Engineering International Conference "UNNES Conservation" 2013 Proceeding
p- ISBN: 979-25-2783
January 08, 2013, Semarang, Indonesia

The Pattern of Cooperation "Teaching Factory"

Nur Rohman Arif
(Author)
(nr.arif.mt@gmail.com)

Abstract*—Globalization has led to the importance of the relationship or cooperation between educational institutions and industry partners. The development of industry in the global era is so rapidly evolving, but the development of the education it moves slowly and tend to be constant. This is certainly a serious problem when vocational institutions are not able to provide education and knowledge in accordance with the conditions of the existing industrial development, because it will be impacted on the difficulty to absorb the graduates of vocational education institutions in the industry due to a highly educated workforce that is ready to wear very rare. Therefore, it needs for mutual cooperation pattern between educational institutions and industry partners in accordance with their vocational taught. The right cooperation Patterns to be applied according to the author is to implement the concept of cooperation "teaching factory" in which implies cooperation between Universities, vocational schools, and industry. In this concept, the author wants the process of cooperation in the form of coaching and training for college students is conducted since the beginning of college until graduate. In which there are concepted coaching patterns and training as well as the programs and ongoing research tailored to the issues facing the industry. In this case, it is expected will be resulted the optimal learning, where students can really learn-by-doing, and industry partners concerned may use the results of research carried out and to make college graduates as labor for the concerned industry.*

Keywords —*Cooperation, Education, Industry, Mutual, Teaching Factory*

I. INTRODUCTION

Reviewing the background of holding this conference which revealed that in the era of globalization has led to the importance of the relationship or cooperation between educational institutions and industry partners, author as the executant of education activities agreed with the conditions presented. Because as long as author carry out learning activities in a formal educational institution, author feel that there should be real participation between educational institutions with industry partners. Because we all know that the development of the industry in the global era is so rapidly evolving. However, the condition that author feel in the world of education is precisely to move slowly and tend to constant development. It can be seen that the curriculum and the methods employed by the school or even high school is still not able to compensate for the developments in the industry. This is clearly a problem for us with the institution when lagged by the rapid development of the company, as it will have an impact on the difficulty to absorb graduates from vocational institutions in the industry as a highly educated workforce that is ready to use very rarely. Thus the author felt the need for improved education system that has been implemented in our education. Because as long as author learn, author just feel fed by science without author knowing the reason why author had to learn. And it happened, because we never understand the purpose of our study.

The exact pattern of cooperation to be implemented according to the authors is to apply the cooperation concept of "teaching factory" at the University that means cooperation between the University and industry, which had previously been developed in vocational high schools in their learning system. And in this concept, the author would like the process of cooperation is in the form of coaching and training for beginning college students do to pass. Where there are the concepted patterns that are coaching, training and research programs ongoing and tailored to the issues facing the industry.

Because education is to encourage the development of human resources who are experts and knowledgeable and has access not only to the national economy but also the global economy. This is because education, especially secondary education could encourage the development of formal thinking skills, encourages abstract problem-solving skills and critical thinking, and equip learners with the charge relevant to the world of work. [1]

II. THE STATE EMPLOYMENT FEBRUARY 2012

II.1. Unemployment rate (TPT) in Indonesia in February 2012 reached 6.32 percent, lower than in August 2011 amounted to 6.56 TPT percent and TPT February 2011 at 6.80 percent.

