Making Apprenticeship Program Meaningful
to Polytechnic Education

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Abstract

Apprenticeship program for Polytechnic students plays an important role and is an important event for polytechnic education in the short and long term missions. In the short mission, it is one strategic of vocational education delivery which can be used for improving technical competencies as well as others competencies needed in the workplace. This program can be used to eliminate the gap between education and work. In the long mission, it can be strengthened collaboration between polytechnic and industries to contribute in applied technology and economic development through the applied researches. Unfortunately most of polytechnics didn't yet delivered this program seriously. So that the result of this program couldn't be influent significantly for individual, as well as institution. The result of literature and documents analysis shows that there is an opportunity to make this program more meaningful than before by using appropriate strategic planning at micro, macro and mega levels. This paper provide other meaning and understanding of apprenticeship program that can be used to design strategic planning more effectively. The effectiveness of this program is measured by the contribution-based of the mission objectives achievement.

Keywords: apprenticeship, competencies, relevannce, strategic planning, effective

1. Introduction

Polytechnic is a higher vocational education and training that have an important role and function in the applied technology and economic development. It's activities are based on the three pilars that said *Tri Dharma Perguruan Tinggi*. These three main activities are education, research and society service activities[20]. It differentiate between polytechnic and vocational education in the secondary level (SMK).

In the other countries such as Germany, USA, Korea, China, Singapore, etc, the same kind of education give their contribution to the inovative technology productions and economic significantly[9];[1];[2].Indonesia have more than 170 polytechnicswith more than 900 study could be drive the economic development.

Vice President, Boediono said, that the Indonesian economic grouwth was not caused from innovatives products but from natural resources. (Kompas, 9 Mei 2012: 1). It is very susceptible for long time, because it will generate dependence to the developed countries as we see since the last decade.

The lack of sinergy between polytechnic and industries, provide the innovatif product of research that just terminated at the contest events.

2. Apprenticeship Training

Apprenticeship training is a system in which an employee is given instruction and experience, both on and off the job, in of the practical and theoritical aspects of the work required in a skilled on occupation, craft, or trade[21].

Apprenticeship is an education based in the workplace, using basic skills and competencies to do real work, solves real problems [24].

These two definitions show that apprenticeship is an education or training for either employee or students, in order to improve their understanding of knowledge, skills and competencies needed in the real world of work and give a value-added for industry by advancing problem solving skills day to day.

2.1 High skills and work experiences

As a long history of vocational education development, it does always related with work force preparation. The industries and enterprises need the trained and an experienced workers. It does mean that completers of vocational education should have work experiences to get a job. Should all prepared by the education? In the condition of fast changing in technology, economic, and the limited fasilities, it's impossible do so. Vocational education needs participation and collaboration of industries as a partner of work.

The learning outcomes are consist of three levels: knowledge as the lowest level, skills, and competence as the highest level of achievement [22]. Knowledge and skills can be trained and

achieved in the campus through the laboratorium and workshop activities. The competence level should be achieved through work experiences in the real situation of work. Work experiences itselves can be achieved through two systems: (1) simulation system; and (2) apprenticeship [7]. Simulation system needs workshop that equipped by facilities that are the same as the industry's facilities. It's not effective and too expensive to be realized in the developing country like Indonesia and in the difficult economic situation. Therefore, the apprenticeship plays an important role in the skills improvement and competence achievement.

Simulation system and apprenticeship both need an initiated training in laboratoriun scale. Therefore the laboratorium and workshop activities must be increased into a basic skills training are needed in the initial work. The initial work is an important vocational education outcome.

2.2 Weak-collaboration provide minimal contribution

The objective of apprenticeship program for polytechnic students were generaly in order to open up them a view of work situation (data survay, 2009-2012). The result of this program didn't improve skills and educational process significantly neither value-added for an industry. In another word, the polytechnic as a higher education didn't yet delivered Tri Dharma in an optimal.

The observation in the fileds identified, there were several problems why this program didn't yet in an optimal: (1) therewasn't strong collaboration between polytechnic and industries; (2) the apprenticeship program wasn't organized by institution but individual; (3) there wasn't competencies's assessment before and after doing the program; (4) there wasn't recognition and reinforcement; (5) the program delivered without strategic planning.

Apprenticeship trainings should be have a meaning in order to have a wide impact to the society. Every training program will have meaningful if: (1) the training result is recognized and praised; (2) setting standards and measuring student performance will encourage students to exceed the standards requirements; (3) use practice methode for perfect result in the learning process [21]. This opinion is concerned with the process and outcomes of learning at the micro level. The different people have different rate of learning. Therefore the program must be planned as flexible as possible. At the makro level, the result of apprenticeship should provide value-added not just for individual or small group, but also for the organization (polytechnic and industry). It's possible to cary out a joint research to create an innovative product. At the mega level, both polytechnic and industry can contribute in developing applied technology and economic.

