

# **Improving Relevance of Higher Education through Improvement of Curriculum; Case study in Food Technology Study Program, Bogor Agricultural University**

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## **Abstract**

To meet the challenge of industrialization era in Indonesia and the globalization of world economy, particularly those concerning the provision of competent employees who are able to take highly competitive national and international post of employment, it is indispensable to design an up to date compatible programs of higher education. The objective of this activity is to continuously evaluate and update the Food Technology Study Program (FTSP) curriculum so that it will meet the need in the job market. Simultaneously, the activity was also enhanced by the improvement of FTSP staff performance and competency.

Improvement of curriculum consist of evaluation of curriculum and course content involving technical assistants from governmental institutions, industries and universities to achieve curriculum more relevant to the job market. The activity will be supported by staff development program. The approach for FTSP curriculum revision was based on the two surveys data. The first survey figured the job distribution and variability of FTSP alumni. The second survey figured the competence of FTSP graduates according to the perception of FTSP alumni and users (food industries and other institutions). A comparative study with other similar study programs in other universities was also conducted. The success of the activity will be measured by a set of indicators. Main indicators to be measured are average GPA of the graduates, graduate average length of study, graduate-waiting time before getting their first job, TOEFL and GRE scores.

Some indicators, especially impact indicators, have shown improvement. The percentage of FTSP graduates with  $GPA \geq 3.0$  and the GPA average during the last five years have been increasing. Improvement was also indicated by a decrease in the percentage of graduates with  $GPA < 2.75$ . The average length of study of FTSP student as well as percentage of students with length of study  $\leq 48$  month have improved. Average length of study was 4.41 year. The average job waiting time has shortened significantly from 3.62 to 3.33 months. Of the 77.1% graduates obtained their first job within  $\leq 3$  months, 39.5 % was female graduates.

**Keywords :** Curriculum, Food Technology, Competency

## **Introduction**

To meet the challenge of industrialization era in Indonesia and the globalization of world economy, particularly those concerning the provision of competent employees who are able to take highly competitive national and international post of employment, it is indispensable to design an up to date compatible programs of higher education. The first objectives of Food Technology Study Program (FTSP) is to produce competent graduates who are competitive in global market, in the field of food science and technology, with good English proficiency, strong technical, managerial, communication and entrepreneurial skills.

To achieve the above objective FTSP setup the strategies, a system approach is used to take into account the input, process, and output as well as environmental aspects. The strategies are:

Continual quality improvement of the incoming students, continual staffs quality improvement, continual staff commitment improvement towards quality, establishing good communication system within the FTSP as well as with alumni and various institutions, implementation of good educational practices in class, laboratory, student supervision and other activities, establishing mutual partnership between FTSP and related institutions, private sectors in particular, to enrich the educational process, implementing “Food Industrial Teaching System” to expose students to the real industrial environment as well as to provide them with required knowledge and skills, improving access of staffs and students to various learning resources and facilities and establishing self-reliance study plan to satisfy client needs and interests.

The existing FTSP curriculum was developed in 1996 and is mostly focussed on technical skill; while courses containing managerial, entrepreneurial and computer as well as international communication skills are considered insufficient. To quickly respond to current development trends and issues in the field of food technology as well as to produce more competent and competitive FTSP graduates in international job market, FTSP curriculum has to be continually improved, both the composition of course and course contents. Likewise, in accordance with the improvement of curriculum the quality of staffs should also be improved. The objective of this activity is to improve the FTSP curriculum so that it is relevant with the need of job market.

### Mechanism and Design

To reach the above objectives, the FTSP will assign a team and invite overseas and domestic technical assistants to evaluate and improve the current curriculum. In addition, FTSP will also send several staffs to pursue their Ph.D. degrees to anticipate any curriculum improvement. The aforementioned team will be working on: (1) policy studies to identify the actual need of food industries for FTSP graduates in term of skills and its relationship to the current curriculum, and (2) Curriculum evaluation by involving external peer reviewers invited from competent institutions. The curriculum revision as well as course content modification should take into consideration inputs from industry, in particular in how to produce qualified FTSP graduates with good English proficiency, good leadership and communication skills, emotional maturity and good attitude. The line of thought in curriculum development is showed in Figure 1. The success of the activity will be measured by a set of indicators. Main indicators to be measured are average GPA of the graduates, graduate average length of study, graduate-waiting time before getting their first job, TOEFL and GRE scores.

### Discussion

Two surveys were carried out to figure the alumni profile as well as to identify the need of job market. The aim of the first survey was to describe the performance of FTSP alumni in the real world. Besides that, this survey identified also the strength and weaknesses of FTSP alumni. In this survey 150 alumni have been participated. The information dinged by the survey included FTSP alumni profiles, namely variability and distribution of FTSP graduates in job position, competitiveness, attitude, appropriateness in job place etc. Some indicators derived from collected data is summarized in Table 1.

