Report on Kyoto University Laboratory for Teaching Improvement Program at UC Davis (May 1 to May 12, 2023)

Seven faculty members of Graduate School of Engineering, Kyoto University (Katsuhiro Isozaki, Yosuke Muranaka, Midori Akiyama, Daiki Shimizu, Shunichiro Ito, Kanami Sugiyama, and Yui Tsuji) have visited UC Davis to take the course of "laboratory for teaching improvement (LTI) program" managed by Dr. Mikaela Huntzinger (Mika). In this program, we learned how to improve our teaching skills for higher education and our presentation skills at conferences. While staying at UC Davis, we joined real organic chemistry classes for undergraduate students in the style of a "flipped classroom," one of the methods we learned for higher education in this program. We also experienced several events held in Davis town and UC Davis, enabling us to understand the culture of the US and how US university is managed.

Improving teaching skills for higher education

We learned about several teaching methods and concepts for higher education, such as "flipping classroom," Backward design, Bloom's taxonomy, Formative and summative assessment, and Think-pair-share. From the Backward design, we learned how specific and measurable objective is important for both teachers and students to share the goal of the class. Bloom's taxonomy enabled us to understand how to construct the structure of the class based on the learning steps, such as remembering, understanding, applying, analyzing, evaluating, and creating.

As actually introduced in US classes, "flipping classroom" was an effective way to make students join the class more positively. In the flipped classroom, students learn about the lecture contents as homework beforehand in the real class and can immediately get feedback from teachers through teaching activities in the real class, such as group discussions with small groups. The immediate feedback and joining teaching activities strongly motivate students to join the class more positively, resulting in getting a further understanding of the lecture contents. This style is totally opposite to those of conventional classrooms in Japan. During the teaching activity, students first think about the question by themselves, then are divided into groups with small members and discuss the questions, and finally share their idea for the questions, followed by immediate feedback from teachers. This think-pair-share method is not only effective for less-understood students to get understood the topic but also effective for better-understood students to get further understanding by teaching each other. In addition, we can assess students' understanding during the teaching activities better than the conventional assessment style in Japan. The traditional Japanese style of assessment is categorized as the "summative assessment,"

assessing the students' understanding by tests after finishing classes. But, in flipped classrooms, we can assess students' understanding stepwise through the teaching activities, and also the immediate and frequent feedbacks help students get understood better. That's why this type of "formative assessment" is recognized as effective for higher education.
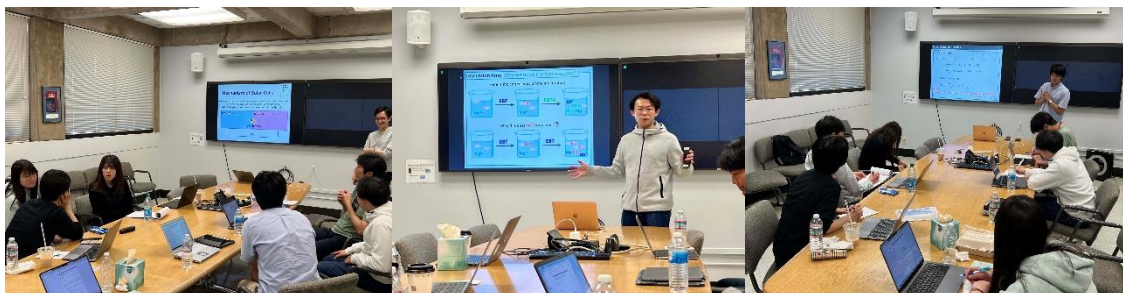
Improving presentation skills at conferences

We learned about several techniques, such as Beginning-Middle-End, Take-home message, Contrast, Signposts, and Clear and effective slides for improving our presentation skills in conferences. In the Beginning-Middle-End storytelling structure, we learned about the difference between Japanese and Western styles. The conventional Japanese storytelling structure is the so-called "Kishōtennketsu," which sometimes makes Western researchers confused. Western researchers like the linear connection of storytelling structure. Thus Beginning-Middle-End structure is effective in international conferences. We also learned about the importance of putting several contrasts and signposts during the presentation to make the audience keep their concentration on the presentation. Although we had known most of these techniques, we confirmed again that as much as clear slides are most effective in making the audience understand well our presenting contents. After learning these techniques, our presentations have become clearer to give a stronger take-home message to the audience.

