

The Ideal Nuclear Non-Proliferation and Nuclear Security and University Education -Based on the Student Session

Kenta Ochiai
Graduate School of Law, Meiji University

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Nuclear Non-Proliferation and Security
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1. Overview of the Student Session

Topic: The Ideal Form of Nuclear Non-Proliferation and Nuclear Security Education at Universities

Date : November 20, 2024, 17:00-17:30 via ZOOM

Participated Students



Yu Nahiro (Ms.)

Yasuda Women's University
Graduate School, Education and
Psychology



Eva Lisowski (Ms.)

Institute of Science Tokyo
School of Environment and Society,
Nuclear Engineering



Kenta Ochiai (Mr.)

Meiji University
Graduate School of Law

Format: Exchange of opinions on several educational models proposed in advance by ISCN

- The complexity of the field of nuclear non-proliferation and nuclear security and university education
- The necessity of nuclear education, clarification of the desired human resources, and consideration of its status in university education!

2. Nuclear Non-Proliferation and Nuclear Security and (University) Education

2.1 The **Need for Human Resource Development** in the Field of Nuclear Non-Proliferation and Nuclear Security / Desired Human Resources

Background 1: Domestic and International Movements toward the Utilization of Nuclear Energy

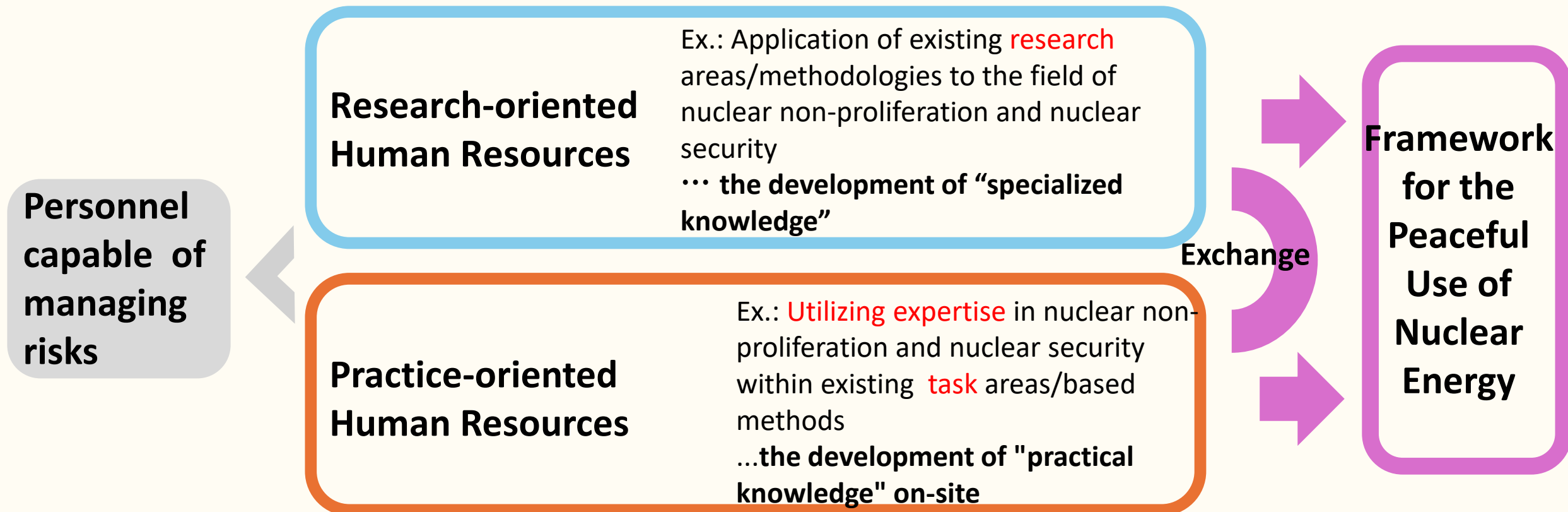
- International **energy transition** such as GX/Carbon Neutral
- Geopolitical risks to thermal power generation fuel
- Development of digital technology
- Importance of risk response in the nuclear field highlighted by the **Ukraine crisis**

Background 2: **Shortage of nuclear human resources** in Japan

Simultaneously, the challenge of **developing human resources capable of responding to nuclear non-proliferation and nuclear security risks**

