Implementation of Collaborative Knowledge Creation Through The Quadruple Helix Concept for Research and Community Service in Vocational Education

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Implementation of Collaborative Knowledge Creation Through The Quadruple Helix Concept for Research and Community Service in Vocational Education

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Abstract

Referring to the concept of innovation model from Triple Helix which focuses on the relationship of three aspects in improving the quality of education, namely: universities, government and industry, the concept of quadruple helix (Etzkowitz, 2008) explained how universities, government, industry, and associations or professionals together equally involved in higher education. In improving the national competitiveness of vocational education, since 2016 the government has revitalized the polytechnic education. The first step of revitalization, 12 polytechnics are expected to provide opportunities to organize polytechnics compete and have professional graduated. The role of lecturer polytechnic not only focus on the field of education and teaching but also doing research and community service. This research focuses on how the role of institutions and leadership processes in the implementation of research and community service in polytechnic conducted by lecturers and students and have an impact on increasing the quality of highly competitive institutions. The result of research shows that the role of polytechnic institution should have coordination with external parties (government, college, asociation and industry) through the concept of collborative knowledge creation and quadruple helix. The visionary leadership concept in the institutional refers to the collaborative knowledge creation especially externalizing and sharing (Du Chatenier, et., Al.: 2009) should have good implementation in vocational education.

Keywords: collaborative knowledge creation, quadruple helix, competitiveness, leadership

1. INTRODUCTION

In the era of globalization and information technology vocational education has an important and strategic role for education programs, more emphasis on theory and practice in addition to referring to the industrial needs. The role and function of lecturer in polytechnic are transfer of learning, researching and community services. Referring to the concept of innovation model from triple helix which focuses on the relationship of three aspects in improving the quality of education, namely: universities, government and industry, the concept of quadruple helix (Etzkowitz, 2008) explained how universities, government, industry, and associations or professionals together equally involved in higher education. Collaborative knowledge creation has become important factor to influence instituion for facing information and technological changes.

The leader of polytechnic should have visionary and strong leadership for improving organization in globalization era. The visionary leadership concept in the institutional refers to the collaborative knowledge creation especially externalizing and sharing (Du Chatenier, et., Al.: 2009) should have good implementation in vocational education.

2. LITERATURE REVIEW

2.1 Collaborative Knowledge Creation

The capitalization of knowledge is the heart of a new mission for the university, linking universities to users of knowledge more tighly and establishing the university as an economic actor in its own right (Etzkowitz, 2008). In the organization there are two perspectives of knowledge that includes the perspective of innovation and learning perspective (Hargadon and Faneli, 2002: 293) and can be viewed from the perspective of knowledge, such as: research questions, assumptions, quality of knowledge and processes.

Collaboration has become a core competency of the 21st century workforce especially in vocational higher of education. The college of vocational education need of collaboration is reshaping the research academic in higher education to produce competent future workforce. To encourage collaboration in the research academic, knowledge commons that integrate technology to infrastructure and system introduced. Collaboration is a powerful vehicle to promote academic researcher such as lecturer and student for learning and professional development and an effective way to maximize the impact of institutional investments in vocational organization.

Collaborative in vocational organization can help to maintain a dynamic institutional climate that sustains good faculty and ultimately promotes a healthy learning environment for students. Collaboration also requires individuals and institutions to step out of the comfort zones where they usually operate quite autonomously. To achieve the benefits that collaboration promises, the parties involved must learn how to work productively reseach in tandem with others.

According to Lee and Schonttenfeld (2014) As collaboration has become a core competency of the 21st century for academic curriculum tu pulfill industrial need in the business workplace and to achieve that the vocational of education have to accommodate the need for collaboration and socialization. Rapid changes in the global economy have created a need for organizational agility and collaboration between and within organizations (The Economist Intelligence Unit, 2007).

Organizational collaboration has been emphasized in the business and industry fields as a means for improved organizational functioning (Kezar, 2005). To address the needs of society and industry, the pedagogical paradigm in higher education has shifted to provide individuals with collaborative skills.

Definition Collaborative knowledge creation (CKC) according to Du Chatenier, et. al., (2009) in developing the organizational learning process is an important step that must be done to produce a product in the form of knowledge, services and technologies built through the three main model, such as: (1) model of knowledge creation, (2) model of expansive learning, and (3) building knowledge models. The stages CKC includes four phases are: (1) externalizing and sharing: knowledge occurs at the level of the current group produces distributed knowledge, (2) interpreting and analyzing where knowledge happens at the individual level when produce decentralized knowledge; (3) negotiating and revising that explaining knowledge happens at the

group level and (4) combining and creating explained knowledge happens at the individual level when generating knowledge that is concrete and supports innovation and new technologies.