## Observations of real classrooms at UC Davis

We joined two organic chemistry classes to observe how teaching skills are used in the US. In both classes, teachers played some nice music before starting the classes to make students relax. Both of these teachers used OHP films on the text sheet and wrote additional information to help the student's understanding.

Dr. Nasiri's organic chemistry class

She taught the basics of Diels–Alder reaction with a remarkably slow speaking speed. But, we felt her slow explanation is beneficial for undergrad students. During the class, she strongly emphasized several important points by repeating them with a loud voice, which enabled us to learn how to keep students concentrated.

Dr. Enderle's organic chemistry class

He taught the difference between electronic geometry and molecular geometry of organic molecules. In his class, we confirmed how "flipping classroom" is effective to make students understand and join the class positively. Surprisingly, each student answered questions soon after the teachers asked. This is much different from the Japanese class. This difference seems to originate from the teaching style of the US for higher education, such as Backward design and flipped classrooms, as we learned in this program.
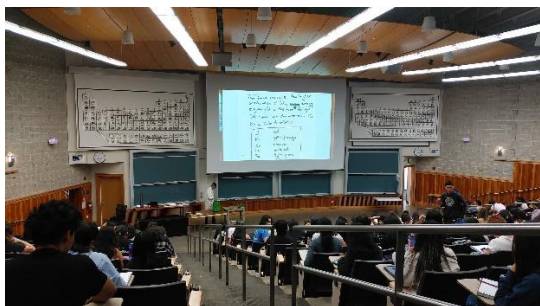
English pronunciation

Starting from different usage of the tongue for pronouncing "l" and "r" sounds, we learned about the syllable schwa. Especially because we all were unfamiliar with syllables and schwa, it was impressive to know how these pronunciations are important to make native speakers understand what we say. Through the teaching and conference demos, we learned how to pronounce specific index terms in our presentations under the direction of Dr. Mika. That was so helpful for us to improve our pronunciation.

Experiences in Davis town

During staying at Davis, we experienced several events held in Davis town under the direction of Dr. Mika. The farmer's market was held every Wednesday and Saturday at the Central Park of Davis town, where we enjoyed various vegetables, fruits, and foods which are difficult to see in Japan. We joined the Science café held once a month in G. St. Wunderbar. We heard a talk from a female scientist at UC Davis on her background and research in the agricultural field. Fortunately, we could join the Whole Earth Festival held once a year at UC Davis. At the festival,

we enjoyed the atmosphere and found a lot of funny goods. Dr. Mika and her husband, Dr. Rick, brought us to the Jepson Prairie Preserve (UC Davis vernal pool research site). We met Japanese agricultural researcher Dr. Shiojiri and her family in that place. We all enjoyed various glasses, flowers, seeds, and insects, which cannot be seen in Japan.

In addition, we met several types of squirrels, hamming birds, Canada geese, and various kinds of plants at UC Davis, which we have never seen in Japan. We enjoyed so much all these experiences.

Summary

As described above, we learned several teaching methods and concepts for higher education which are generally adopted at US universities. We will apply what we learned to our classes at Kyoto Univ. We also got understood English pronunciations and learned several techniques to improve our presentations at conferences, which will help us to discuss with Western researchers efficiently.

What we learned and experienced cannot be gained in Japan, so this LTI program at UC Davis is really important for the faculty members of Kyoto University to cultivate their further knowledge not only for teaching and presentations but also as worldwide researchers.

In addition, throughout the course for two weeks, we got very close and became a strong team. This connection will surely be a valuable asset in our lives. We are deeply grateful for the JGP program for offering us this valuable opportunity.