FIRST WORK ON COLLABORATION BETWEEN HIGH SCHOOLS AND UNIVERSITY BY HOLDING WORKSHOPS

Takeshi Tanaka¹, Masayuki Yamauchi¹, Tomomi Tanioka¹, Mayumi Tanaka², Terushige Yamada², Shohei Nakata³, Katsumi Chiba³, and Katia Vutova³

Hiroshima Institute of Technology, Japan¹, Hiroshima Prefectural Hiroshima Minami High School², Hiroshima Prefectural Kure Mitsuta High School¹, Hiroshima Prefectural Gion-kita High School², Institute of electronics - Bulgarian Academy of Sciences³
tanaka@cc.it-hiroshima.ac.jp

Abstract: In May 2018, we held the 1st International Workshop. In this research, we reported the case of collaboration between high schools and universities on holding workshops together, and the effects of learning through participation from high school age through to university students, and lecturers.

Keywords: INTERNATIONAL WORKSHOP, UNIVERSITY, HIGH SCHOOL, COLLABORATION

1. Introduction

In recent years the field related to engineering, electrical and electronic engineering has been rapidly developing throughout the world. As the humankind has continued to develop leading-edge technologies, students who graduate from universities in engineering and start working for companies or laboratories as engineers, require the opportunities to acquire new skills and develop new devices globally. In the process of development of technology, engineers need to attend meetings, discuss matters, make presentations, and negotiate with people from various countries. It is necessary for engineers to have not only professional knowledge and technical skills but also communication ability, the ability to think for themselves, and the skills to exchange their ideas to create something new with their colleagues. Recently, many educational institutions in Japan have been seeking to introduce new types of classes for improving the communication ability, logical thinking ability, problem-solving ability, and expressiveness of students through training in making presentations.1)

Today, with the dramatic progress of science and technology and due to the rapid globalization, engineers and researchers are requesting more capabilities than before such as wide range of scientific knowledge, logical thinking and problem-solving skills, expressive ability, communication skills, presentation skills, etc. The "communication ability" is the one that many companies emphasize on.2)

Workshops on Education and Research of Electronic Device, Circuits, Illuminations, Systems and other fields, sponsored by the Chugoku Branch of the Illuminating Engineering Institutes of Japan, co-organized by the Chushikoku branch of the Japan Society of Applied Physics, Chugoku district and the neighboring universities and academic organizations with the cooperation of the Shikoku region, were conducted - a domestic workshop³ and an international workshop in May 2018.4)

In the workshops where university and company lecturers and students attended, we were able to answer questions after presenting at participating college and graduate students at local workshops. Since that year, we started planning an international workshop so we could increase the number of venues and start collaborating with high schools. In this work, we reported cases of collaboration between high schools and university when holding workshops, learning effect on high school students by university students’ and lecturers’ attendance.

2. Purpose of the Workshops

We hold workshops on educational research in electronic devices, circuits, lighting, systems and other fields. First, as a domestic workshop for neighboring universities, we mainly conducted oral presentations related to educational research by students, graduate students, and social workers, as well as poster sessions in electronic devices, circuits, lighting systems and in other fields, discussions on the methods of educational research. As a next step, we will hold domestic workshops to discuss the education and research methods in these fields concerning companies, universities, junior high schools and high school science, technology and industry.

Through holding workshops, presenters can exchange information on the present situation and problems of science and technology, education and research at junior and senior high schools, including enterprises, universities, etc., and their solutions and goals. In addition, it is an opportunity to share information on various teaching materials used for education and teaching materials produced by themselves, how to create and utilize them. Furthermore, mutual collaboration with junior high schools, high schools, universities and companies will deepen, and it will be expected that momentum will be developed and expanded to promote science and technology, education and research throughout the region.

3. Program and implementation status

An international workshop held in Hiroshima venue, Kure venue, and Fukuyama venue as follows:

1. December 7, 2018, Kure Venue (Yamato Museum) including:
   - Opening Declaration 14:00~14:03 h
   - Keynote Speech 14:04~14:34 h
   - Oral Presentations 14:35~15:22 h
   - Poster Session (in Japanese) 15:23~17:00 h

The workshop at the Kure venue began with the opening declaration by the executive committee, and 72 people participated (1 from Thailand, 1 from Taiwan, 70 from Japan). There were one keynote lecture, four lectures in English and five poster presentations in Japanese, followed by active discussions (questions and answers) on electronic devices, circuits and systems, other education and research methods, etc. The workshop activities at the Kure site ended with a greeting by the chairperson.

Fig. 1 Lecture in English.
2. December 8, 2018, Hiroshima Venue (Hiroshima Institute of Technology):
- Opening Declaration 10:00~10:03 h
- Keynote Speech 10:04~10:34 h
- Oral Presentation (in Japanese) 10:35~11:46 h
- Poster Session (in Japanese) 13:00~14:00 h

The workshop at the Hiroshima venue started with the opening declaration by the executive committee chairman, and there were 56 participants (1 from Thailand, 1 from Taiwan, 54 from Japan). The presentations included: 2 keynote lectures, 2 general lectures in English, 6 lectures in Japanese and 14 poster presentations in Japanese, there also were many questions and interesting discussions on electronic devices, circuits and systems, research and educational methods, etc. A greeting by the vice chairperson was at the end.

2. December 8, 2018, Fukuyama Venue (Hiroshima Prefectural Cultural Center Fukuyama)
- Opening Declaration 14:00~14:03 h
- Keynote Speeches 14:04~14:55 h
- Oral Presentation (in Japanese) 15:06~15:17 h

The workshop at the Fukuyama venue started with the opening declaration of the executive committee chairman, and seven people participated (2 from Taiwan, 1 from China, 4 from Japan). There were two keynote lectures and one lecture in Japanese, together with questions and answers on the workshop topics and at the end there was a greeting by the vice chairperson.