2.2 Quadruple Helix

The definition of quadruple helix based on Galbraith (2015) A partnership built by university-industry-government-association. In the multilevel innovations systems, which are being carried and driven by advanced knowledge production in context of the quadruple helix innovation model, research activities of the universities of the sciences (natural sciences, life sciences, social sciences, and humanities) are essential. The quadruple helix is a model based on the triple helix model and adds as fourth helix the 'public', more specifically being defined as the 'media-based and culture-based public' and civil society. This fourth helix associates with media, creative industries, culture, valuew, lifestyles, art, and perhaps also the notion of the creative news (Carayannis and Campbell, 2009).

2.3 Research and Community Service

Applied research is original investigation undertaken in order to acquire new knowledge. It is, however, directed primarily towards a specific, practical aim or objective (including a client-driven purpose).

Based on report of OECD (2015) the activities that support research and meet this definition of research include: Professional, technical, administrative or clerical support staff directly engaged in activities essential to the conduct of research, management of staff who are either directly engaged in the conduct of research or are providing professional, technical, administrative or clerical support or assistance to those staff, the activities and training of HDR students enrolled at the University. The development of HDR training and courses, the supervision of students enrolled at the HEP and undertaking HDR training and courses, research and experimental development into applications software, new programming languages and new operating systems (such R&D would normally meet the definition of research), prototype development and testing.

2.4 Strategy Within The Organization

In organization, strategies are potential actions that require top management decisions and large amounts of corporate resources (David, 2011). According to Ireland, et.al., (2013) strategy is a set of integrated and coordinated commands and actions designed to exploit core competencies and achieve competitive advantage. Wignaraja (2005) explains that the strategy in learning organization is how the organization grows and has the competitiveness to win the competition. There are three perspectives in winning the competition: (a) the macro is related to the internal and external balance of the state and focuses on real exchange rate management, (b) business strategy relating to competition between firms and countries that have different roles and limited policies public, and (c) technologies and innovations that emphasize innovation and learning that produce value and high competitiveness.

3. METHODOLOGY

3.1 Research Methodology

The method used in this research is soft systems methodology (SSM) and descripti qualitative. The research method is based on the philosophy postpositivisme, used to examine the condition of natural objects, (as his opponent was an experiment) where the researcher is as an instrument of key sampling data source is purposive and snowbaal, collection techniques by triangulation (combined), data analysis inductive and qualitative research lebeh emphasize the significance of generalization (Checkland, 2006). The SSM refers the seven principles, such as: (1) problem situation considered, (2) problem situation expressed, (3)definition of relevant puporseful activity systems, (4) conceptual models of the system named in the root defintion, (5) comparison of models and real word, (6) Changes: Systematically desirable Culturally feasible , (7) action to improve the problem.