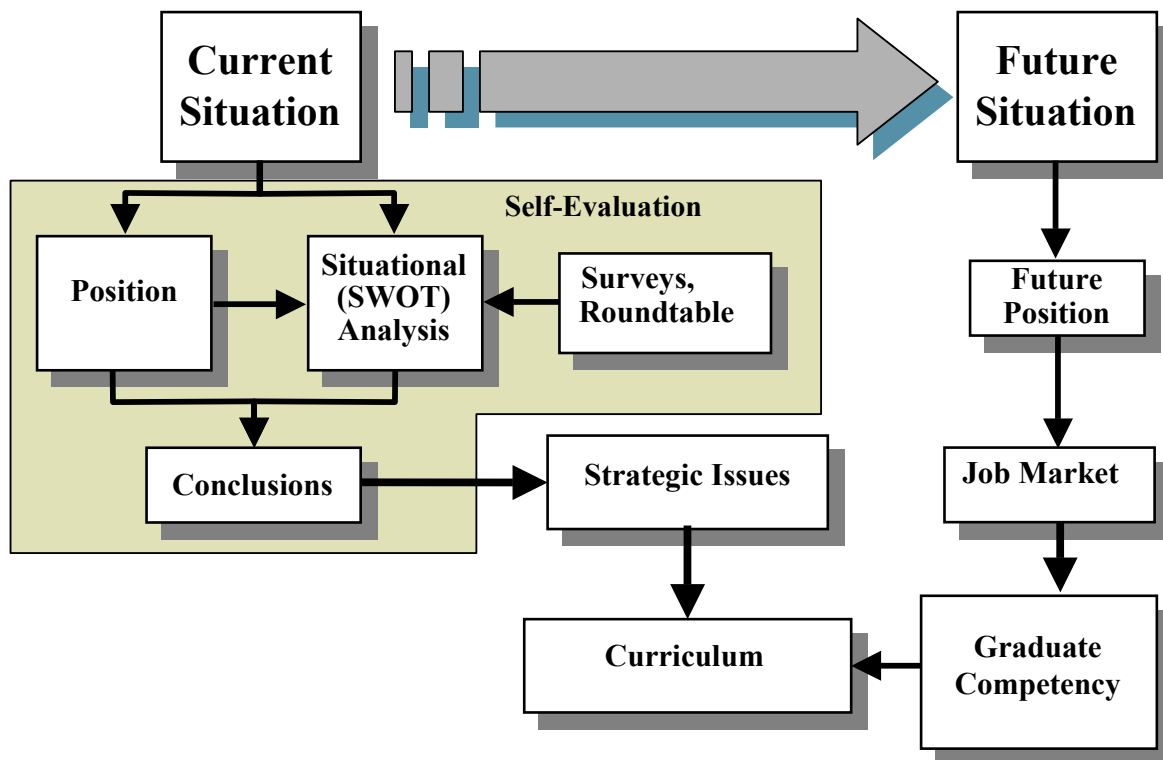


Figure 1. Line of thought in Improving Curriculum

Table 1. Some performance indicators of FTSP alumni

No.	Indicators	Percentage
<b>1.</b>	<b>First Job Place</b>	
	Private Sector	95.2 %
	Government Institution	3.4 %
	Non Governmental Organization	1.4 %
<b>2.</b>	<b>Type of private sector</b>	
	Multinational Corporation	30.6 %
	National Corporation	58.5 %
	Entrepreneurship	6.1 %
<b>3.</b>	<b>Type of Industry</b>	
	Food Industry (processing, service and supporting)	85 %
	Non-food industry	1.36 %
	Education	1.36 %
	Miscellaneous	7.48 %
<b>4.</b>	<b>Ways to obtain the first job</b>	
	Selection	81.0 %
	Recommendation, Family, etc	19.0 %
<b>5.</b>	<b>Average waiting time for the first job</b>	<b>3.3 month</b>

The second survey collect relevant input either from food industries, or government institutions. The information dinged by the survey included FTSP qualification required by food industries, input in how to improve relationship and communication between FTSP and alumni, proposed revision on FTSP curriculum, food industry database, available job opportunity for FTSP graduates, etc. These studies involved 45 food industries in Jakarta, Bogor, Tangerang and Bekasi (Jabotabek) including food manufacture, food service, food distribution and marketing.

Both survey recognized many important points to improve the graduate of FTSP. In response to these finding, the head of department formed a task force to review and recommend outcome-based guidelines as compared to minimum standard to inspire excellence in food technology education. The outcome as well as the graduate competency is shown in Table 2.

Table 2. Core competencies in Food Technology

Core Competency	By completion of the food technology program, the student should:
Food Chemistry and Analysis	Understand the chemistry underlying the properties and reaction of various food component.
	Have sufficient knowledge of food chemistry to control reaction in foods.
	Understand the major chemical reactions that limit shelf life of foods.
	Be able to use the laboratory techniques common to basic and applied food chemistry.
	Understand the principles behind analytical techniques associated with food.
	Be able to select the appropriate analytical technique when presented with a practical problem.
	Demonstrate practical proficiency in a food analysis laboratory.
Food safety and microbiology	Identify the important pathogens and spoilage microorganisms in foods and the conditions under which they will grow
	Identify the conditions under which the important pathogens are commonly inactivated, killed, or made harmless in foods.
	Utilize laboratory techniques to identify microorganisms in foods.
	Understand the principles involving food preservation via fermentation processes.
	Understand the role and significance of microbial inactivation, adaption, and environmental factors (i.e., $a_w$ , pH, temperature) on growth and response of microorganisms in various environments.
	Be able to identify the conditions including sanitation practices, under which the important pathogens and spoilage microorganisms are commonly inactivated, killed, or made harmless in foods
Food processing and engineering	Understand the source and variability of raw food material and their impact on food processing operations
	Know the spoilage and deterioration mechanisms in foods and methods to control deterioration and spoilage.
	Understand the principles that make a food product safe for consumption.
	Understand the transport processes and unit operations in food processing as demonstrated both conceptually and practical laboratory settings.

