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# Promoting global education in science and engineering: An experience in Indonesian high schools

F Triawan<sup>1,2\*</sup>, M K Biddinika<sup>3,4</sup>, S Hanaoka<sup>2</sup>, F Takahashi<sup>3</sup>, M Aziz<sup>5</sup>

<sup>1</sup> Mechanical Engineering Study Program, Sampoerna University, Jl. Raya Pasar Minggu, Kav 16, Jakarta Selatan 12780, Indonesia

<sup>2</sup> Department of Transdisciplinary Science and Engineering, Tokyo Institute of Technology, 2-12-1 Ookayama, Meguro, Tokyo 152-8550, Japan

<sup>3</sup> School of Environment and Society, Tokyo Institute of Technology, 4259 Nagatsuta, Midori, Yokohama 226-8503, Japan

<sup>4</sup> Center for Waste Management and Bioenergy, Universitas Janabadra, Jl. Tentara Rakyat Mataram 58, Bumijo, Jetis, Yogyakarta 55231, Indonesia

<sup>5</sup> Institute of Innovative Research, Tokyo Institute of Technology, 2-12-1 Ookayama, Meguro, Tokyo 152-8550, Japan

Email: farid.triawan@sampoernauniversity.ac.id; triawan.f.aa@m.titech.ac.jp

**Abstract.** Japan has initiated higher education reform in which internationalization is one of the challenges as a way to improve excellence in research and competitiveness within Asia and the world. In becoming the “Asian Gateway” to the rest of the world, Japan also invites students from Asian countries to pursue higher education in Japan. However, language problem is often considered as one of the barriers faced by international students – not only from Asian countries – in Japan, especially for undergraduate program since the program is mostly held in Japanese language. The Global Scientists and Engineers Program (GSEP) is the international bachelor of engineering degree program in Tokyo Institute of Technology (Tokyo Tech). It does not require any Japanese language ability since the whole program would be taught in English. This paper presents the experience of promotional activities of the program in Indonesia in order to identify the challenges, to document the method, and to outline some recommendations for improvement. The promotion was held by presentation in front of 13 (thirteen) high schools in Jakarta and nearby. After the promotional presentation, participants were also requested to express their interest in applying the program as well as their perceived usefulness of the presentation.

## 1. Background and motivation

The Japanese government is encouraging the nation's institutions of higher education to internationalize as a way to increase its research excellence and competitiveness within Asia and the world [1][2][3]. Besides recruiting more foreign staffs in academic profession, increasing more foreign students is also central to Japan's – national strategy of internationalization [4][5]. Various policies have been implemented since 1983 in order to attract more students from overseas; such as allocating more funding to secure human resources, establishing new international programs, and assist private and local agencies in providing educational services to students from overseas [6]. Since 1980s, Japan has successfully recruited 100,000 foreign students (*gaikokujin ryugakusei*) and continues with a plan



in 2007 by Prime Minister Fukuda to attract another 300,000 high-qualified foreign students by 2020 [3][4].

However, recruiting large number of foreign students cause another problem since international students are considered as a vulnerable student population [7]. A study mentioned that they are vulnerable to experience language barriers, adjusting to a new culture, academic and financial difficulties, interpersonal problems, racial discrimination, loss of social support, alienation and homesickness [8]. They are also vulnerable to exploitation such as receiving unequal opportunity of education so that they receive low quality of education, being financially exploited , and being regarded as consumers when an educational institution considers internationalization as a chance to sell products to “foreigners”[9].

As a prominent higher education institution in science and technology, Tokyo Institute of Technology (Tokyo Tech) hosts an international bachelor of engineering degree program called Global Scientists and Engineers Program (GSEP). The program has just been started from April 2016, hence some improvements are still underway including in the effort to attract high qualified high school graduates from foreign countries to join the program. One of the efforts is a promotional activity in Indonesia by a lecturer belongs to the program. In addition, the lecturer’s country of origin is Indonesia so that the promotion is expected to be easier in terms of cultural understanding, including language of instruction.

Indonesia was considered because Indonesian student is the second largest international student in Tokyo Tech after Chinese student. The large number of Indonesian students in Tokyo Tech, approximately 160 students by April 2017, may support to resolve some international students’ problems such as loss of social support, alienation, and homesickness. The large number of Indonesian students as well as a lecturer from the same country of origin may also provide both social support, friendship, and social connectedness which are considered by previous study as important factors in ensuring international students succeed in their new environment [7].