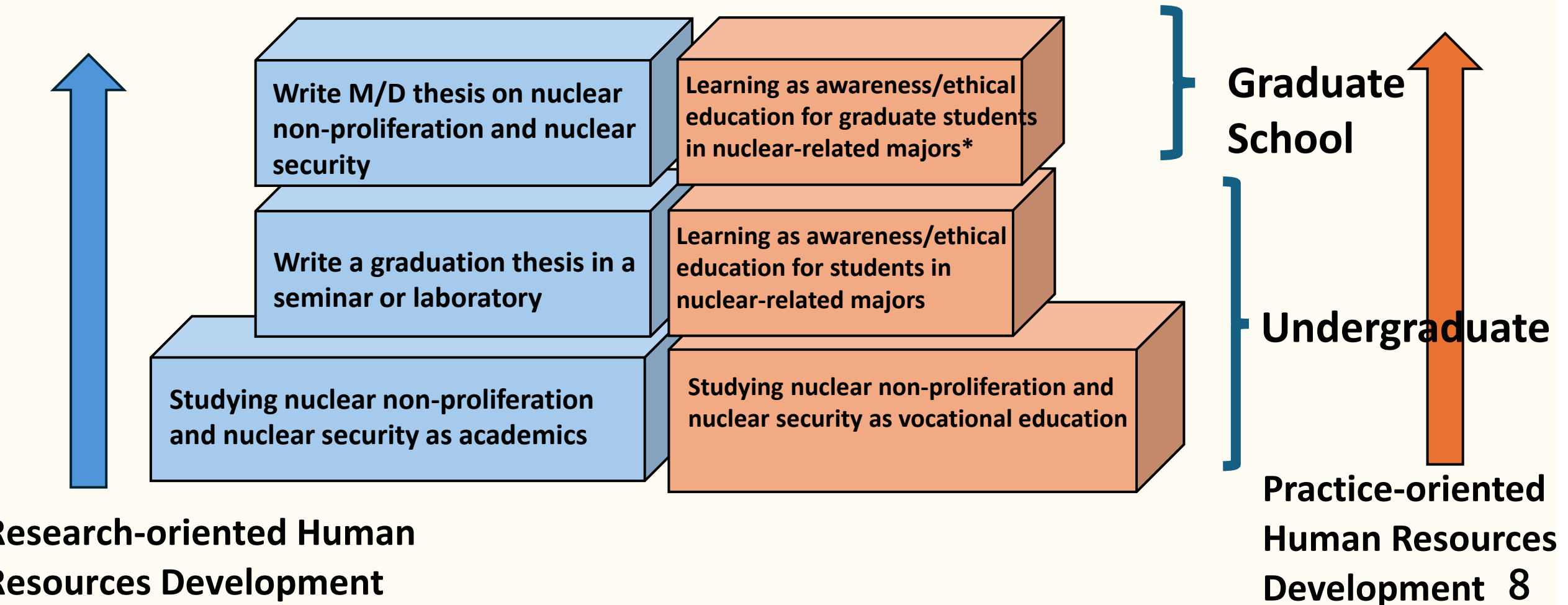
- What is the "ideal personnel to address nuclear non-proliferation and nuclear security risks"?

The ideal personnel to address nuclear nonproliferation and nuclear security risks