	Be able to use the mass and energy balances for a given food process.
	Understand the unit operations required to produce a given food product.
	Understand the principles and current practices of processing techniques and the effects of processing parameters on product quality.
	Understand the properties and uses of various packaging materials.
	Understand the basic principles and practices of cleaning and sanitation in food processing operations.
	Understand the requirements of water utilization and waste management in food and food processing.
Applied food science	Be able apply and incorporate the principles of food science in practical, real-world situations and problems.
	Know how to use computers to solve food science problems.
	Be able to apply statistical principles to food science applications.
	Be able to apply the principles of food science to control and assure the quality of food products.
	Understand the basic principles of sensory analysis.
	Be aware of current topics of importance to the food industry.
	Understand government regulations required for the manufacture and sale of food products.
Success skill	Demonstrate the use of oral and written communication skills. This includes such skill as writing technical reports, letters, and memos; communicating technical information to a nontechnical audience; and making formal and informal presentations.
	Define a problem, identify potential causes and possible solutions, and make thoughtful recommendations.
	Apply critical-thinking skills to new situations.
	Commit to the highest standards of professional integrity and ethical values.
	Work and/or interact with individuals from diverse cultures.
	Explain the skills necessary to continually educate oneself.
	Work effectively with others.
	Provide leadership in a variety of situations.
	Deal with individual and/or group conflict.
	Independently research scientific and nonscientific information.
	Competently use library resources.
	Manage time effectively.
	Facilitate group projects.
	Handle multiple tasks and pressures.

The above recommendation is elaborated further to develop the FTSP curriculum as a long term solution and the modification of course content as a short term solution. The workshop on curriculum recommended that the FTSP curriculum comprise of three groups i.e. (1) General Courses which includes *Basic Sciences, Ethical, Humanities and Social* comprise of three groups i.e. (1) General Courses which includes *Basic Sciences, Ethical, Humanities and Social Sciences*,

and *Communication and Computer Skills*; (2) *General Food Science and Technology Courses*; and (3) *Option Courses*, which includes *Food, Nutrition and Health*, *Food Science*, *Food Manufacturing*, *Food Business & Management*, and *Post-harvest Technology*.

The success of the improving relevance of higher education can be measured by a set of indicators. Main indicators to be measured are average GPA of the graduates, graduate average length of study, graduate-waiting time before getting their first job, TOEFL and GRE scores. We realized that the above indicators are aggregate indicators. They will be influenced not only by improving curriculum, but also by another improving activity, e.g. improving academic atmosphere, efficiency and productivity etc.

Some indicators, especially impact indicators, have shown improvement. The percentage of FTSP graduates with GPA  $\geq 3.0$  and the GPA average during the last five years have been increasing. Improvement was also indicated by a decrease in the percentage of graduates with GPA  $< 2.75$ . The average length of study of FTSP student as well as percentage of students with length of study  $\leq 48$  month have improved. Average length of study was 4.41 year. The average job waiting time has shortened significantly from 3.62 to 3.33 months. Of the 77.1% graduates obtained their first job within  $\leq 3$  months, 39.5 % was female graduates.

Besides that, improving curriculum activities gave also significant impact to improve academic atmosphere in the department. The impacts have been identified as follows:

1. More awareness of the staff on the importance of entrepreneurship
2. More awareness on improvement of efficiency in teaching and learning process.
3. More awareness on the importance of industrial exposure in improving entrepreneurial skill.
4. Closer relationship between FTSP and alumni and other stakeholders
5. Awareness of the FTSP staff to implement a new curriculum.

## Conclusion

The outcome-based curriculum is apparently more powerful to respond need of job market. The curriculum should be enriched with results of policy study, technical assistant report and roundtable meeting involving all stakeholders. Once learning outcomes are developed for both the overall program and individual courses, the success of teaching and learning of activity must be evaluated according to these outcomes.

## References

- Ashcroft, K. 1995. *The Lecturer's Guide to Quality and Standards in Colleges and Universities*. The Falmer Press, London
- Ashworth, A., and R. Harvey. 1994. *Assessing Quality in Further and Higher Education*. Jessica Kingsley Pub., London
- Cave, M.C., S. Hanney, M. Henkel and M. Kogan. 1997. *The Use of Performance Indicators in Higher Education*. Jessica Kingsley Pub., London
- Hartel, R.W. 2001. IFT Revises its Education Standards. *Food Technology* 55:10;53-59