

IMPLEMENTATION OF NATIONAL QUALIFICATION FRAMEWORK-BASED CURRICULUM IN UNIVERSITIES

(Content Analysis Study on Machine Drawing Lecture)

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Abstract: This research aims to know the implementation of National Qualification Framework-based curriculum in universities. The approach used is qualitative approach and the method is content analysis. The research data source is in the form of syllabus, lecture plans, activities in one semester, and materials of Machine Drawing lecture in Mechanical Engineering Education Study Program. Procedure and data analysis refer to Philip Marying. Verification of data validity in this research is carried out through credibility, dependability, transferability, and confirmability. The research results show that the learning outcome of Machine Drawing lecture is in accordance with the Bachelor Degree graduates level. Profile of the graduates reflect the minimum ability that should be mastered by the university students that refer to four aspects: (1) attitude, (2) knowledge, (3) machine drawing skill, and (4) managerial and responsibility.

Keywords: National Qualification Framework, curriculum, machine drawing.

INTRODUCTION

Curriculum, which comes from Latin language, was defined as a mileage that is used in a horse riding to reach a destination and relate to a certain time period. Curriculum in universities used to be seen as activities that take place in classrooms, while the activities outside classrooms are from the educative value given by the curriculum. However, people need to know that extra activities are specific part in the education program from kindergarten until university level. In modern view, intracurricular and extracurricular are not separated. All activities that aim to give education experience are packed in a curriculum.

Furthermore, Fraser and Bosanquet highlighted that in higher education have very different understandings of the term 'curriculum', as various as: (1) The structure and content of a unit (subject), (2) The structure and content of a programme of study, (3) The students' experience of learning, and (4) A dynamic and interactive process of teaching and learning (In E Book Barnett, R. and Coates, K. (2005: 1). In addition by O'Neill, G (2015: 10) the curriculum is also highly influenced by the social, physical, economic and cultural environment (<http://www.ucd.ie/t4cms/UCDTLP0068.pdf>).

Statements above lead to an understanding that curriculum in activity dimension is a manifestation of efforts to realize the curriculum that is still in written documents to be actual in a series of learning activities, which are adjusted to the condition of

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social, economic, and culture. Thus, curriculum is made and designed as a tool to achieve universal education goals in every learning activity in universities. It also has main and supporting components that are related to each other. The components of curriculum are as follows: (1) learning objectives to be achieved, (2) materials; a teaching material that will be delivered by lecturers to university students, (3) medium, facilities and infrastructure that support learning and teaching activities, (4) methods and strategies, and (5) learning and teaching process (belmawa.ristekdikti.go.id).

Referring to the statement above, a curriculum is designed for education levels starting from primary education, secondary education, and higher education with the boundaries of each science respectively. Meanwhile, several factors that affect the curriculum implementation are curriculum characteristic, implementation strategy, assessment characteristic, lecturer's knowledge of curriculum, attitudes on curriculum, and directing skill. Hence, often there are problems occurred in the higher education curriculum implementation as well as criticisms from various parties that revolve around quality, potency, system or function and the role in producing graduates nowadays. The criticisms are the indicator to determine quality standards in universities. From some main problems that are being faced, there are problems that need to be solved, including the quality of graduates. In quantity, there are a lot of universities' graduates, but the quality is still far from satisfying. Therefore, the graduates are considered able to meet the expectations of society. The efforts to achieve good quality graduates are carried out through curriculum development.

Curriculum development study includes aspects such as curriculum designation, curriculum implementation in universities, along with the intensive assessments and improvements made to certain components of the curriculum on the basis of the assessment results (A. Hamid Syarif, 1993: 33). If the curriculum has been evaluated and improved, hence the curriculum development task has completed; then continued by coaching duty.