2.3 Strategic planning for implementing Tri Dharma PT

Educators and education institutions want to do better, but how to define and to do it. Some of institution were developed their curriculum by adding subjects and or adding the time, so that the load of students and teacher more and more day to day, but it have not significant impact in society or community.

The strategic planning has attracted serious attention and have to be added with the focus on societal good at three levels: mega, macro and micro [11]. A system approach with proactive's strategic which is focused on the future will be used in planning this program. This mean, if any changing in one element of this system, it will influence the other elements. This model will be applied in order to be match with the Tri Dharma Perguruan Tinggi function.

The planning starts from the ideal vision at each levels with the new philosophy at the organization level, which provides the continuing and developing basis for results at the macro-and-micro levels, and provides substantion to process and inputs. The vision is a clear perspective about who you are and what aim to be doing in the future. A clear vision is a strong driver [23]. It's a personal vision. This definition can be expanded to hingher levels (makro, mega). The three levels of planning is described in Figure 1.

Education change requires systematic, systemic, and formal planning approach [11]. It is an approach at a system scale. This scope can be narrowed to program scale.
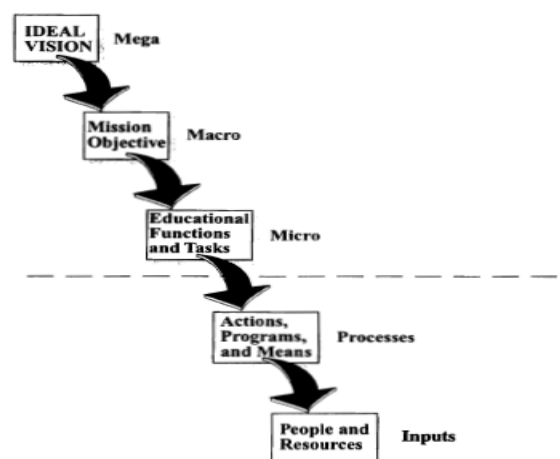

Figure 1. The Three Levels of Planning (Mega, Macro, Micro) and Their Relation to Inputs and Processes (copy Kaufman, Herman, & Watters, 2002 from Kaufman, 1995)

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The planning is based-on new philosophy which provides new paradigm. The program planning reform is listed in Tabel 1. This tabel contain the critical element of progam that should be reformed and managed. Figure 2 describes the planning management of this reformation.

Table 1. The Program Planning Reform

| Element	Before	Next
Philosophy	• Supply-driven	• Demand-driven
Vision	• Individual/small group achievement	• Individual/small group contribution • Organization contribution
Concept	• Closed, rigid	• Open, flexible
Objectives	• To give students' work outlook	• To give value-added at micro, macro, mega, level
Curriculum of apprenticeship	• unplanned	• strategic planning, outside-in
Result of training	• ???	• Recognized competence (micro level) • The strength of networking and collaboration between polytechnic and industry • Narrowing the gap between education-work • More contribution in applied technology and economic development
Evaluation	• No standard qualification	• Based-on National competence qualification framework (KKNI) • The achievment is based-on the agreement of competence's level could be achieved.
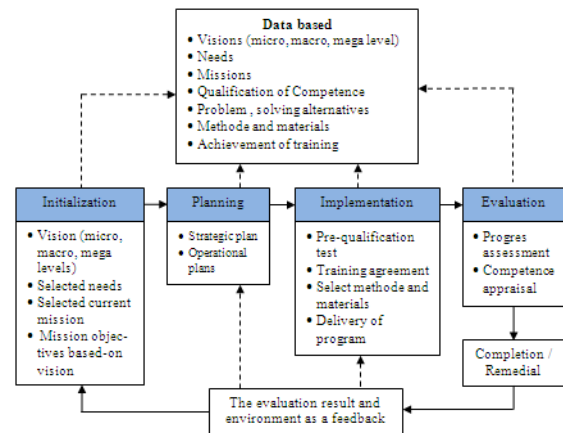
Figure 2. The Management of Strategic Planning of Apprenticeship Program

2.4 Organizational work

There are several reasons for organizing work: (1) to establish lines of authority; (2) to improves efficiency and quality by establising synergy; (3) to improve communication. The organization structure can be established at the polytechnic's level (makro level) and or mega level that is invloved another organizations, such as other polytechnics and industries. At the micro level, the structure of organization can be established by each polytechnic or department level.