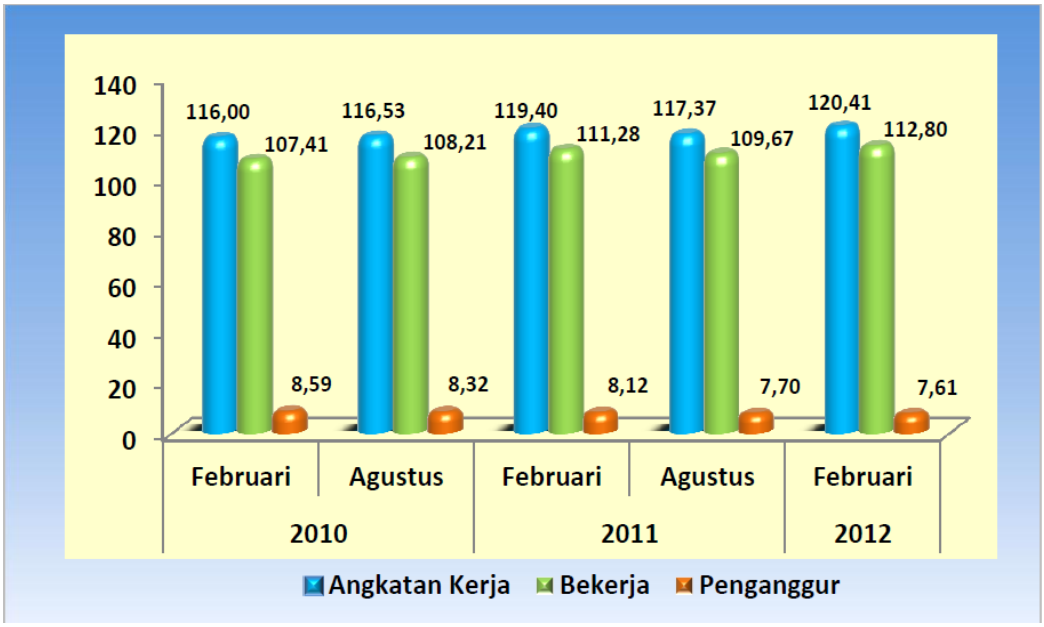

Fig. 1. Total Labor Force, the Working Population and Unemployment 2010-2012 (million people)
Source : Central Bureau of Statistics

II.2. The number of people working in Indonesia in February 2012 reached 112.8 million, an increase of approximately 3.1 million people compared to the state in August 2011 amounted to 109.7 million people, an increase of 1.5 million people compared to the state in February 2011.

II.3. Total labor force in Indonesia in February 2012 reached 120.4 million, an increase of approximately 3.0 million people compared to the labor force in August 2011 amounted to 117.4 million people, an increase of 1.0 million people compared with February 2011.

II.4. During the last year (February 2011-February 2012), the working population has increased especially in the trade sector about 780 thousand people (3.36 percent), and the Financial Sector for 720 thousand people (34.95 percent). While the sector is the sector that declined Agriculture 1.3 million (3.01 percent) and the Transport Sector, Warehousing, and Communications 380 thousand people (6.81 percent).

II.5. Based on the number of hours worked in February 2012, amounting to 77.2 million people (68.48 percent) worked 35 hours or more per week, while workers with the number of hours working less than 15 per week reached 6.9 million (6.08 percent).

II.6. In February 2012, workers at the elementary education level and below remained dominate in the amount of 55.5 million people (49.21 percent), while workers education diploma with about 3.1 million people (2.77 percent) and workers university education amounted to only 7.2 million people (6.43 percent). [2]

World Economic Forum competitiveness report ranked countries in the world in a report titled Global Competitiveness Report (GCR). In 2005, Indonesia ranks 72nd out of 102 countries (WEF, 2004: xiv). In the GCR report 2008/2009 Indonesia was ranked the 55th out of 131 countries (WEF, 2008:10). The assessment shows that the competitiveness of Indonesia is still low is a fact that needs to be fixed. Low competitiveness is the result of domestic climate less conducive, which boils down to the quality of the weak because of poor human resource. [3]

It means that the existing workforce can not be optimally absorbed by the industry and other business sectors, which causes the main factor is the quality of Indonesian human resources is still low.

III. TEACHING FACTORY

In a simple concept, Teaching factory is the development of unit production and the dual system of education that has been implemented at SMK - SMK. Teaching factory concept is one form of the development of the school vocational school to be a model of production. This is consistent with the statement that delivered by Triatmoko (2009: 35) that SMK is still difficult to implement education-based production (production-based education and training) as held at ATMI (Academy of Mechanical Engineering Indonesia). Therefore raised term teaching factory that requires SMK to implement to have a unit or units of production as a place for learning

students. In business or production unit, students directly perform practices to produce goods or services that can be sold to consumers. Implementation of teaching factory for learning by establishing business units or production in the school opposite the learning process going on in Germany.

