

Toward Research University

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1. INTRODUCTION

The history of Institut Teknologi Bandung goes back to the Dutch colonial period. In 1920 the Dutch Government established the first higher learning in engineering and science in Indonesia. It was named Bandung Technische Hoogeschool. During World War II, 1942-1945, it was renamed as Bandung Kogyo Daigaku and then transformed as Faculty of Engineering and Science as part of the Universitas Indonesia during the first decade after the independence war. In 1959, the government of Indonesia decided to establish and form a separate institute which focuses in science, technology and arts. Finally the institute was named as Institut Teknologi Bandung in March 1959.

As part of the institute, Mechanical Engineering Department was established in 1942. When it was part of Universitas Indonesia (1950's), the Lecturers and Professors were mainly foreign contract staff (Dutch, German, and American). Due to political policy in the 1960's they were replaced by Indonesian nationals educated mostly in Europe and USA. They were the first Indonesian lecturers and Professors in the Department, mostly with master degrees and few with doctorate degrees. Their dedication and pioneering work to establish an engineering department with very little guidance from senior staffs or Professors is well respected and admired up to now.

To strengthen the academic staff, the second generation of staff were sent abroad in the

1970's, and most returned with doctorate degrees. Expertise groups then were established mainly in four conventional mechanical-engineering fields: energy conversion, mechanical design and applied mechanics, production engineering and materials engineering.

In 1980's the development of the academic staff actually already reached its critical mass since more than 50% of the academic staff holds doctorate degrees. They were ready to transform the activities of the department from mainly teaching to research and industrial collaboration activities. In addition, the development of the third generation academic staff is also implemented. Homma (2006), who has experiences in the academic staff development for Western Indonesian Universities (HEDS-JICA project, 1987-2002) and now involve in the staff development for South-East Asia (ASEAN) countries (AUN/SEED-Net-JICA project, 2002-now), mentioned that the development period for the returning staff is a critical one (see Figure 1). The authors feel that this period needs a so called "after care program" which should be designed to enhance the expertise of the returning staff members as the basis for improvement of academic quality.

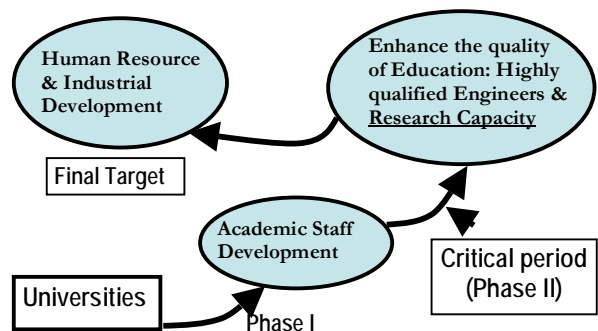


Figure 1 University Staff Development (based on Homma, 2006)

2. AT THE CRITICAL PERIOD

Our Department experience in the critical period is not a unique one, similar experiences also happened at other

Departments in Institut Teknologi Bandung, or in other Universities in Indonesia and probably also in other Universities in developing countries. As a University, Institut Teknologi Bandung follows the mission statement guidance from the state which is: 1. Contribution to higher education, 2. Contribution to research, and 3. Community Service. The ideal mission is consistently followed; however the real implementation is not an easy task.

In the education mission, we are fortunate to have high selectivity for freshmen in the bachelor program. "Beautiful values, attitude and mind" is consistently used as the philosophy in the selection of the freshmen. The institute gets mostly excellent students even though there is fierce competition from medical and right now from law and business schools. The impact of education mission is felt in the community and our graduates become professionals in various fields, managers, entrepreneurs, and government officials, leaders in the community as well as lecturers or Professors at various universities. In the research mission, however, we are not as fortunate. There are many obstacles in the implementation, for example a not-so-well organized research groups, limited research funds from the government as well from industry, limited qualified graduate students and limited time from the staff since some of them engage part of their time to industrial consultation or in the other government institutions. The graduate program which was started in the 1980's was mainly in the master level and few groups are doing the research or program in the doctoral, post doctoral as well as industrial research collaboration. As a consequence, little impact is felt as the results of this mission. The production of scientific publication, patent as well as industrial design is not yet a major concern for most of the academic staff members.

Beside internal factors, actually external factors also play a major role in the success of the research mission. The academic environment for research is also influenced by the political and economic condition of the country. Indonesia experienced 3 critical periods, namely in 1965 during "the Communist Rebellion", in 1977-78 during the

student protest of Suharto's regime and in 1998 during Asian economic crisis. Compare to the other universities which have excellent environment, well stated mission statement and research funding from government or community, qualified staff and graduate students the task to form a research university is not an easy one, however it is not an impossible mission.

3. THE WAY AHEAD

Since Institut Teknologi Bandung was declared as autonomous university at the end of 2000, a clear mission statement is reestablish namely for education, basic research as well as research collaboration with industries. 93 expertise groups (8-22 staffs) were formed with multi-chairs philosophy for flexibility to form smaller research groups in the future. Research areas were sought, for example alternative energy which is relevant for Mechanical Engineering, in order to focus in the areas which will produce high impact. In addition, appropriate and sufficient funding is also pursued for excellent and well organized research projects. However above requirements will not guarantee successful results if these 3 following factors (i.e., leadership, fighting spirit and good governance) do not exist to balance the limited available funding. In addition, the reform should be done carefully such as providing activities for other academic staff who are not involved in the research projects to avoid unnecessary social conflicts.

The long term objectives are to enhance the quality of the academic staff, their research capability and the quality of education both for undergraduate and graduate levels. The research and industrial exposure experiences should be used for improving the teaching materials. Problem based learning should be part of the curriculum in engineering education and therefore network to the community of practice should be well established. In the end, it will have some significant impact on both human resources and industrial development (see Figure 1). Referring to Boyer Commission on Educating Undergraduates in the Research University,

the authors warn that the negative experiences of the U.S Research Universities should be avoided. Boyer Commission mentioned that *“Ideally, the campus environment is enriched by interaction among faculty members in separate fields, with graduate students enlivened by their exploration of faculty roles, and with undergraduates, whose questions and fresh approaches may open new path of inquiry”*. However, the report also criticized that *“Unfortunately, research universities are often archipelagos of intellectual pursuit rather than connected and integrated communities”*. The report is a valuable lesson learned for developing Research University.

4. CLOSING REMARKS

The Mechanical Engineering Department now has 50 staff with 90% holding doctorate degrees. It has an external industrial advisory committee who helps with the industrial exposure program. It enhances the education program by adding entrepreneurship training and soft skill. It initiates the so called “open regeneration program” for future academic staffs as well as staffs for other institutions.

The department was chosen as the host institute for graduate program for ASEAN universities (AUN/SEED-Net - JICA project). Lastly, through this article we would like also to invite international collaboration for enhancing our research and education programs.

5. REFERENCES

1. Homma H., “Toward enhancement of education quality through academic staff development”, presented at AUN/SEED-Net Field Wise Seminar in Aero-Mechanical Engineering, Bangkok, June 2006.
2. The Boyer Commission Report, “Reinventing Undergraduate Education; A Blueprint for America’s Research University”

This article is dedicated to the late Prof Samudro who was the first Indonesian Professor in Mechanical Engineering and the senior Professors and academic staffs who already retired for their pioneering works to establish the Mechanical Engineering Department.