The internal organization structure is described in Figure 3. It's related to external organization which is influence the performance of internal organization. The dashes lines show the coordinate lines. Government controls the quality of educations and determines the education's policies. There is a National Board (BNSP) that has an authority to issue the competence sertification.
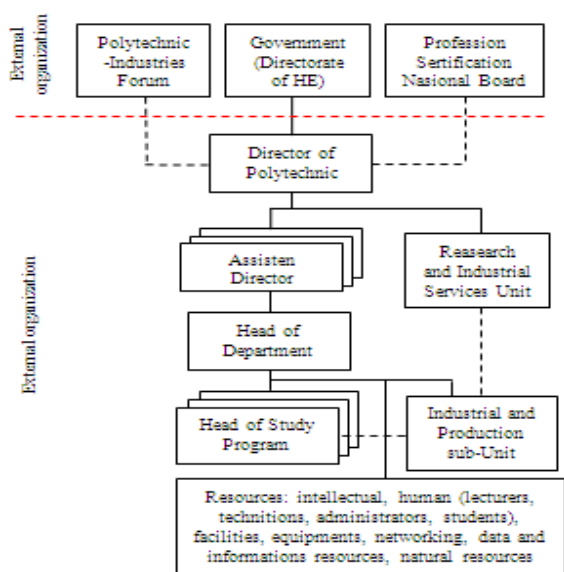

Figure 3. The Internal Organization (Organizational or Macro level)

The apprenticeship have to be managed by an unit at organization level which covers all activities

related to the delivery of apprenticeship program included industrial information services, research & development. This unit has sub-units at the lower level or operational level which covers activities in the field, for example prototype development, the production quality control, etc.

The contribution of apprenticeship to society have to be organized and managed in order to become more efficient and effective. This organization structure involve several polytechnics and industries which establish a consortium. This consortium may as an informal organization which coordinate by one of members, and it plays the role of "think tank". Their sinergy create an innovative product of applied technology that contribute to economic development. The informal structure of organization is described in Figure 4. Representatives of polytechnics and industries meet periodically to discussed about new idea, new concept of product, solving the problems, etc.
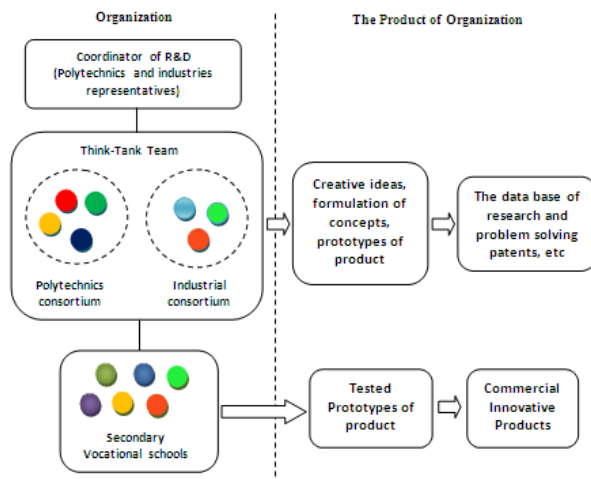

Figure 4. The Mega Organization of Apprenticeship

This organization is coordinated by one of organization's member. All idea, concepts, problems and alternative solution, the result of research included patents are stored in the data base. The secondary vocational schools play as the partner of work in the production field. The propered research products can be developed as new products in the industry which sponsored this research.

2.5 Implementation

Strategic planning and quality management are two useful process when applied consistenly and correctly [11]. Strategic planning identifies and defining criteria where to head. Quality management provides power for change and continuous improvement. They have to be

synergetic in order to become an efficient and effectiveprogram. The process management of apprenticeship of program at three levels is described in Figure 5.
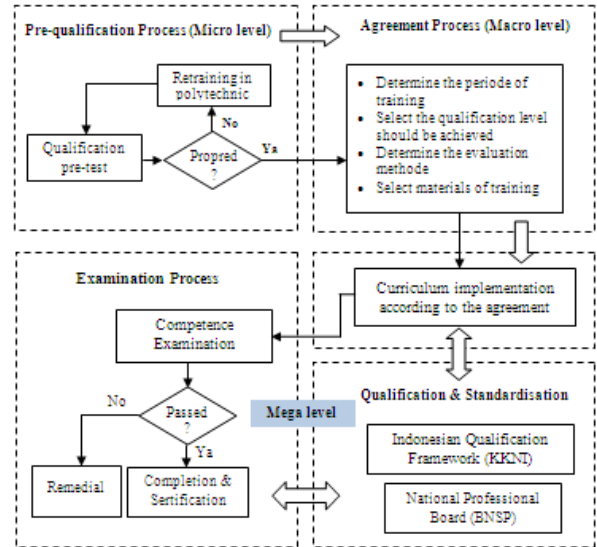

Figure 5. The Process Management of Apprenticeship Program

At mega level, implementation of apprenticeship program involve the other organization such as National Professional Sertification Board (BNSP) and National Education Standar Board (BSNP). They are semiformal organization. Implementation at makro level (organizational level) involves internal organization or consortium polytechnic-industri. At micro level, the management process of program delivery involves individual or small group of students.