According Moerwismadhi (2009), vocational school students practice activities in Germany done in a factory or a company, while the government teaching theoretical material in the school for one to two days per week. Thus, teaching factory is a learning activity in which students direct production activities in the form of goods or services in the environmental education. Goods or services produced quality so it's worth selling and accepted by the public or consumers.

Teaching factory as one of the learning strategy has several purpose. In a paper published in the American Society for Engineering Education Annual Conference and Exposition, Alptekin, et al (2001: 1) states that the goal is teaching factory: produce professional graduates in field, developing a curriculum that focused on modern concepts, demonstrate appropriate solutions to the challenges facing the industry, and technology transfer from industry to partner with students and institutions education. While teaching factory development at Penn State Univesity, The University of Puerto Rico-Mayagues, The University of Washington, and Sandia Natinal Labs aims to provide real experience in the design, manufacture, and realization of the products designed and developed a curriculum that have a balance between theoretical knowledge and analysis with manufacturing, design, business, and professional skills (Jorgensen, et al. 2995: 2).

While the vocational development roadmap 2010-2014 (Directorate PSMK: 2009), teaching factory was used as a model for empower SMK to create entrepreneurial graduates and competence skills through the development of cooperation with industry and relevant business entities. Besides teaching factory aims to improve the quality of learning through the vehicle to learn while doing (learning by doing). Learning with this approach, will foster entrepreneurial spirit for students.

Besides aiming to improve the competence of vocational students graduate, goods or services resulting from the activities of teaching factory also must be accepted by public or consumers. Products or services that are produced must meet criteria worth selling that can generate added value for school (Directorate PSMK, 2008). The advantage gained is used to add source of income to finance activities in vocational learning. [4]

From several studies on the above theory, it can be concluded that the teaching factory has several objectives:

III.1. Improving vocational competency,
III.2. Improving mental entepreneurship vocational graduates,
III.3. Products in the form of goods or services that have a value-added,
III.4. Improving school revenue sources,
III.5. Increasing cooperation with industry or business entities that are relevant.

IV. COOPERATION CONCEPT OF "TEACHING FACTORY"

The concept of organizing educational partnerships between universities and industry in Indonesia is close to the model-fit connection (link and match) that was initiated by Wardiman Djojonegoro (1990). The concept is not new, especially in Germany and the United States. In Indonesia, this concept was adopted into the concept of "teaching factory" that contain the meaning of co-operation between universities, vocational schools, and industry.

The concept of educational partnerships between universities and industry has the following characteristics.

IV.1. First, higher education institutions into centers of excellence (center of excellence). Institute organizers include one unit of institution of higher learning that has training centers of excellence (training center) are spread in several places. The concept was initiated by Bockelmann (2001). The spread of centers of excellence on the consideration that the potential labor market instead of being in one place, but in some places. Center of excellence is a training center that utilizes high technology. Have adopted high-tech technology to make the students to practice and get used to doing the production process that utilizes a high degree of accuracy. The providers should weigh the benefits of the training services provided. For that the providers should consider that:
  IV.1.1. Training is conducted in accordance with the relevant demand and competence,
  IV.1.2. Improve the quality of labor and self-employment,
  IV.1.3. Provides scholarships to underprivileged students,
  IV.1.4. Provides investment and operating costs for classrooms, office space and furniture.

IV.2. Second, the areas of cooperation should be specific. Gert W. Thoma (2000) says that the providers have formed a partnership with the industry (manufacturers) in the form of a pilot project, in which the providers (universities) and industry :

IV.2.1. to assess the product quality, product diversification, improvement of the production process and even support in marketing . Students will be involved in this process,

IV.2.2. perform sub-contracts with industry to make the process of production,

IV.2.3. applied research and development involving students. Therefore, the areas of cooperation between universities organizers and partner institutions (foreign universities) should be specific, such as the field of mechatronics, automobile engines, electronics, or furniture.

