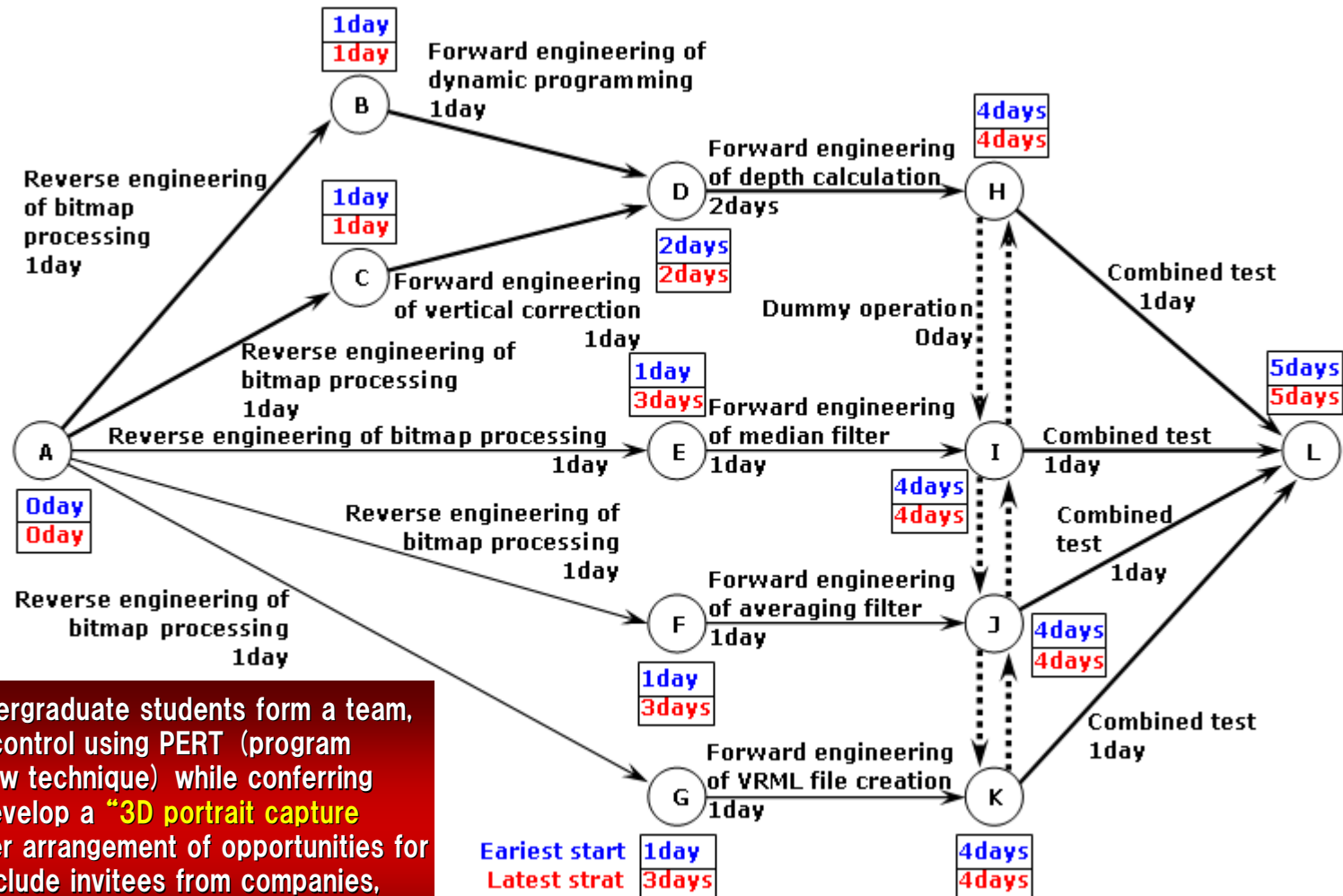
+ Left image



|| Right image



3D rendering



Four third-year undergraduate students form a team, engage in process control using PERT (program evaluation and review technique) while conferring about the matter, develop a "3D portrait capture interface" and, under arrangement of opportunities for a presentation to include invitees from companies, obtain evaluation from other teams, graduate student TAs, faculty members, and the invitees.