The training curriculum design must be integrated with the assessment task and learning methode [8]. It will be focused on student learning and therefore must be designed by considering three related components learning and teaching:

a. What learning outcomes will they achieve?
b. What teaching method we will use to support students to achieve these learning outcomes?
c. What assessment task and criteria we will use to show that students have achieved these learning outcomes.

According to these assumptions, the curriculum of apprenticeship have to be planned by considering these components learning at each three levels of mission objectives.
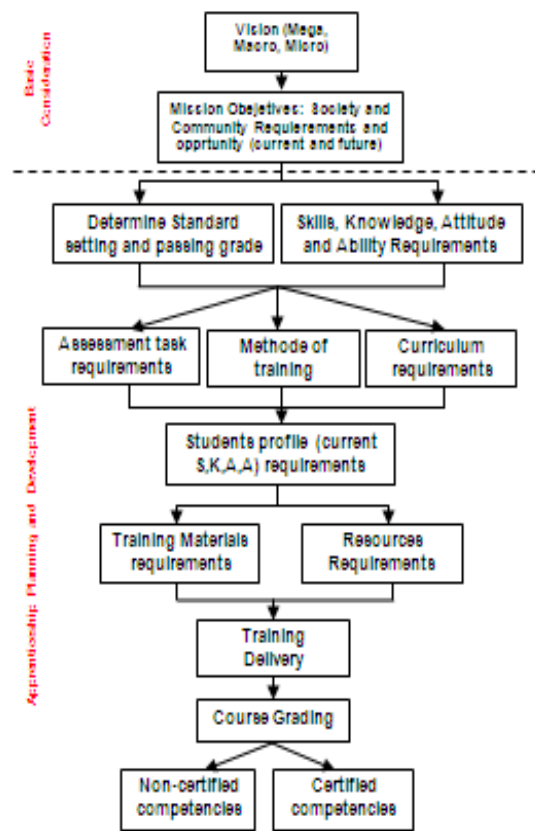
Figure 6. The Framework of Apprenticship
Curriculum Development

2.6 Assessment, Evaluation and Recognition

There are two elements of assessing student learning which are considered to assessment method: assessment design to influence student's learning and feedback to improve student's learning. Assessment design is assessment to influence learning. Assessment as feedback is focused on practices to improve student learning [8]. Based on these principals, the assessment in higher education is more focused on supporting the student learning than the rate of absorbtion the learning materials. This supoort is realized in the feedback form.

The assessment methodes that appropriate to appraise the progress of student's competences are: (1) easy test: it is to test the students abilities to construct coherent and reason arguments; (2) performance assessment or observation: to test the skills and competences of students; (3) certification test: to recognize the training result.

Recognition is one of values that make an apprenticeship has a meaning. Certification

purposes to enabling the public (including employers) and education providers to know that individual has attained an appropriate level of achievment that reflects the academic standard set by awarding institution and agreed the KKNI norm. This may include demonstrating fitness to practice or meeting other professional requirements. D3 completers should be fit to 5th level of KKNI, and D4 completers should be fit to 6th level of KKNI norm.

Assessment as feedback could be used to improve students performance. In the case of apprenticeship, it is unfair if the assessment only performed once at the end of the program. Students haven't opportunity to improve their performance. Step by step competence test will be used to assess the progress of competence achievement. The performance test will be used to assess the result of apprenticeship training. Performance test is based on a national qualification standard (KKNI). Standardizatation provide a mark or grade that enables a student's performance to be established. The key principle is to design assessment before designing the content to ensure that both students and lecturers are informed about how they are in progressing. It according to the suggestion of Ramsden (2003) and Birenbaum et.al (2005) [8]. This principle will be used to select and determine the content of training during apprenticeship. The progress of skills or competence achievement must be monitored and observed by advisers and lecturers who are responsible to this program.

At macro and mega levels, the fitness of program with the demands must be evaluated periodicly by an external board.

3. Conclusion

According to the analysis as describe above, it can be concluded that:
- Apprenticeship program could be understood more than just open up the view of students.
- It have opportunities to develop a collaborative program with secondary vocational schools and other institutions that can give more contribution to the applied technology and economic development.
- Apprenticeship program should be strategically planned in order to more efficiently and effectively.
- The program is more effective and efficient if it met with the KKNI standard's level and can contribute more heavily on technology and economic development.
- At the operational level, the curriculum of apprenticeship should be developed by considering three related components: (1) learning outcomes which students have to be

achieved; (2) the appropriate teaching methods to support students to achieve their learning outcomes; (3) the task of assessment and criteria which will be used to show the achievement of students learning outcomes.

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