This paper describes the experience of promotional activities on GSEP in Indonesia since such activities might have been conducted, however, little knowledge on such activities that had been academically published. This paper would identify the challenges, to document the method, and to outline some recommendations for future improvement of the activities. The content of this paper consists of the component of promotion activities which describes timeline, participants, and content of presentation material. Then the paper also shows participants’ interest in applying the program as well as their perceived usefulness of the presentation.

## **2. Component of promotion activities**

The promotion activities consist of presentation in classroom and questionnaire survey. The activities were conducted in 13 (thirteen) high-ranking high school located in Jakarta and its surrounding areas as shown in table 1, from August 1st, 2016 until August 13th, 2016. The principal of each school has been contacted prior to the promotion in order to conform with school’s schedule and students’ availability.

Based on students’ availability, the high schools had different arrangement for students’ participants. In some high schools, all third-year students were asked to attend the promotion activities, so that the participants were limited to the third-year students only. A high school even included some second-year students who were also interested to join besides all third-year students. However, most of the high school opened the activities for those who are interested in, instead of asked certain students to attend the activities. Students’ participants from each school varied in number, from 30s until 100s, but less than 200 because of limitation of the classroom.

The promotion agenda consists of classroom oral presentation and questionnaire survey regarding the participants’ impression on study abroad especially in Japan, and interest in applying the program as well as their perceived usefulness of the presentation. However, only their interest in applying the program as well as their perceived usefulness of the promotional presentation are presented here.

**Table 1.** List and location where promotion held

High school's name	Location
SMANU MH Thamrin	Jakarta
SMA Negeri 1 Bekasi	Bekasi
SMAK 3 Penabur	Jakarta
SMAK Penabur Gading Serpong	Tangerang
SMA Negeri 1 Bogor	Bogor
SMA Negeri 3 Bogor	Bogor
Pribadi Bilingual Boarding School	Bandung
SMA Negeri 3 Bandung	Bandung
SMA Negeri 8 Jakarta	Jakarta
SMA Kharisma Bangsa	Tangerang
MAN Insan Cendekia Serpong	Tangerang
SMA Negeri 2 Tangerang Selatan	Tangerang
SMA Negeri Cahaya Madani Boarding School	Tangerang

The promotional presentation was delivered within 30 minutes followed by 10-15 minutes of question and answer (Q&A) session. The questionnaire survey was then carried out within 15-20 minutes. Situation during the presentation are depicted in figure 1(a) and (b). In one presentation session, high interest of students was observed by excess of participants within available seats of a classroom as shown by figure 1(a).

The presentation content comprised 7 (seven) points; introduction to Tokyo Tech, overview of GSEP, admission process, scholarship, accommodation facilities, curriculum of GSEP, and online information regarding GSEP.

Introduction to Tokyo Tech also covered a brief description about Japan and Tokyo area for those who are not familiar with Japan. In addition, portion of international students both in undergraduate and graduate programs were also highlighted in order to provide a brief picture how Tokyo Tech has experience in handling a number of foreign students so far. Another emphasis within the presentation was that no proficiency of Japanese language needed to enroll in the program. Most of the bachelor program in Japan requires Japanese language proficiency since all subject within the program is taught in Japanese language. Hence, the presentation emphasized that no proficiency of the Japanese language is required to enroll Tokyo Tech's GSEP.

In the program overview, 3 (three) points were highlighted; affiliation of GSEP students, transdisciplinary science and engineering (TSE) program which covers broad and flexible field due to unlimited to any specific science and engineering field, and degree earned by GSEP students after completion of course requirement in the program.

In the presentation of GSEP curriculum, it was explained that many of the core course are conducted through project-based learning and hands-on formats covering various fields of science and engineering. The students are able to take other elective course based on their own interests and goals. It offers students opportunity to design their own coursework with close consultation with faculty members. It was also explained that GSEP students on their 4th (fourth) year study would be asked to choose a laboratory among research laboratories of the department's faculty according to their intended field of specialization. They would undertake a research project in the laboratory of their chosen professor and that would serve as their thesis. The presentation on curriculum was followed by information on admission's process and schedule. The participants of the presentation were explained on the step-by-step of the admission to the program.

As the key factor in study abroad by students from developing countries, scholarship and financial support were also explained during the presentation of the program. There are 3 (three) scholarship opportunity for students of the program; Japanese government's (Ministry of Education, Culture, Sports, Science and Technology, MEXT, in Japanese referred to as *Monbukagakusho*) scholarship,

Japan Student Service Organization (JASSO) Scholarship, and other opportunity of financial support such as scholarship from private companies, tuition fee waiver, and so on. Each scholarship is briefly explained in the number of recipients, monthly stipend, and qualification and condition. Besides scholarships, accommodation was also briefly explained especially on the availability of student's dormitory.



