

#13>#14: #13 Better Overall

December 9, 2023

The workshop course is provided by technology-oriented engineering department. The goal is to understand technologies but also to foster motivation and active involvement of groupwork. The assignment given to the students was as follows:

1. Kinematic Synthesis of Mechanisms <Train Gap Filler>

The gap between the train and the platform at train stations is a significant safety hazard, often leading to accidents. This risk is especially high for children, the elderly, and individuals with physical disabilities with wheelchairs. The challenge is to devise a mechanism that effectively mitigates this danger.

2. Net Zero X <All Electric Airplane>

The objective of this project is to develop a strategy for reducing CO2 emissions from airplanes. It involves researching the current challenges faced by the airline industry regarding CO2 emissions and conceptualizing an all-electric airplane as a viable solution to significantly lower these emissions.

3. Radioactive <Science Communication on High-Level Radioactive Waste>

High-level radioactive waste (HLW) is created by the reprocessing of spent nuclear fuel. Storage cannot provide the permanent isolation of the wastes from human's environment. This workshop aims to reveal the current conditions and possible disposal methods of HLW, and understand ways of dealing with real social issues.

4. Monster Track <Damages on Infrastructures by Oversized Vehicles>

The oversized loading induced an excessive external load which exceeds load-carrying capacity of bridges, resulted in collapse incidents. Clarify the common challenges in protection of infrastructures during their life cycle from oversized vehicles and come up with initiatives and solutions to this issue.

Around six students formed groups and challenged one of the above problems in seven 3-hour workshops: ideation, interim report, prototyping, final report, and a reflection essay at the end. Each student is requested to create an individual reflection essay including the following descriptions.

- Project description (300-400 words)

Title, goal and conclusion of the project

Process of the project: how you applied design thinking methods

- Contribution (300-400 words)

Your role in the project

Your contribution to the project

- Reflection (200-300 words)

Write freely but we are interested in what you learned from the series of workshops not only professional knowledge and skills but also how to contribute to and facilitate the workshops

The following two essays were prepared by students according to the above instructions.

[STUDENT #13's ESSAY]

As a group, we constructed a project named science communication on high-level radioactive waste, based on the reason that there may exist some misconceptions or knowledge gap between the general public and the organizations dealing with nuclear activities. The main objective of our project is to find out the public's concerns and understanding of high-level radioactive waste. Since our topic is about communicating on the high-level radioactive waste, we decided to have a questionnaire as a

way of communication. Our project includes two questionnaires and results analysis on the responses from the questionnaires trying to identify the major considerations of the general public towards the management and disposal of high-level radioactive waste.

After receiving a general image of what is high-level radioactive waste from our facilitator professor, the students discussed on what kind of questions will be sent to the public and designed suitable questions that involve critical thinking for the respondents. The first questionnaire was a trial targeted mainly to the students and facilitator from the SHIP course, whereas the second questionnaire will be sent to a wider range of audience. Since the topic of radioactive is quite sensitive, we spent time considering the information provided in each question and ensure all the answer choices are appropriate for every possible participant of our questionnaire. After receiving enough responses from the first questionnaire, we started analyzing the choices made by the respondents to find out why he/she has chosen that particular option.

Based on the reflections from the first questionnaire and midterm presentation, we constructed the second questionnaire with improvements. We kept a few questions from the first questionnaire which had given us positive feedback and edited/removed those which was not very helpful. Furthermore, we added questions with the explicit implication of identifying the public's general understanding and concerns based on two major investigations, 1) public and political considerations, and 2) scientific-technical issues, which could better fit our objective of this project. Similar to the first result analysis, we group up each choice made by the respondents in the second questionnaire and provide explanations for each group. From the analysis, we concluded that more than 60% of the respondents have limited understanding of high-level radioactive waste, the organizations of nuclear energy should provide information with educating purpose to the general public to fill up the knowledge gap and avoid misconceptions in dealing with high-level radioactive waste.

Since our project involves question designing and result analysis, my main role was just like other group members, which was to brainstorm ideas on the type of questions to be given to the public in order to obtain the necessary information to support the objective of our project. Before the second questionnaire was sent out, I and 2 other group members worked together with our professor in finalizing the questions for English version. After getting the results from the questionnaire, the whole group worked together in identifying the possible trend of choices from the result of the two questionnaires and I took the role in analyzing the results from the English version of the second questionnaire while those who are bilingual focused on both the Japanese and English version.

For the midterm presentation, I was assigned to present the material section, which I needed to explain the results we obtained for the questions relating to the type of material that is the most suitable for the storing of high-level radioactive waste. Not surprisingly, all the questions from the other groups were material-related, which means the section about the material is the most intriguing topic and caught the most attention. The same happens to the final presentation where more questions were asked on the material section of the presentation. For the final presentation, I volunteered to present the introduction and objective of our project, and it was much harder than I thought. Since each group was given 10 minutes to present, I have only roughly 2 minutes to explain the background of high-level radioactive waste and the objective of the project, while the same section took a total of 4 minutes in the midterm presentation.