It also applies for every curriculum component, such as teaching method improvement or learning media improvement. According to Audrey Nichols and S. Howard Nichools as quoted by Oemar Hamalik (2008: 96-97) that *curriculum development* is: the planning of learning opportunities intended to bring about certain deserved in pupils, and assessment of the extent to which these changes have taken place. This statement shows that curriculum development is learning opportunities planning, which aims to bring the university students to the desired changes and evaluate how far the changes have taken effects on the students. Curriculum development can not be separated from various aspects that affect it, such as a way of thinking, value systems (moral value, religion, politic, culture,

and social), development process, the needs of learners, the needs of society, and the direction of education programs.

Curriculum development model is an alternative procedure for designing, implementing, and evaluating a curriculum. Therefore, curriculum development must be able to describe a learning planning system that can meet the needs and success benchmarks in education (Toto Ruhimat and Muthia Alinawati, 2013: 78). Curriculum development needs to be carried out on the basis of proper theories then the successful theory can be effective. As stated in the above statement, the curriculum development model is an alternative in designing, implementing, and evaluating as well as being a follow-up in learning.

Curriculum development is based on the curriculum development concept, which all dimensions of curriculum such as idea, design, implementation, and evaluation of curriculum is planned in one unit. *Curriculum development* concept wishes a team that since the beginning has designed the development of curriculum idea, curriculum document, curriculum implementation, and curriculum evaluation in one grand design. The research results regarding curriculum development are as follows Curriculum Development And Design For University Programmes by Marinov and Fraszczyk described that influenced by globalisation, internationalisation and different social needs it appears that the higher education is currently changing from an input-output based professor-led approach towards a more integrated competence-based student-led approach. The necessity to develop deep understanding of multi-disciplinary concepts and orientations for a sustainable future has forced industrial, technological and service sectors to cross boundaries. In this paper we discuss concepts, standards and designs for innovative curricula for an MSc in Rail Freight and Logistics which employs a flexible mobility-based hybrid model integrating subjects, teaching and learning methods from four European Universities (2014: 1166 – 1170). This research proves that the influence of globalization, internationalization and changes in higher education today requires the development of an innovative curriculum, which the orientation is a sustainable future, needs to be carried out. The other researches regarding Curriculum Development is highlighted by Helena Mälkki and Jukka V. Paatero that Curriculum is a key factor in defining programme outcomes. It typically consists of modules and courses, which should be linked together to produce the desired learning outcomes for students. This work aims to explore the practical and theoretical principles of curriculum-centred strategic planning and to inspect how curriculum planning and its implementation are visible in the corresponding teaching structures and student experiences. This research approach used in this paper includes a student survey, teacher interviews and core content analysis. The paper demonstrates that when addressing only a cluster of courses, a relatively simplified approach provides sufficient information

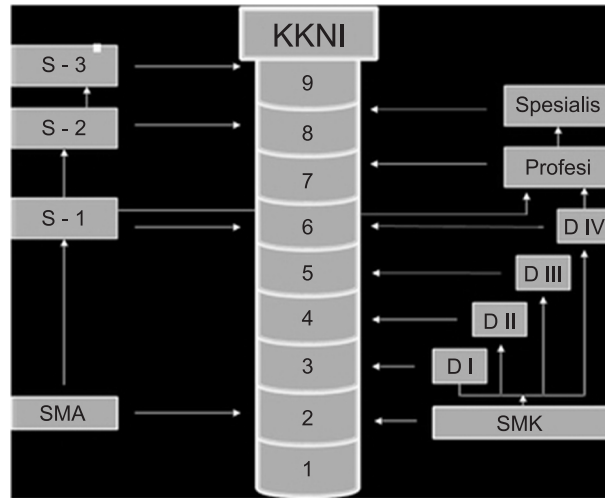
for identifying existing strengths and good practices that can be built upon as well as key areas that need further improvement. In addition, the key observations and best practices can also be utilized within any engineering education context (2015: 292-299). The research findings clarify that the curriculum development in universities is the key factor in determining the desired learning outcomes and the implementation is seen in a suitable learning structure and students' experience. Based on the research findings, hence the curriculum in universities needs to be developed in the form of a program to produce graduates who have same qualification as the agreed qualifications, which is National Qualification Framework.