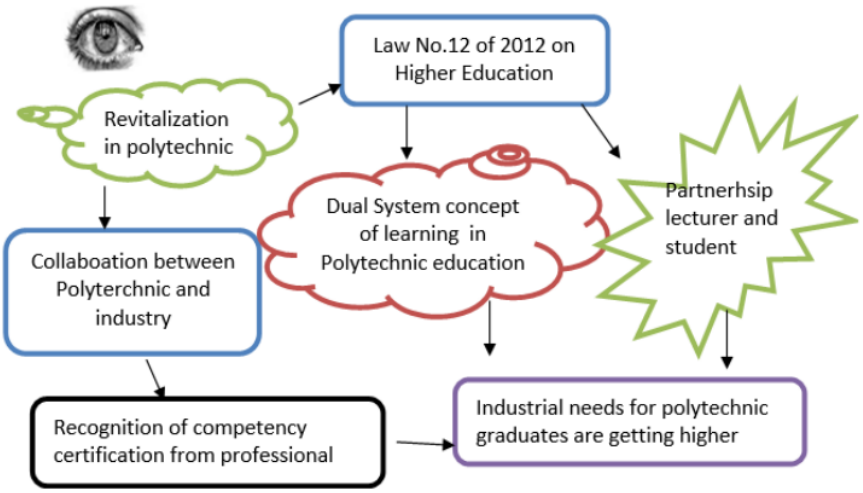
3.2 Data Collection Techniques

This research refers to the stages that are standardized on the Soft Systems Methodology (SSM), and the method of collection of data in the field has a formal and informal nature. The collection of information in this study is done through observation, study documentation and literature study, informal discussions and interviews with the person, such as: Assistant of Director of Academic, Head of Research and Community Service, Head of International Office, and Lecturer who are doing some research and community service. The data analysis method used in this research is qualitative analysis of data conducted in accordance with the type of the data Studied. The Data have been grouped to associate with one another and interpreted by using the soft systems methodology (SSM) and CATWOE approach (Clients, Actors, Transformation, Weltanschauung or World View, Owners and Environment) in analyzing building and innovation trough for collaborative knowledge creation competitiveness in higher vocational education organization. The collection of information in this study is done through observation, study documentation, informal discussions and interviews with leaders and lecturer of polytechnic as an owner issue.

4. ANALYSIS AND DISCUSSION

This study discusses the activities of research and community service by using the f collaborative knowledge creation approach through the concept of quadruple helix in polytechnic. The polytechnics that became the object of this research are: State Polytechnic of Jakarta and State Polytechnic of Semarang which has been awarded as the first ranked in Indonesia for research and community service conducted by polytechnic. Penelitian menggambarkan bagaimana konsep collaborative knowledge creation dan quadruple helix digunakan dalam peningkatan kualitas penelitian dan pengabdian kepada masyarakat sehingga organisasi memiliki daya saing yang tinggi. Berikut rich picture yang menjelaskan tentang konsep tersebut dan digunakan dalam penelitian ini.

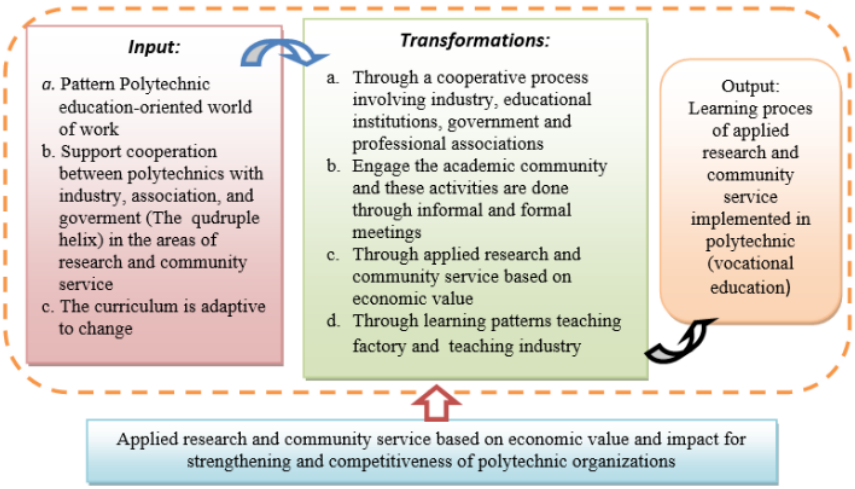
Figure-1. Rich Picture
Implementation fo collaborative knowledge creation and quadruple helix using in research and community service in polytechnic



Source: data processed, 2017

In figure -2 describes how the collaborative knowledge creation and quadruple helix using in research and community service to become polytechnic organization more competitiness .

Figure 2. Proces of research and community service in polytechnic organization



Source: data processed, 2017

To explain how the concept of CKC and quadruple helix used in the study is described in table-1.

Table 1.Root Definition (RD) for CKC dan quadruple helix
for research and community service in Polytechnic

ROOT DEFINITION	PROCESS	SYSTEM
RD	The process of policy formulation within a form of collaboration cooperation and partnership polytechnic with industry, companies, governments, Associations and other institutions within to realize the collaborative knowledge creation (CKC)	The system is owned and operated by polytechnics in the framework of policy formulation (P) through the improvement of interaction and communication in externalizing and sharing stage which can overcome the asymmetry information challenge in the node of institutional cooperation network (Q) through quadruple helix so as to facilitate the application of all stages of collaborative knowledge creation (CKC) on policy formulation process to improve the competitiveness of polytechnic organization

Source: data processed, 2017

Table 2. CATWOE and 3E

Customers	Director, Assistant to Director for Academic Affairs, Assistant to Director for Field of Cooperation and Industry, lecturer, government, professional association, and industry
Actors	Director, Assistant to Director for Academic Affairs, Assistant to Director for Field of Cooperation and Industry, lecturer, Head of International Office, Head of Research and Community Service
Transformasi	Externalizing and Sharing in addressing the challenge of information asymmetry between education providers
Weltanschaung	Submission of information between delivery is important to be implemented to produce strategies for strengthening the dynamic capabilities of the organization
Owner	Director, Assistant to Director for Academic Affairs, lecturer, Head of Research and Community Service
Environment	Time and budgeting are limited
E-Efikasi	Existence of externalizing and sharing to overcome the challenge of information asymmetry in institutional cooperation network, research and community service
E-Efisiensi	Optimizing available resources and equipment
E-Efektif	The achievement of institutional cooperation network with external parties Polytechnic