Although this was the first time I worked with my classmates from the same major as a group, I tried my best to remove any barriers between each of us. Despite the amount of time spent together during the classes was not plenty enough, I always try to give my opinion and thoughts both during the meeting each week and outside in the line group we made. Furthermore, I participated in answering questions from other groups without being shy or having concerns because I know my group members will support and add-on to what I said if some information is missing.

I believe one of the most important aspects of the series of workshops is about teamwork and collaboration, which is also the reason why the students are in groups of 5 or 6 and not in individuals or groups of 2 only. What I learned from the workshops is not only about the knowledge of high-level radioactive waste, but moreover, I learned how to support my group members and work together with them at the same pace. The question designing part of the project required brainstorming and considerations in all forms (political, emotional, etc.) due to the sensitivity of the topic, and this is

when collaborations between the group members, TA, and facilitator become extremely critical. Each of us gives our personal opinion and comes together to decide on the final layout of the questions, during this stage, we learned how to design questions with reference to an explicit objective while taking the sensitive information into consideration.

One possible improvement for our project can be using another type of communication. Due to time constraints, we were not able to contrast an interview to some of the respondents of the questionnaire, by having an interview can also be helpful in understanding the public's concerns and level of knowledge on the high-level radioactive waste. In my opinion, we can have the second questionnaire as an interview while the first questionnaire could be sent to a wider range of public.

[END of STUDENT #13's ESSAY]

[STUDENT #14's ESSAY]

The goal of this project is to design a questionnaire to understand the public's thoughts and concerns about the disposal of high-level radioactive waste, and one which can at the same time give the respondents some information and a general idea about the disposal of high-level radioactive waste. Then by gathering the results and by analyzing the results we aim to understand the public and at the same time assess the questions in the questionnaire to see if the questions are able to earn the information or results that our group wants and to modify any questions. The importance to understand the public's thought and concerns about the disposal of high-level radioactive waste all lies in the point that the disposal of high-level radioactive waste is not carried out because of the lack of public's approval. So, by understanding about the public, we could think of ways to earn the approval by the public.

Through the two months working in this project, we were able to design and analyze two questionnaires. One questionnaire was designed for the people in the SHIP class, there were 40 responses and through the analysis we concluded that the questionnaire had confusing wording and there was a need to modify the words. The other questionnaire was designed for the public, there were 133 responses and through the analysis we concluded that the public only has a little knowledge about high-level radioactive waste, does not know the details of the disposal of high-level radioactive waste and that most accepts thinks that the waste should be disposed in their own countries.

Throughout the project what we have done was to design questions. When doing so, we first thought of what specifically we had to know about the public, then after that we thought of the type of format that is suitable for what we want to know and after that we chose the appropriate choices for the question. Finally, we shape it up and make it into a question and modify the wording so it would fit the target respondent.

I thought that my role in this project was an idea giver, analyzer, and translator. I thought that I was an idea giver as I thought that I have contributed to the project by thinking of new ideas for the question of the questionnaire. For example, I have thought of the idea for the question number 11 which asked the closest radius that the respondents can accept the disposal site of high-level radioactive waste, this question intends to find an image of a specific distance that the public can accept, by knowing a distance that the public can accept it could be used for the consideration of the disposal site of high-level radioactive waste.

I thought that I was an analyzer as I had contributed in the analysis of the results. When talking about the analysis, I have contributed especially on the analysis to divide the respondents of the Japanese questionnaire into public and experts. When dividing the respondents we had to analyze many of the technical issue related questions and free answer questions, so as one of the native Japanese speakers I had to analyze the people's answers and see if there were any respondents that could be classified as "experts". For example, although we gave an overall classification by seeing whether the respondents answered that they have done any scientific research related to the disposal of high-level radioactive waste, some respondents who was not classified as experts was then classified as an expert as their response to the free answer question was an answer which a person with expert knowledge could only answer. I thought that I was a translator as I have contributed in the creation of the Japanese questionnaire. Like I have previously explained, as I was one of the native Japanese speakers in our group, after the English questionnaire was made, I have done the translation of the questionnaire into

Japanese.

As our groups project was different to other groups, I thought that it was very hard but interesting to do the project. On the other hand, as our groups project was different to other groups, many of the things that we learnt in the SHIP lecture was hard to apply into the project. I thought so because our groups project aimed to design a questionnaire to understand the public, while for the other groups project they aimed to find, or think of a solution to a problem that they found, which is very different and as the previous SHIP workshop and this SHIP workshop both focused on trying to find a problem and then think of a solution, it was hard to apply.

From the series of workshops, I thought that I have learnt the importance of sharing each person's idea no matter how small or boring it might look. Through out the SHIP workshops each group had to think, or find a problem and a solution to it and in this process all the members in the project had to think of some ideas, but when thinking of ideas there would always be some ideas that may seem very small or meaningless for the person and the person usually won't present that. On the other hand I learnt that it is important to present any small idea as these ideas could then be a trigger for other members or even yourself to think of new ideas.

[END of STUDENT #14's ESSAY]

Compare and evaluate the above two essays according to the rubric specified below.