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Collection of Newspaper Articles (Examples)

December 18, 2008 Nikkei Sangyo Shimbun, page 19, “Intelligence,” “Employment Support for China’s Science Students,” “Focusing on Personnel Reduction in Japan”

December 19, 2008 Nikkan Kogyo Shimbun, page 6, “Export Control as It Should Be? Impending Foreign Exchange Law Revision 3) Limitations Even on Self-Defense Measures,” “Introduction of Facilities Movement Detection Systems/CP,” “The Key to Importance Penetration Within the Company”

December 22, 2008 Nikkan Kogyo Shimbun, page 5, “Export Control as It Should Be? Impending Foreign Exchange Law Revision 4) New Carrot and Stick Regulations,” “Support Measures for Small and Medium-Size Manufacturers,” “Clear Presentation of Details Necessary”

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February 12, 2009 Nippon Keizai Shimbun, page 3, “Cargo That Can Be Diverted to Military Use,” “Penal Regulations Apply to Companies if Control Is Deficient,” “Foreign Exchange Law Draft Revision — Mandatory Recording of Export Destinations”

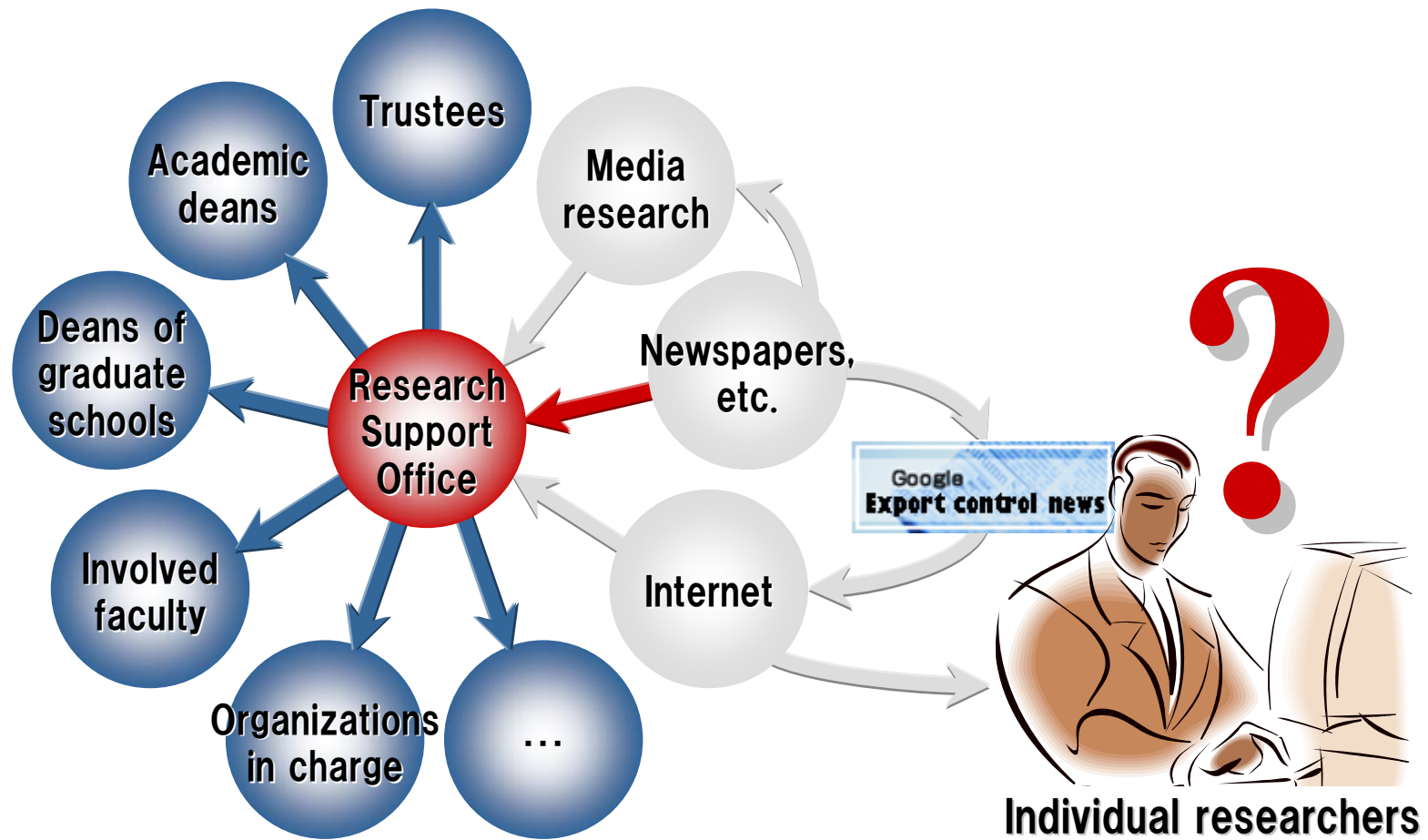
February 16, 2009 Nippon Keizai Shimbun, page 13, “Overseas ‘Brain Drain’ Unabated,” “Closedness Hampering Women and Young People” in the first half of “Inspecting Scientific and Technological Powerhouse Japan”