This National Qualification Framework-based Curriculum provides nine qualification levels, starting from the first level as the lowest qualification and ninth level as the highest qualification. The determination of level 1 to 9 as is conducted through comprehensive mapping of the employment condition in Indonesia, in terms of supply push and demand pull of workers. Descriptor of every qualification level is also adjusted by considering the country's condition in overall, including the development of science, technology and art, as well as sectors improvement.

In determining the levels there are characteristics that need to be considered, as follows: (a) that in every descriptor of Indonesian National Qualification Framework for the same qualification level can consist of the compositions of science, knowledge, know-how, and skill that are different from one to another. It also means that every learning outcome of education can have more prominent skill compare to science but given the recognition of the same qualification level; (b) explain that for higher qualification level hence the descriptor of Indonesian National Qualification Framework shall be more characterized in science, while the lower it is emphasizes on the mastering level of skill. It affects the lecturers' planning because a curriculum is a guideline and manual of lecturers in designing a planning, implementation, and learning assessment.

Guidelines that must be fulfilled in each level need to be able to differentiate: (1) Learning Outcomes (LO), (2) Semester Credit hours, (3) Minimum study time, (4) Mandatory lectures: to achieve learning outcomes with general competencies, (5) Student-centered learning process, (6) Assessment accountability, and (7) The needs of Diploma Supplement or supplementary letter of graduation certificate and transcript (<http://belmawa.ristekdikti.go.id/pendidikan/deskripsi>).

Other consideration is academic-weighted dominant disciplines, which are known with the levels such as Strata 1 (Bachelor Degree), Strata 2 (Master's Degree) and Strata 3 (Doctorate Degree) and vocation-weighted or skill-weighted disciplines, which is known with levels such as Diploma 1, Diploma 2, Diploma 3, Diploma 4



and Profession 1, Profession 2. It should be noted that there is a difference between academic study program and vocational; academic study program is in charge of developing science, which is based on rational and empirical facts, hence it needs systematic rational and comprehensive study that is supported by empirical facts and tested through survey and research results. While vocational is a development, which is dominant towards a know-how and Practice Skills in carrying out a duty and work. Therefore, the curriculum development nuance of both types of study program have different domain emphasis; in academic study program field there are many academic developments in sciences, and in vocational the emphasis is on skill or practice fields. Referring to the levels, qualification descriptor of Bachelor Degree in universities is in level 6, which are mastering theoretical concept, being able to apply the skills, formulating problem solving, making decisions, and being responsible for the work, and being able to be responsible for the work achievements of the organization. (<http://kkni-kemenristekdikti.org/pendidikan/deskripsi>).

There are two other reasons regarding the application of the current Indonesian National Qualification Framework-based curriculum, which are external and internal reasons. The external reasons are global challenges and competitions. The agreement for free trade and AFTA (ASEAN Free Trade Area) was applied but never ready. While the internal reason is the relevance of producers versus users, which resulting in unemployment. In addition to that, there are various qualification rules. Architects have qualifications, so do the doctors, lawyers, and in education field, the graduates. None of them is the same. Hence, there are many problems in this country that can be the obstacles of inter-professions competitiveness; even often there is discrimination on our workers when actually the qualifications are equal with the foreign workers. In fact, efforts are required to make Indonesia

human resources and the foreign ones have equality and recognition. The problem is that our workers only depend on the certificates not qualifications. This what makes our work world is not recognized. Through the recognition of qualification of Indonesia human resources, individual competencies will be known and can be juxtaposed in the realm of employment or duties.