2.2 The Interface of Nuclear Non-Proliferation and Nuclear Security Education and Universities

Possible Research and Conservation-oriented Human Resources Development Flow

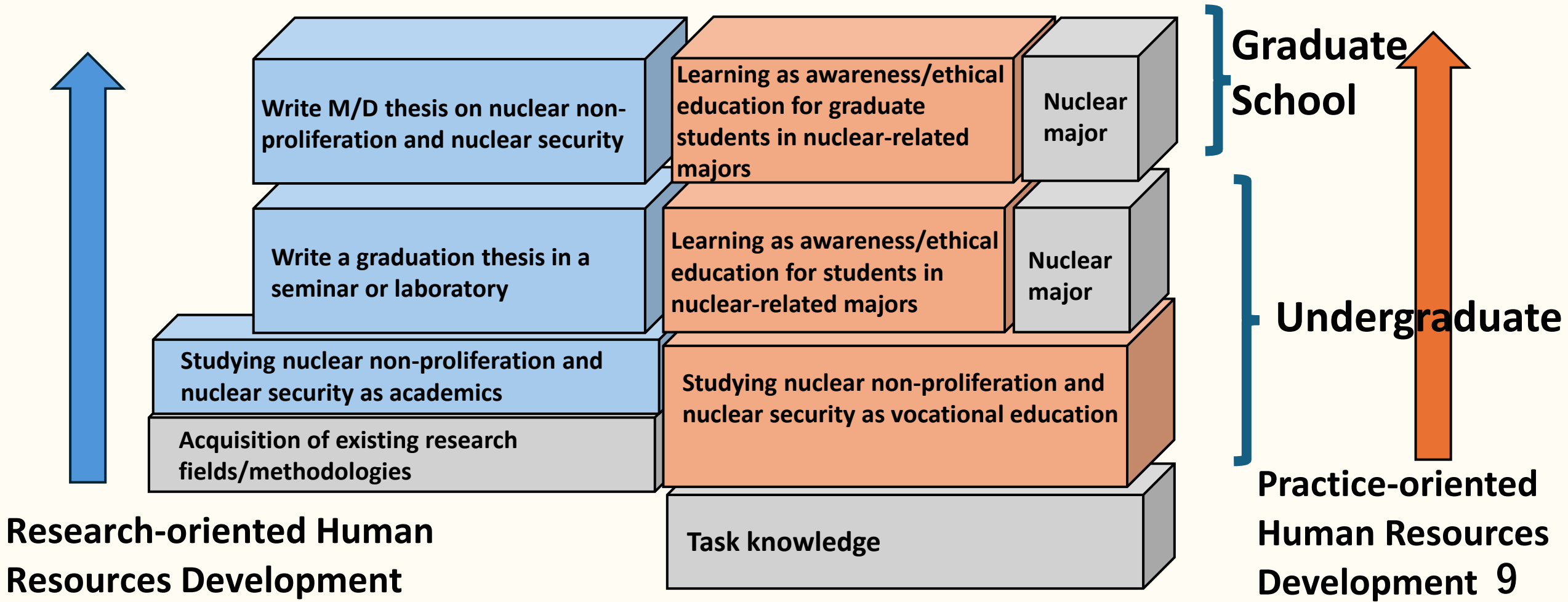


※For nuclear majors as well as departments that handle radioisotopes within their studies