Source: data processed, 2017

From that table-1 described the trust and communication, a sense of shared interests and goals, defined and clear expectations and roles should have implemented in polytechnic. Trust is an unspoken but essential component of a successful collaboration in research and community service in polytechnic. If an individual perceives his or her partner (s) as being overly opportunistic and /or acting as a rival, the individual may be relating to participate fully in the collaboration for fear of being exploited. This is true and more impact for collaborating institutions as well.

Trust between partners must exist in order for the collaboration in polytechnic with the external parties based on quadruple helix concept.

Impementation of research and community service conducted at State Polytechnic of Jakarta and Polytechnic of Semarang has the same concept, but the difference is in Polytechnic of Semarang when the lecturer produces articles published in accredited journals and indexed by Scopus and have a good point SINTA get awarded from polytechnic, this case make the lecturer have a motivated to continue and conducting research and community service. In fact, in 2017 Polytechnic of Semarang earned the highest rank in research and community service for polytechnic in Indonesia from Higer Education and Research and technology department. Based on the policy from the Director of Polytechnic of Semarang it is clear rules and expectations. In State Polytechnic of Jakarta, the role of the Head of Research and Community Service as a leader is crucial for maintaining collaborations with the industry, government and association. Collaboration leaders must ensure there is a responsibility in improving the competitiveness of polytechnic.

Table 3 Relations Collaborative Knowledge Creation and Quadruple Helix with the Stages of Research and Community Service in Polytechnic

NO	STAGING CKC	RESEARCH AND COMMUNITY SERVICE
1	Externalizing and Sharing: knowledge occurs at the level of the current group of distributed knowledge	To produce research results-oriented faculty and students on intellectual property developed as a result of the knowledge that can be shared with other parties
2	Interpreting and Analyzing where knowledge happens at the individual level while generating decentralized knowledge	a. Lecturer doing applied research and community service that has an impact on increasing economic empowerment of society and high competitiveness. b. Lecturer having defined rules, procedures, and expectations of members in the relationship help to define formally the boundaries of what each partner. c. Lecturer have a chance to follow training for research methodology. d. Lecturer have a chance to get national certification as a reviewer for research from the certification organization.
3	Negotiating and revising that explaining knowledge occurs at the level of group	a. Lecturer group performs a collaboration with the industry and government and commercialize the research results. b. Lecturer have good skill in writing paper/article and published in international journal. c. Lecturer have an intellectual property right based on their research and community service. d. Head of Research and Community Service have a strong leadership to push the lecturer doing research and community service

		collaboration wirh industry or government. e. Polytechnic have an annual training in writing journal for the lecturer facing to published in international journal.
4	Combining and creating that explains knowledge happens at the individual level when generating knowledge that is concrete and supports innovation and new technologies	a. Lecturer and the student combined the different knowledge base on process knowledge with a new ideas, creative, innovative in doing research and community service in facing competitiveness organization. b. Organization support lecturer and student to present the results of research in national seminar or international conference.

Source: data processed, 2017

5. CONCLUSION

Conclusion

The conclusions from this study:

1. Implementation of collaborative knowledge creation and quadruple helix in polytechnic used in reseach and community service between polytechnic with the company, industry, government or community agencies;
2. The role of leader in polytechnic to push lecturer doing research much important to pulfill acreditation;
3. Lecturer having defined rules, procedures, and expectations of members in the relationship help to define formally the boundaries of what each partner doing in research and community service;
4. Lecturer have a chance to follow the training for research methodology and get certification as a reviewer research from certification organization.
5. Quadruple helix is a concept can adopted in polytechnic facing competitiveness organization wih collaborative knowledge creation.

Suggestions

In implementing the concept of quadruple helix and knowledge collaboration in research and community service in polytechnic should have:

a. A good team work among lecturer and student;
b. Strong leadership for enhancing professional lecturer
c. Visioner leadership implemented in polytechnic;
d. Director/Assistant Director of Academic Affair support the lecturer with the budget to have chance presenting results of researh in national seminar and international conference.

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