Mechanical Engineering Education Study Program is one of the higher education institutions that has duties and functions to produce qualified and professional graduates in mechanical engineering field. Education implementation and teaching refer to the competencies required by the graduates in the form of educational competency as a bachelor degree teacher at the levels of Vocational High School and non education competency-based in the form of competency for maintenance and repair of vehicles. One of the mandatory lectures in the major is advanced Machine Drawing from Enginnering Drawing lecture in the form of an activity of describing forms of items or components on a paper. Competencies of the graduates in the Mechanical Engineering Education Major for the bachelor degree refers to the competencies of graduates that consist of personal competency, professional competency, and social competency, in addition to engineering competency that needs to be developed while the on the learning process, there are 3 (three important components that are related to each other. Those three components are; (1) curriculum, material that is taught, (2) process, how the material is taught, (3) product, the result from learning process.

Some researches regarding curriculum development were conducted by Saad F. Shower, who studied about teacher-driven curriculum development at the classroom level, implications for curriculum, pedagogy and teacher training. Major findings indicate curriculum policy in terms of curriculum content, pedagogical and assessment orientations, teacher curriculum development opportunities and teacher soft skills. This study provides recommendations for curriculum and instruction, teacher education, and future research (Journal Teaching and Teacher Education Vol. 63, April 2017, page 296-313, <http://www.sciencedirect.com/science/article>.

Furthermore, Xiao-Ping Jiang, Li Yan, Xian-LanZheng, Xian Liu, and Xiao-Qiong Wei, who studied about development and evaluation of a new curriculum based on the Delphi method for master of nursing programs in China, (Journal Chinese Nursing Research Volume 3, Issue 4, December 2016, pages 162-167, <http://www.sciencedirect.com/science/article/pii/>.

Findings in this research resulting in new curriculum development for master's degree and to give reference for nursing education in China. Meanwhile, Rebeeh Barghi, Zuraini Zakaria, Aswati Hamzah, and Nor Hashimah Hash confirmed the research findings. This research investigates Malaysia's new primary school curriculum to determine to what extent the core curriculum cultivates an awareness of and sense of respect for heritage. These research findings stated that the schools'

curriculum needs to be developed regarding building awareness and respect on the cultural heritage (Journal Teaching and Teacher Education, Vol 61, January 2017, pages 124–131, <http://www.sciencedirect.com/science/article>).

Meanwhile for the research of mechanical engineering drawing was conducted by Murat Yapici and Birsen Koldemi, who said that drawing applications used in the manufacture of ships, also gained importance in the balance and construction account. Covering recent years has been facilitated by computer-aided ship design software projects that replace paper disk less space, has virtual drawings stored in CDs or external hard drives. In this study, Marine engineering drawings and computer-aided design of the importance of maritime education, are being investigated as active as long as how to switch from the traditional process of innovation (Journal Procedia - Social and Behavioral Sciences Volume 195, 3 July 2015, pages 2813-2821).

On the other hand, a research about curriculum in Indonesia was conducted by Sukoco and friends (2015), which proved that Indonesian National Qualification Framework-based curriculum has been accommodated in all lectures with 4 (four) realms of learning outcome including attitude, knowledge, general and specific skills that have been represented by all lectures in Automotive Engineering Education Major of the Engineering Faculty of State University of Yogyakarta as demands and expectations either industrial world or education world, where Bachelor degree, according to Indonesian National Work Qualification in level 6 demands competency as candidates of educator in Vocational High School and demands from industrial world (<http://www.eprints.uny.ac.id>). The research findings of Sukoco are applied in all lectures, but the research regarding how National Qualification Framework is implemented in every lecture. It also needs to be explored in depth. Therefore, realizing the importance of National Qualification Framework-based curriculum as a reference of learning process in every lecture, hence this research is conducted to obtain the deep understanding of how to implement National Qualification Framework-based Curriculum in the learning of Machine Drawing lecture in universities viewed from attitude, knowledge, machine drawing skill, and managerial.