(a)



(b)

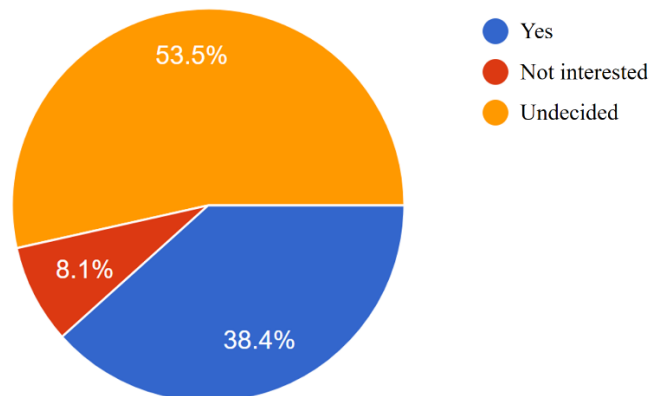
**Figure 1.** Some pictures during promotional presentations in the classroom

List of faculty and research laboratory under the program were also presented in order to provide a description on how broad and various disciplines the GSEP students could choose and covered by the program. In the last part of the presentation, online information of the program including its social media page were also provided for more detailed and interactive information.

### 3. Questionnaire survey results

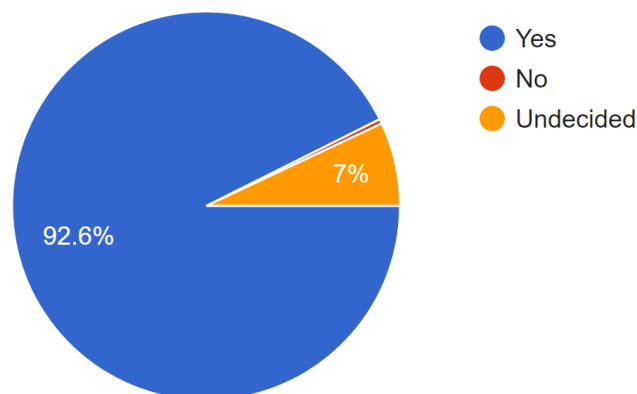
After the presentation, the participants were requested to fulfill a questionnaire sheet. The objective of the question was to observe their interest in applying GSEP in the following year and their opinion on the usefulness of promotional explanation on GSEP they had just received. From each school, 20 (twenty) fulfilled sheets were analyzed and the results are presented here.

Regarding the participants' interest, more than half of the 258 participants' – as the respondent – responses still showed “undecided” and “not interested” as shown in figure 2, while only 38.4% of the respondent were interested in applying for the next year's GSEP. However, it still needs further investigation whether “undecided” and “not interested” answers were due to the time frame of the question – next year – or due to the vapidness (less interesting) of GSEP. Another additional questionnaire should have been asked following this question in order to provide evident answer to these two answers. It is suggested to provide such a question in the future questionnaire survey following promotional presentations in the near future.



**Figure 2.** Respondents' answer to question “Are you interested in applying for next year's GSEP?”

Regarding the participants' opinion on the usefulness of promotional explanation on GSEP, most of the participants considered it as useful as shown in figure 3. In terms of timing and participant selection among students, the promotional presentation was said to be good for the third-year students since they were just about to start their third-year study on the beginning of August according to academic calendar in Indonesia. The promotional presentation somehow encouraged the students to study hard and more serious for their graduation and study abroad.



**Figure 3.** Respondents' perception on usefulness of the promotional explanation

During the Q&A sessions, several interesting facts were found. It was observed that the TSE major/course offered in GSEP seems to be difficult to be understood by the students. Most of them know only specific single-disciplinary major/course while the transdisciplinary major/course was a new major for them. For example, they were not sure about what type of job they could get in the future after graduating from the TSE major. Moreover, it was also informed by some teachers that several famous universities from Korea and Australia regularly invite Indonesian teachers to visit their

campus beside providing some pamphlets in their high schools every year to provide more detailed information on the bachelor program of the universities. This was considered as an effective promotional method to attract more attention from students in Indonesian high schools. In addition, it was mentioned that some of high schools had visited several Korean universities for study tours by invitation, and the teachers asked if their school could also obtain similar invitation to visit Tokyo Tech.

#### 4. Conclusion

Visiting high schools is suggested to be an important effort in order to attract high qualified high school's graduate to apply for GSEP. However, some other effort suggested by high school side are also worth a try for the next promotional activities. A further investigation on the questionnaire survey regarding the question "Are you interested in applying for next year's GSEP?" is needed to observe whether "undecided" and "not interested" answers were due to the time frame of the question – next year – or due to the vapidness (less interesting) of GSEP.

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