March 16, 2009 Nippon Keizai Shimbun, page 13, “Regional National Universities,” “Industry-University Collaboration, Escaping Overseas,” “Licensing of Technology to British and Chinese Companies,” “Economic Slump — Decrease in Joint Research with Local Entities”

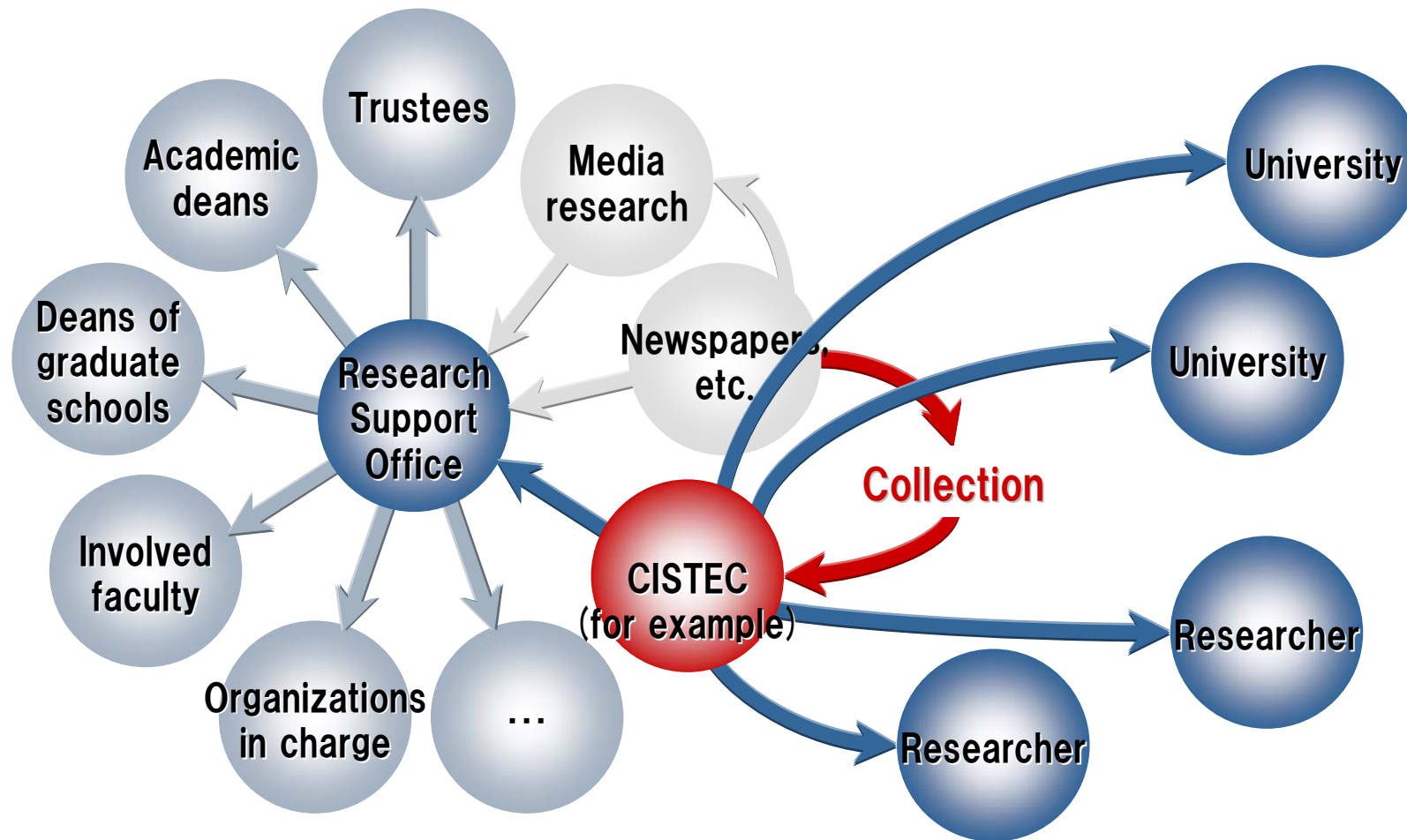
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July 31, 2009 Yomiuri Shimbun, page 1, “International Student from Iranian Laboratory Suspected of Nuclear Weapons Research to Tohoku University”