METHOD

The approach used in this research is qualitative approach and content analysis method. Data sources in this research are in the form of syllabus, lesson plan and lectures' activities in one semester, and teaching materials of Machine Drawing lecture. Research procedure is conducted in the following manners (a) reading texts thoroughly, (b) giving signs (coding) on expressions that contain National Qualification Framework, (c) carrying out clarification by dividing based on National Qualification Framework aspects, and (d) data that are obtained further are

identified and clarified in accordance with the research focus. While according to Philip Maving data analysis is used by deductive category development procedure (<http://www.qualitative-research.net/index.php/fqs/article/>).

Examination of validity of data in this research was conducted through credibility by observing carefully the research' data source, and to be directly involved in this research either on the adequacy of the theory, triangulation of theory, relevant researches in international journals, triangulation of experts, which data analysis results are confirmed by competent experts in accordance with this research focus, as well as examination of colleagues through discussion of Teachers in Vocational High School, lecturers, and some experts who have competency in curriculum field of study. To explain the process and technique of data validity, the researcher set the data credibility by researcher's persistence in finding deeper understanding. For dependability, external audit shall be carried out regarding the strengths and weaknesses through a cross-check with someone outside this research. While transferability is an effort to complete theories by using clear concepts. Next is conformability, which is objectivity level of research results. In conformability, the researcher conducted research data documentation by checking repeatedly; data analyzed are data that have been chosen and verified thoroughly and in detailed hence the research results are objective data analysis results.

RESULTS AND DISCUSSION

In this National Qualification perspective, every study program clarify "graduates' profile", which is expected through the study tracking activity, feasibility study and analysis of needs in community. Graduates profile reflect the minimal ability that needs to be mastered by students after graduating, which refer to four elements: (1) attitude, (2) knowledge, (3) work ability, and (4) managerial and responsible. The four abilities further must be described in a learning outcome in Drawing Machine lecture hence later all lesson plan or Semester Implementation Plan (SIP) must be based on the learning outcomes that suit the needs of graduates profile.

The following are the details of research findings on learning process in machine drawing lectures of Machine Drawing by formalizing the graduates Learning Outcomes (LO) in the Graduate Quality Standard, which are stated into 3 (three) factors i.e. attitudes, knowledge and skills consisting general skills and special skill, which are adjusted for the university graduates. The attitude factor in the Graduate Quality Standard is attitudes of university graduates.

First, attitude in Graduates Quality Standard is the attitude owned by university graduates. Attitude findings were obtained through learning process while joining Machine Drawing lecture. It was found that the right attitude as the result of internalization and actualization of values and norms in social life, either through drawing machine tasks given individually or collectively.

Second, the knowledge factor has understanding that equals to the knowledge factor that should be mastered by graduates in this subject. The next one is “skill” factor, it is a combination of “working abilities” factor and “powers and abilities” factor and special skills factor that characterize the students’ ability to draw machines in forms of course learning outcomes of machine drawing, which means students are able to draw machines manually or by using CAD according to the general convention; to evaluate machine drawings after reading the shop drawing; and to revise the machine drawings after evaluating the shop drawing while the general skills characterize the students’ abilities during the observation-based (discovery) learning, collaborative learning and project-based learning.

During the learning process of this subject, the role of science in machine drawing is described as a scientific methodology system to build knowledge so that the Learning Outcomes (LO) in this subject is the abilities gained through the internalization of knowledge in drawing machines, attitudes, skills, competencies, and accumulation of working experiences as well as the calibration (measuring tools) of what students gain when completing the learning process of machine drawing, either structured or not. The following is the number of Credit Units during the semester in this subject of Machine Drawing Study Program of Engineering Education is 3 (three) credits with the aim of students will be able to read, make, evaluate, and revise the mechanical drawings based on the general conventional representation prepared as shop drawing made by conventional drawing tools and CAD (Computer Aided Design). Meanwhile, the referred general competencies of students are accumulation of students’ abilities in applying working instructions of machine drawing, which is measurable with a structured assessment including the aspects of students’ individual independencies and individual responsibility on the material related to projections, cuts, measurements, linear tolerance, surface condition, geometrical tolerance, gears and springs as well as the shop drawing in which the whole learning and teaching process is conducted according to the ISO standard.