2.2 The Interface of Nuclear Non-Proliferation and Nuclear Security Education and Universities

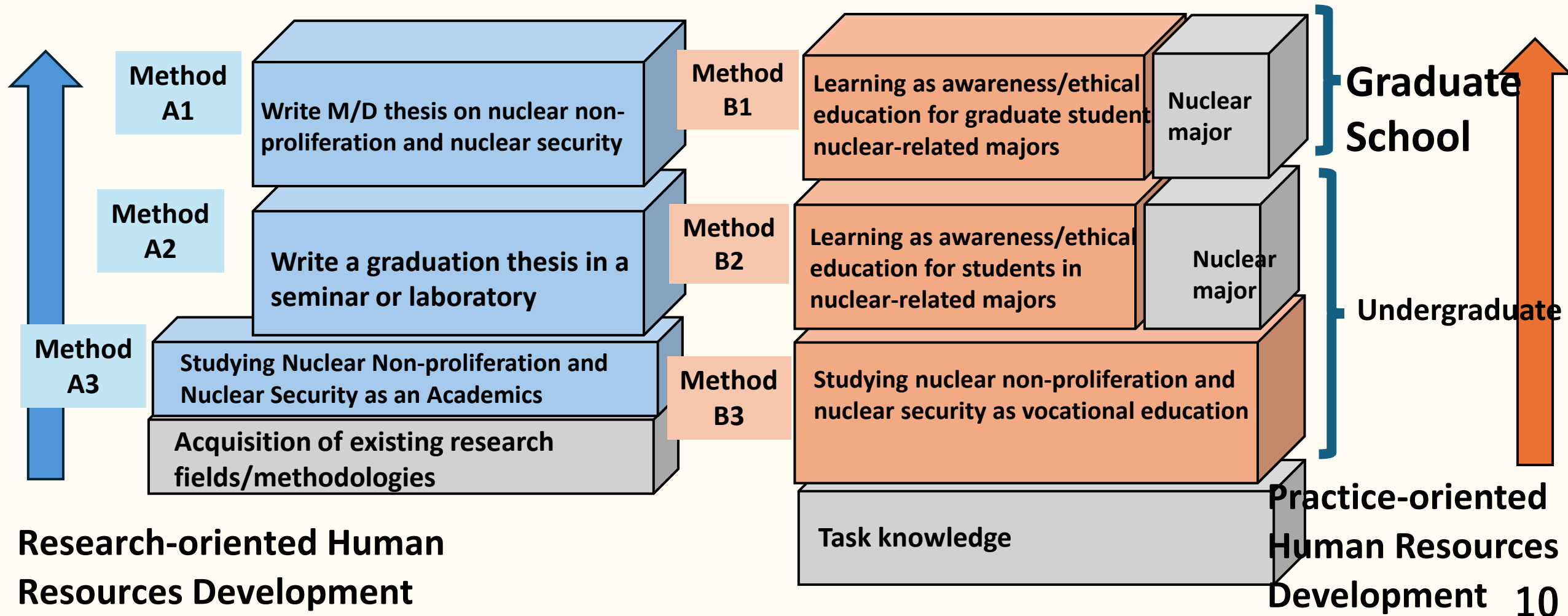


Relationship between Research and Conservation-oriented Human Resources Development and Existing (University) Education



2.2 The Interface of Nuclear Non-Proliferation and Nuclear Security Education and Universities

Relationship between Research and Conservation-oriented Human Resources Development and Existing (University) Education



3. Various Research and Education Methods and Student Comments

3.1 Research-oriented Human Resources Development

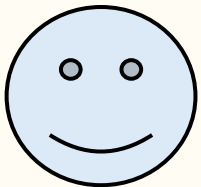
Method
A1

Graduate
School

Write M/D thesis on nuclear non-proliferation and nuclear security

Ex.) -Establishment of professional graduate schools/courses where degrees in nuclear non-proliferation and nuclear security can be obtained
-Establishment of lectures and laboratories specializing in nuclear non-proliferation and nuclear security

- (Specialized professional graduate schools) should prioritize to define demand and establishing themselves as unique academic fields.
- For countries planning to adopt nuclear power, it is advantageous to create dedicated platforms for conducting research in this area.
- Encouraging collaborative research and fostering interaction with related fields should also be a priority.



• Necessary for students who want to learn more than just (undergraduate) lectures

• Are there places for work for specialized human resources after graduation?

3.1 Research-oriented Human Resources Development

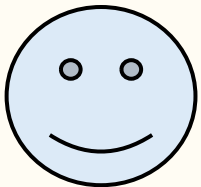
Method
A2

Write a graduation thesis in a seminar or laboratory

Ex.) -Establishment of courses and laboratories specializing in nuclear nonproliferation and nuclear security
-ISCN Summer School ※ Long-term and deliverables submission required. Extensive research guidance

- For countries planning to adopt nuclear power, it is advantageous to create dedicated platforms for conducting research in this area.
- Encouraging collaborative research and fostering interaction with related fields should also be a priority.

• Necessary for students who want to learn more than just (undergraduate) lectures



• There is a need for organized research resources and materials that can be referenced when conducting studies on nuclear non-proliferation and nuclear security, such as research monographs, systematic textbooks, and open-access data.

3.1 Research-oriented Human Resources Development

Method A3

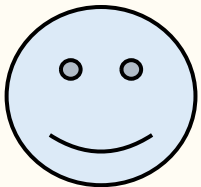
Studying Nuclear Non-proliferation and Nuclear Security as an Academics

Ex.) -Establishment of lecture courses or implementation of special lectures on nuclear non-proliferation and nuclear security.
-ISCN Summer School

(Undergraduate)

• I believe nuclear non-proliferation should reach and be understood by more people.

• Not only I want people to take an interest, but I also hope they will continue learning after the lectures and maintain opportunities to work or engage in the field.



• Since it is an applied field, the course should be conducted after students have acquired academic methods within their own major.

The typical university lecture is about 45 hours per credit (one 90-minute class per week x 15 classes x 2 terms), but can you find that much volume in the field of nuclear nonproliferation and nuclear security?

3. Various Research and Education Methods and Student Comments

3.1 Practice-oriented Human Resources

Method
B1

Learning as awareness/ethical education for graduate students in nuclear-related majors

Method
B2

Learning as awareness/ethical education for students in nuclear-related majors

Ex.) -In universities with nuclear engineering programs, incorporate education on nuclear non-proliferation and nuclear security as part of the curriculum.

