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Curriculum Development for Ph.D. Students to Cultivate Literacy and Competency

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Based on the social requirements, today's Ph.D. courses education require the ability to work in a broader spectrum and apply one's skills to a multidisciplinary setting while maintaining a high level of expertise. This paper outlines the development of an education program for Ph.D. course students to cultivate literacy and competency, in addition to comprising doctoral theses and highlighting the ability to achieve results through innovative research of new themes. The program aims to cultivate fundamental attainment (the fundamentals of natural and social sciences, such as mathematics, physics, chemistry, and biology), specialized knowledge (mechanical dynamics, material mechanics, hydrodynamics, thermodynamics, design engineering, manufacturing engineering, and material engineering, as well as a bird's-eye view knowledge of technology, society, and the environment), literacy (language, information literacy, technological literacy, legal knowledge, and ethics), and competency (creativity, problem identification and solution, planning and execution, self-management, teamwork, leadership, a sense of responsibility and duty).

The program targets Ph.D. course students in the School of Engineering, which includes Mechanical Engineering, Aeronautics and Astronautics, Precision Engineering, Systems Innovation, Materials Engineering, Applied Chemistry, and Chemical Systems Engineering. The program focuses on (1) Cultivating a bird's-eye-view of the role of engineering in society, (2) Cultivating competitiveness based on international understanding and specialized knowledge, and (3) Cultivating leadership in industry and academia.

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The corresponding relationship between the educational objectives and the educational program is articulated, as it shows the contribution ratio of the four abilities that can be expected to be cultivated from each program. We instructed the students who enrolled in the program to take a survey with questions inquiring what type of coursework they felt contributed the most to attaining the four educational objectives: fundamental attainment, specialized knowledge, literacy, and competency. Figure 1 compares the ratio of education objectives between faculty setting and students feeling calculated by questionnaire. There are some differences, but overall tendency shows good agreement. We can confirm students feel to get literacy and competency from these education programs. We can change the faculty setting or can change contents of education program according to the student's voice. Also we can change the contribution ratio of four objectives. For example, students feel, Project based learning need fundamental achievement and specialized knowledge. This is because PBL theme is much more realistic engineering theme than the faculty expected. We very thanks to company members offer PBL theme. At this year objectives, we already changed the ratio of PBL.

We plan to continue running this program, making continuous improvements in the curriculum based on the opinions of students who participated and industry members who cooperating with education programs. With these continuous improvements in the curriculum, we can foster human resources with multidisciplinary application skills that will actively engage in a wider range of areas. ■

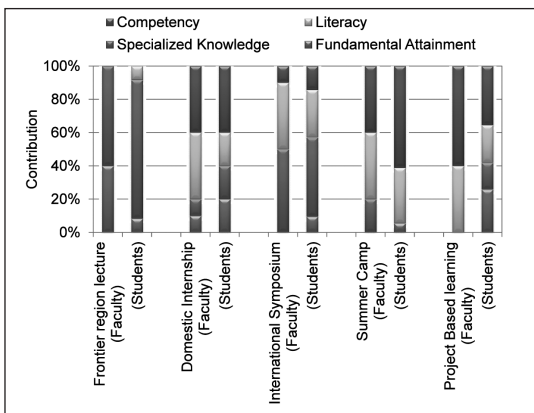


Fig. 1. Ratio of education objectives between faculty setting and students feeling

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