Another important thing, which is also important, is student-centered learning process completed by the assessment accountability so that the students’ competency after the learning process in Machine Drawing lecture is no longer only about the learning achievement but refers to the qualification framework that agreed nationally as the basis of result recognition of educating a student, which is accountable and relevant to the needs of teachers and skillful in industrial field. Implementation of this curriculum development is the most critical phase in a series of activities to produce good quality graduates. Curriculum should be implemented in accordance with the curriculum quality, curriculum management quality, and the learning process quality. In addition to that on. The implementation of education process needs to observe knowledge developments, which are related to developments of neurology, psychology and pedagogy that associated with the *observation-based (discovery)*

learning, collaborative learning and project-based learning. Three approaches in learning enable the application of learning theories about the thinking abilities, learning habits, behaviors, and psycho motor skills. These three ability groups could be referred as development content that may only be developed through sustainable, continuous and qualified learning activities. These learning activities may be implemented by being accompanied with the curriculum development in a design according to the content characteristics, which means the curriculum design applying sustainable, continuous and qualified learning activities is required. In addition to that, social problems are also important to be observed as stated by Oliva (1992) that curriculum is a product of its time... Curriculum responds to and is changed by social forces, philosophical positions, psychological principles, accumulating knowledge, and educational leadership at its moment its history. Since they impact the curriculum, changes in the society should be answered and thus the curriculum development is undeniable. Therefore, the universities are currently applying the Indonesian National Qualification Framework-based curriculum made based on specific needs and purposes to align the education and training system in the world of work as well as designed in accordance with curriculums developed in other countries. This development also refers and considers the qualification system in other countries i.e. Europe, Australia, UK, Scotland, Hongkong and New Zealand. This makes the qualification included in the qualifications could be compared and accepted by other countries so that the program of students exchange or labor exchange between countries may be implemented properly.

The third finding is machine drawing work skill. This implementation of National Qualification Framework is on the learning process can be used as a qualification that may have been able to pair with, equalize, and integrate the education and employment fields. Machine Drawing skill has been oriented on the users or relevant industry and has experience in the industry as early as possible, not only produce educators in Vocational High School but also people who work in industrial world. In the context of granting recognition of work skills in accordance with the structure of work in various sectors, there must be commitment from from universities as a breakthrough in order to make the quality of the graduates can be guaranteed and have bargaining power in globalization era.

The forth finding is being able to carry out machine drawing task, which is entrusted to the graduates. This does not mean the program is already perfect, because there are some suggestions and feedbacks, either from its own graduates as well as from the users. Feedbacks from the graduates' employers, especially from the industry are the needs to improve the managerial competency, leadership, and foreign languages. As anticipation to face the future employment, graduates are directed to fill the needs of human resources in industries both local and global markets. They should also be prepared to face the international society despite working within the country. It is recommended that the graduates master at least three

languages, namely the local language as the native language and identity, Bahasa Indonesia for the national language, and English for international communication. If possible the graduates are encouraged to master other languages, such as Japanese, Chinese or Korean.

Having good quality graduates is the responsibility of all parties; as well as to grow and become quality culture. Expectations in producing good quality graduates are better conducted through education that is managed and applied well. Regarding the quality of results of Machine Drawing subject, it is very dependent on the learning process implementation affected by internal and external factors. The role of the two-factor relationship is very major in determining the quality of the achievements. The results of interviews with alumnus, either who work in education as teachers, instructors, or other educator roles, and those who work in industrial or non-industrial field, about the learning process of machine drawing show some points i.e. the compatibility of graduates' jobs and educational background, which means most of the graduates work according to their educational background. As for the period of waiting for the first job is categorized as good and it is proven by the data of waiting period is less than 3 (three) months, which means that graduates does not find it hard to get a job and the society also welcomes them.

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