[SCORING RUBRIC]

Comprehensive Evaluation of Workshop Course

1. Technical Knowledge and Application (1/3)

- Understanding of Concepts: Evaluates how well the student grasps the technological and theoretical concepts relevant to the project.
- Practical Application: Assesses the effectiveness of applying technical knowledge in practical situations, specifically in project design and development.
- Innovation and Problem Solving: Measures the creativity and innovation in addressing project challenges and proposing effective solutions.

2. Teamwork and Collaborative Skills (1/3)

- Individual Role and Contribution: Looks at how clearly the student defines and fulfills their role within the team, and their contribution to the project.
- Team Interaction and Communication: Evaluates the student's ability to communicate and collaborate effectively within the team.
- Peer Engagement: Considers the student's participation in peer learning, support to team members, and contribution to the team's dynamics.

3. Reflective Learning and Personal Growth (1/3)

- Self-Reflection and Insights: Assesses the depth of the student's self-reflection on personal learning and development throughout the project.
- Design Thinking and Process: Measures how well the student demonstrates the application of design thinking methods and management of the project process.
- Skill and Attitude Development: Evaluates the growth in the student's professional and soft skills, like critical thinking, adaptability, and communication.

[END of SCORING RUBRIC]

Compare and evaluate two essays based on the three main criteria in the above rubric: Project Description, Role and Contribution, and Reflection and Insight. Summarize the comparison of the three main criteria and then determine which essay is better overall.

The final score should be as follows. If one is superior to the other even slightly, award +1 point to the superior essay, and -1 point to the other. If one is clearly superior to the other, award +2 points to the clearly superior essay, and -2 point to the other. If both are the same, give each a score of 0.

To evaluate the essays of Students #13 and #14 based on the specified scoring rubric, I will compare them across three main criteria: Technical Knowledge and Application, Teamwork and Collaborative Skills, and Reflective Learning and Personal Growth. Each criterion will be assessed, and then a summary will be provided to determine which essay is superior overall.

1. Technical Knowledge and Application

Student #13

- **Understanding of Concepts:** Demonstrates a good understanding of the project's goal, the importance of effective communication on high-level radioactive waste, and the need for public education.
- **Practical Application:** Effectively applied this understanding in designing two rounds of questionnaires and analyzing the results.
- **Innovation and Problem Solving:** Shows creativity in the iterative process of questionnaire design and the analysis of public perception, but lacks a detailed explanation of innovative problem-solving methods.

Student #14

- **Understanding of Concepts:** Similar to #13, shows a clear understanding of the project's aim and the significance of public opinion on high-level radioactive waste disposal.
- **Practical Application:** Also focused on questionnaire design and result analysis, but with less emphasis on the evolution of the questionnaire.
- **Innovation and Problem Solving:** Like #13, demonstrates an innovative approach to understanding public opinion but lacks specific details on creative problem-solving.

Comparison: Both students demonstrate a good grasp of the technical aspects and practical application, but neither stands out in terms of innovation.

Score: #13: 0, #14: 0

2. Teamwork and Collaborative Skills

Student #13

- **Individual Role and Contribution:** Clearly defines their role in questionnaire design and analysis, especially for the English version.
- **Team Interaction and Communication:** Mentions effective collaboration with the team and facilitator, highlighting teamwork.
- **Peer Engagement:** Describes active participation in meetings and a willingness to engage with peers, although specific examples of peer engagement are limited.

Student #14

- **Individual Role and Contribution:** Identifies as an idea giver, analyzer, and translator, with specific contributions to questionnaire design and analysis.
- **Team Interaction and Communication:** Less emphasis on team dynamics but mentions translating the questionnaire, indicating collaboration.
- **Peer Engagement:** Reflects on the importance of sharing ideas, but like #13, lacks detailed

examples of engaging with peers.

Comparison: #13 demonstrates a slightly better understanding of teamwork dynamics, although both essays are somewhat similar.

Score: #13: +1, #14: -1

3. Reflective Learning and Personal Growth

Student #13

- Self-Reflection and Insights: Provides a thoughtful reflection on the importance of teamwork and the challenges of sensitive topic communication.
- Design Thinking and Process: Describes the iterative process of questionnaire design and the application of design thinking.
- Skill and Attitude Development: Reflects on personal development, especially in terms of team collaboration and communication.

Student #14

- Self-Reflection and Insights: Highlights the importance of idea sharing and the difficulty in applying workshop teachings to their unique project.
- Design Thinking and Process: Less emphasis on design thinking processes compared to #13.
- Skill and Attitude Development: Reflects on the growth of idea generation and analysis skills, but less on personal attitude development.

Comparison: #13 offers a more comprehensive reflection on personal and professional growth, as well as the application of design thinking.

Score: #13: +1, #14: -1

Overall Comparison and Final Score

Both essays are strong in their technical knowledge and application, but Student #13's essay stands out slightly more in teamwork and collaborative skills and significantly more in reflective learning and personal growth. Therefore, the overall score would be:

Final Score: #13: +2, #14: -2

Student #13's essay is better overall in terms of the criteria set by the rubric.