In this international workshop, special prizes were given to Thai S. Anantathanasarn for the Keynote lecture, to Frederick Chan from Taiwan and to Professor Takeshi Tanaka from the Hiroshima Institute of Technology for the support of the participant's teacher relationship and careful deliberation. As a result, since the following announcement was recognized as an excellent announcement, an encouragement prize was awarded from the Chugoku branch of the Illuminating Engineering Institute of Japan. (General / University Student Division and High School Student Division).

Some high school students were also awarded the Encouragement Prizes as well as their teachers were awarded excellent teacher prizes: Hiroshima Prefectural Kure Mitsuta High School - Shohei Nakata, Yoshimasa Kawamoto, Midori Mukai, Hiroshima Prefectural Hiroshima Minami High School - Mayumi Tanaka, Hiroshima Prefectural Gion-kita High School - Katsumi Chiba. Finally, an excellent group prize was awarded to Hiroshima Prefectural Kure Mitsuta High School (Principal Marimi Shojiguchi) which gave great cooperation in oral presentations by high school students, poster presentations and workshop planning and operation.

4. Status of workshop participation from high schools

4.1. Hiroshima Prefectural Hiroshima Minami High School

The students told the group that they won the award, “We have elaborated over time and made posters a number of times, but it was a lot of learning by summarizing the research. In the poster session, exchange with college students, college studies I got a chance to see it and it became a reference for those who came to see it and it gave me the opportunity to learn sanitary nursing department of Minami High School. Also got a lot of advice on research and got opportunity of participation for which I am grateful for.” A group of hand massagers who seemed to throw in the middle also said, “I am thankful that the first grader got together and I was able to go to the presentation and it would be interesting to measure the pulse at the same time for those who came. I was trying to measure the surface temperature of the skin with a thermography and asked if I could hear that there was still room for improvement. “I felt a sense of accomplishment that I worked on until the end.

Six posters were presented at Hiroshima University and Hiroshima Institute of Technology and for students the contents closest to us were to be studied by way of holding perspectives, to summarize in the form of posters, to direct visitors. It was a valuable learning opportunity different from school, such as sessions can be done, for which I am thankful.

Also, from the students, “It was a valuable experience, leading to deepening my knowledge by requiring ingenuity to explain easily to people.”

“Since I got a lot of opinions and questions at this poster, I wanted to make use of it for future activities.”

“I myself did not make a poster presentation, but when I saw posters of other people, I found out the research of each group and the features of the poster, which I got help and I was doing interesting research. It was fun to listen. I thought about making the next poster more attracting to people.”
4.2. Hiroshima Prefectural Kure Mitsuta High School

Hiroshima Prefectural Kure Mitsuta High School and other schools are conducting "Social Exploration Project Learning (Social Exploration PBL)" in the comprehensive learning time of the second grade. In this activity, the students discovered the problems which Kure city has, and are exploring solutions. Also, Study by social exploration PBL, students learn how to approach "questions without answers" and cultivate thinking ability, judgment ability, expression power required for problem-solving in the real world.

With the participation in the academic conference this time, the students were able to improve the communication skills and presentation abilities to have others understand their thoughts. Also, by receiving indications and advices on the contents and presentation method from teachers and students, experts from companies and universities from Japan and abroad participated in the conference, I looked back on their learning and I felt motivation for deepening inquiries and sense of accomplishment for my learning in the future.

Initially, the students felt tension by making a presentation in English at the international conference, but we felt a sense of fulfillment strongly by challenging and appraising it boldly. In addition, through such announcement, learning and daily connection with society I feel attached and motivated toward realizing my own course is expanded. I strongly feel that I would like to cherish the opportunities for students to disseminate what they have explored in the future.

4.3. Hiroshima Prefectural Gion-kita High School

The Hiroshima prefectural Gion-kita High School Science Research Division has five teams of physics, chemistry, biology, earth science and mathematics, with about 30 members deciding themes in their favorite fields and conducting research.

At the research presentation such as universities and academic meetings held outside the school from autumn to winter, each group participates in high school students’ department etc and challenges multiple presentations. Among them, students receive surprisingly transformed questions and advice from university teachers. In particular, understanding the intention of the questioner such as "why the questioner did such a question", the ability to think and organize and respond to themselves with their own heads will surprisingly grow. And as we look back on our research and excellence again, we are increasingly aware of the importance of research in the first place and realize that it has led to the realization of the course after graduation.
Fig. 9 DNA analysis experiment at the university laboratory and students from the Hiroshima Prefectural Gion-kita High School.

Fig. 10 Fossil collection at the Saijyo River and students from the Hiroshima Prefectural Gion-kita High School.

6. Conclusions

This work reported the outline of the 2nd International Workshop on Education and Research related to electronic devices, circuits, lighting and systems sponsored by the Chugoku branch of the Illuminating Engineering Institute of Japan. 4 speeches (lectures in English), 4 general lectures (in Japanese), and poster presentations (in Japanese) were presented at the Hiroshima venue, the Kure site and the Fukuyama site. It was thought that interesting discussions and comments were held at all oral and poster presentations and the obtained results correspond to the purpose (section 2). Through high school students presented own learning outcomes in the session of high schools, it is thought to have had a good influence on them. In the future, it is expected to examine this good influence on both high school and university students.

In the future, we would like to make an international organizing committee of this workshop and to develop the international workshop. In addition, we would like to promote information exchange between high schools and universities by a system using secret sharing with high information security.

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References

(6) http://c2q.cc.it-hiroshima.ac.jp/