IV.3. Third, the international standard certification. Graduates of higher education for qualified undergraduate students are certified to internationally recognized standards and the needs of industry. Meyer (2000) says that it is necessary for the training of students with a minimum standard of education such as:

IV.3.1. organizational management capabilities, communications, and marketing, and

IV.3.2. ISO certified training (such as ISO 9000, 9001, 9002, and 14000),

IV.3.3. to force the government to release the organizers of the domestic institutions of the several requirements that restrict the scope of internal financial management.

IV.4. Fourth, the parties involved in the partnership should develop a business plan (bussiness plan). Status of the cooperation of all parties should have clear and deed made cooperation agreements. College will act as an institution builder. Meanwhile, the organization built the industry that is an arm of the needs of the industry will act as a training role is to conduct training of the production process. With the business plan of the college are invited to think more about the reality of their work plan to be to Be well (Andreas Koenig, 2000).

IV.5. Fifth, to facilitate entrepreneurship. Forms of skills provided by the organizers need to consider the needs of small-medium industries. [5]

V. ANALYSIS AND RECOMMENDATIONS

According to the author, the manufacturing industry is still potential to provide vast employment opportunities, but highly educated labor force available in the job market is still relatively rare. Although the prospect of job opportunities for graduates of higher education tends to increase employment than graduates is lower, but the prospect is not fully considered the opportunity "business" for a number of higher education institutions. This is evidenced by the college that still prioritizes diplomas and degrees than providing quality assurance "definitely working".

The analysis that follows is the fact the number of unemployed graduates of higher education was still high. If there is any job opportunities for highly educated labor force, then the reward is very limited. This suggests that their competence gaps as compared to the existing employment opportunities. As a result, education Upper Secondary School (SLTA) General and Vocational high school preferred by the world of work than high school graduates. This is a challenge for the world of higher education.

In this regard, the author recommends the need to invite even "force" the world's universities to conduct educational partnerships with industry / company. In which cooperation should be in the form of coaching and ongoing training and given to students start college until graduation. Due to the "forced" to cooperate education, college organizers will learn a few things, including:

V.1. First, the college will improve the management of their education in order to go-industrial society and even go-international management to make them better, in terms of academic management, student education, and community service. Thus, the college will be more effective conduct of the educational process is useful.

V.2. Second, educational partnerships between universities and industry will make college more independent. What is provided college would find temunya point with the needs of industry / company. Universities will be free to develop research and education, while the industry will benefit from the need for the college in the form of research and the provision of qualified workforce.

V.3. And third, the concept of Tri Darma universities, education, research and community service can run just the same money at a time when educational partnerships between universities and industry / company can be realized effectively. Cooperation in education must be within three area.

VI. CONCLUSION

This article teaches us that, first, education is the most important vehicle to enhance human capacity development, and it is also the best way to resolve the issue of development. Second, the educational cooperation between higher education and industry / company is one of the best ways to increase human capacity. Third, a superior nation characterized by the presence of industrial / multinationals that have global competitiveness. Therefore, the educational cooperation between higher education and industry / company is best intended for printing workforce that can fill the needs of the industry / company.

REFERENCES

[1] Keith Lewin and Françoise Caillods, *Financing The Development of Secondary Education in Developing Countries, Journal "Prospects" volume XXXI, no. 1*, March 2001 (UNESCO: Paris).
[2] BPS, *Laporan Bulanan Data Sosial Ekonomi* (Badan Pusat Statistik, Jakarta: 2012).
[3] Randy Wrihatnolo, *Kerjasama Pendidikan Antara Perguruan Tinggi dan Industri, http://www.bappenas.go.id/blog/?p=90*, December 2010 (Bappenas Blog), accessed at December 29, 2012.
[4] Ibnu Siswanto, *Pelaksanaan Teaching Factory untuk Meningkatkan Kompetensi dan Jiwa Kewirausahaan Siswa Sekolah Menengah Kejuruan*, downloaded at *http://staff.uny.ac.id* December 30, 2012.
[5] Randy Wrihatnolo, *Kerjasama Pendidikan Antara Perguruan Tinggi dan Industri, http://www.bappenas.go.id/blog/?p=90*, December 2010 (Bappenas Blog), accessed at December 29, 2012.