

Technical Committee on Frontier in Education

1. Objective

In March 2017, the Minister of Education, Culture, Sports, Science, and Technology advised the Central Council for Education on the "Future Plan for Higher Education in Japan," and in November 2018, "Grand Design for Higher Education toward 2040 (Report)" was compiled. This was outlined as follows: ○ Shift to learner-oriented education; ○ Assure diversity and flexibility; ○ Rebuild quality assurance for “learning” and provide diverse education through various organizations; ○ Visualize costs and expand support lent by several sectors.

In April 2019, the Minister of Education advised the Central Education Council on ideal elementary and secondary education for the new era. In December 2019, the Elementary and Secondary Education Subcommittee summarized discussions based on the deliberations till then. These are outlined as follows: ○ Realization of individually optimized learning; ○ Environments enabling high-quality educational activities.

At present, there are several problems to be solved, addressed, and reformed with respect to higher education, elementary and secondary education, and social responsibility. The Technical Committee on Frontier in Education has been established considering the importance of the IEEJ positively contributing to education.

2. Fields of activity

Education and research activity themes include ① efforts toward "making things" and engineering education at universities and colleges; ② new educational methods, practices, and material development using IT devices; ③ curricula improvement; ④ lifelong learning; ⑤ response to JABEE; ⑥ engineering ethics and safety education; ⑦ communication and presentation; ⑧ career design education; ⑨ liberal arts and cultural education; ⑩ FD activities; ⑪ elementary and secondary school experience-based education through regional cooperation; ⑫ education through collaboration between high schools and universities; ⑬ PBL; ⑭ flipped teaching; ⑮ active planning; ⑯ SDGs, ESD, STEAM, and Society 5.0; ⑰ gender equality and diversity; and ⑱ performance evaluation methods; ⑲ Education through collaboration between industry and academia; ⑳ New education in COVID-19 calamity.

3. Activity content

○ Education frontier Technical Meetings

Education frontier Technical Meetings meet three times a year. At the first and third

meetings of the year, the theme of “general education” is addressed, and at the second meeting, special planning is carried out jointly with the IEEJ Engineering Ethics Committee to address the theme of "engineering ethics and general education."

- Special planning with the Ethics Committee

In line with the research support activities of the Ethics Committee, special planning is carried out jointly with the Ethics Committee and the Technical Committee on Frontier in Education, papers are publicly solicited under the theme of "Engineer Ethics and General Education," and opportunities for research presentations are provided to engineering ethics researchers.

- Collaboration with the Elementary and Secondary Education Support WG

The Elementary and Secondary Education Support WG under the Social Cooperation Committee is implementing measures to "enhance the quality of knowledge comprehension and foster the qualities and skills" of teachers, education faculty students, and the general public with regard to electricity and its related areas addressed in elementary and secondary education. The Technical Committee on Frontier in Education works with the Elementary and Secondary Education Support WG in a timely and appropriate manner, the WG disseminates information on the results of its activities at workshops, and the Technical Committee conveys the problems to the WG.

4. Introduction to activities

The second annual meeting of education frontier Technical Meetings addresses the theme of "Engineering Ethics and General Education," accounting for ~60% of the papers in ⑥ engineering ethics and safety education. Each time, there tend to be several papers on ② new educational methods, practices, and material development using IT devices, showing how teachers are working hard to teach and establish themselves in an easy-to-understand manner to students. Papers related to ⑩ SDGs that were newly added as educational and research themes in 2018 were announced early. Recently, papers on remote classes conducted due to the COVID-19 pandemic have accounted for approximately one-third of all papers, reflecting urgency.

In the "Notification" section of the Social Cooperation Committee web page, we published a guide to convening education frontier Technical Meetings, and we identified the merits of cooperation based on the level of attention.

Technical Meetings have also been affected by the COVID-19 pandemic, which resulted in all of last year’s meetings being held online. However, we feel that online meetings are not merely a substitute made necessary by the coronavirus but also a new Technical Meeting workstyle for the present or post-COVID-19 era that makes the best

use of on-site and online options.

In special planning with the Ethics Committee addressing the theme of "Engineering Ethics of Engineers aiming at SDGs," briefings on difficulties in engineering ethics were delivered, covering the causes, backgrounds, details, and responses of example cases considering the viewpoint of a professional engineer (PE). The first attempt involved two student panelists expressing their opinions on approaching matters based on their viewpoint, which was a valuable experience for the students as well. In addition, in the special plan addressing the theme of "Ethics in Educational Activities during an Emergency," problems were introduced for countermeasures to prevent the spread of the novel coronavirus (emergency) at premier educational institutions (universities and colleges); then, opinions on the dilemma were exchanged and discussed, ensuring the safety, security (physical, mental), and competency (academic ability) of students and ascertaining primary and secondary priorities.

5. Committee members

Position	Name	Affiliation
Chairperson	Itaru Nakamura	National Institute of Technology, Kagoshima College
Vice-chairperson	Naoyuki Shimomura	Tokushima University
Primary member	Naoyuki Aikawa	Tokyo University of Science
"	Yohei Ishikawa	National Institute of Technology, Ariake College
"	Akira Uchida	Nihon University
"	Masashi Ochi	Chiba Institute of Technology
"	Tetsuo Oka	Shibaura Institute of Technology
"	Yukihiko Sato	Chiba University
"	Haruhiko Suzuki	National Institute of Technology, Fukushima College
"	Takeshi Tanaka	Hiroshima Institute of Technology
"	Takahiro Hoshino	Nihon University
"	Satoru Homma	Tokyo Medical and Dental University
"	Chikako Miyamoto	Fukuoka Institute of Technology
"	Michiko Yamada	HEXEL Works Inc.
Secretary	Kenji Takahara	Fukuoka Institute of Technology

(October 31st, 2021)