-ISCN Summer School

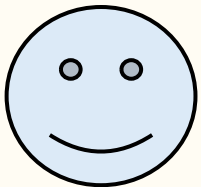
(Graduate •
Undergraduate
School)

• For nuclear engineering majors, it should be a mandatory subject as it contributes to raising awareness.

• The level of emphasis can be adjusted based on the extent to which the field of study involves handling radioactive materials.

• It would be effective to integrate this education into existing research safety or ethical education.

• Ensure students do not panic due to misinformation.



3.2 Practice-oriented Human Resources

Method
B3

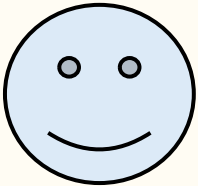
Learning nuclear non-proliferation and nuclear security as part of professional education

Ex.) - ISCN's Human Resource Development Support Activities

-ISCN Summer School

(Undergraduate)

- Practical content in specific fields should not be taught as part of general university education.

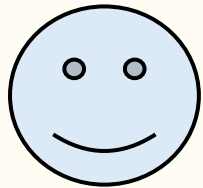


When discussing this topic, it is important not to confuse vocational education (or public relations for specific industries), safety and ethics education, and research education at universities.

→ The role and purpose of university education are being re-evaluated.

3.3 Case Study: Approach to Elementary and Junior High School Teachers

In education theory, it is said that elementary and middle school teachers need to teach radiation education to students, but there are no places for teachers or students to learn about radiation education.



Is it a research issue or a practical problem?

Teachers as research-oriented human resources (applicants)

Issue

"I would like to address 'nuclear non-proliferation and nuclear security education' as a topic for a report or (degree) thesis in the field of education."

Solution

If there are no specialized faculty members at the university, it cannot be properly evaluated.

Teachers as practice-oriented human resources (applicants)

"I am struggling with how to teach nuclear non-proliferation and nuclear security education, which is included as an item in the curriculum guidelines, to students."

Incorporated into the public outreach strategy for the general population.

additional remarks

Despite growing policy imperatives, public consensus for the promotion of nuclear power is still far from being achieved.

Approaches to university education should not be expected to provide a backdoor to the lack of consensus.

In other countries and at the local level, there are active efforts to have the public/citizens discuss the state of energy and reflect this in policy.

4. Summary

- The theme of "Nuclear Nonproliferation and Nuclear Security Education and Universities" is complex.

It is essential to examine the necessity of such education, clarify the ideal profile of human resources, and consider its position within university education.

- The framework of "Research-oriented Human Resources" forming specialized knowledge and "Practice-oriented Human Resources" forming practical knowledge is effective for human resource development policy formation.
- It is confirmed that vocational education (or public relations for specific industries), safety and ethics education, and research education at universities should not be confused when discussing this theme.

References

1. Outline of the Student Session

-The necessity of mapping/visualization was also pointed out by the Ministry of Education, Culture, Sports, Science and Technology, Science and Technology Council, Research Planning and Evaluation Subcommittee, Committee on Nuclear Science and Technology (26th meeting), Working Group on Nuclear Nonproliferation and Nuclear Security (18th meeting), Reference Material 2-3:
https://www.mext.go.jp/content/20210519r-mxt_genshi-000016075_13.pdf

2.1 Necessity of human resource development in the field of nuclear nonproliferation and nuclear security

-The author understands the difference between GX and carbon neutrality as follows: “Carbon neutrality is an initiative to make the amount of carbon dioxide emitted equal to the amount of carbon dioxide absorbed. Carbon neutrality is included as one of the activities in the GX. Unlike decarbonization, carbon neutrality does not aim for zero emissions.” Nikkei Crosstec(2024) “Useful Information / ColumnsColumns The difference between GX (Green Transformation) and carbon neutrality explained.

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-Ministry of Economy, Trade and Industry (2022) 29th General Resources and Energy Investigation Committee, Electricity and Gas Industry Subcommittee, Nuclear Energy Subcommittee, “Document 3: Technology Roadmap for Innovative Reactor Development Toward Carbon Neutrality and Energy Security (Draft Outline).

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Thank you for your attention.