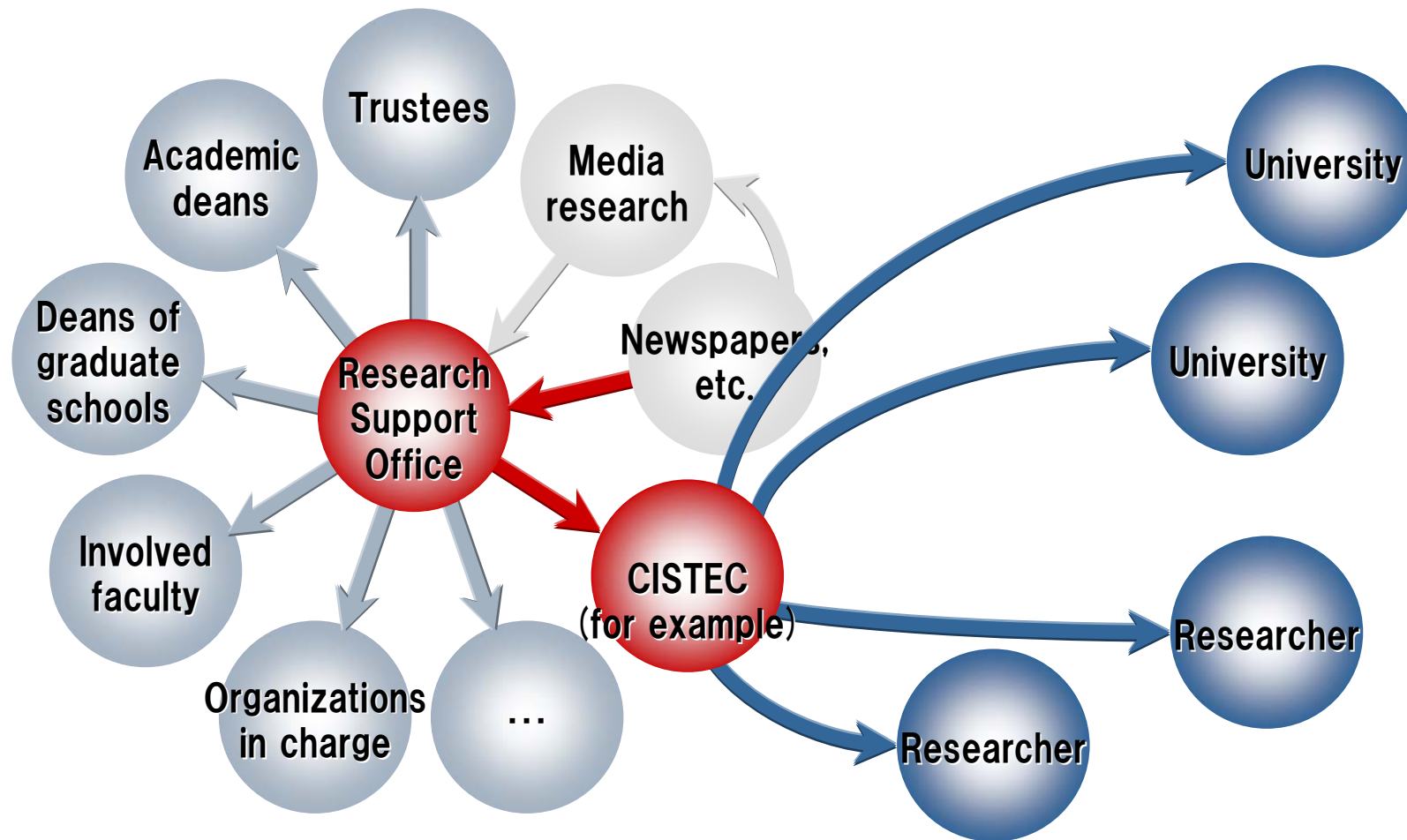
The Limits of Awareness Activities



Multiplier Effect from Information Hub Development



Direct Utilization of University Resources



Things That Can Be Continuously Promoted from Outside Universities

Ministry of Economy,
Trade and Industry
+ Ministry of
Education, Culture,
Sports, Science and
Technology

Development of IT
tools

Approach to
universities

Approach to
academic societies

Approach to the
Japan University
Accreditation
Association

Approach to the
media