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EMPOWERING VOCATIONAL EDUCATION AND TRAINING TO ELEVATE NATIONAL ECONOMIC GROWTH

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Welcome to the 3rd annual INTERNATIONAL CONFERENCE ON VOCATIONAL EDUCATION AND TRAINING (ICVET2014).

Educational practices today encounter the challenge of skills gap as the demand for diversity of skills qualification both in business and industry have not been fulfilled by the qualified workforce, particularly in the fields of technical and specialized skills. The unsuccessful attempt to meet this demand has resulted the high unemployment rate and sluggish economic growth. Vocational Education and Training (VET) has the potential to take responsibility in developing opportunities to address these challenges through closing skills gaps, reducing unemployment, and accelerating economic growth as well as to play a crucial role in a social and economy development of a nation.

Addition to having the opportunity in contributing completed above problems, another fact encountered VET in the presence of unfavorable situation, especially in its ability to meet the demands of VET qualification and fulfill meet of learning outcomes. In the new economic environment, VET is more expected to produce an educated, skilled, and motivated work force. In this condition, the current issue is not so much about the value and importance of VET but how to ensure its relevance, responsiveness and added value in an increasingly national economy growth.

This conference provides the opportunity for teachers/lecturers, educational practitioners, and stakeholders as well to share knowledge, experiences, and research findings relevant in contributing ideas and considerations for the implementation of VET policy-making in order to strengthen the national economic development and employment demands.
Dear friends and colleagues,
distinguished speakers: Prof. Dr. Thomas Kohler (TU Dresden Germany), Dr. Margarita Pavlova (Griffith University Australia), Dr. Lomovtseva Natalya (The Russian State Vocational Pedagogical University), Dr. Numyoot Songthanapitak (RMULT Thailand) distinguished guests & participants, ladies & gentlemen

Good morning, May peace and God’s blessing be upon you all.
In this precious occasion, let me extend to you all my warmest greetings and welcome to Yogyakarta, especially to our invited speakers who have come a long way to Jogjakarta. We indeed feel honoured to have the opportunity to host this conference, the 3rd International Conference on Vocational Education & Training, attended by academicians & educational practitioners who have deep concerns for Vocational Education & Training (VET).

I am particularly happy with the theme of this conference “Empowering Vocational Education & Training to Elevate National Economic Growth” for some reasons. First, I believe vocational education is facing various problems that we have to solve immediately. The qualified workforce has to be improved to fulfill the demand in business & industry. Then, VET has the potential to take the responsibility in accelerating economic growth as well as to play crucial role in the social & economic development of a nation, and developing opportunities to address these challenges by removing skills gaps & reducing unemployment.

In addition, gender equality is a challenge to increase the quality of VET. The other challenge of VET is to produce an educated, skilled, & motivated workforce that is suitable with the industrial needs. The implementation of VET policy-making in order to strengthen the national economic development & employment demands is the key issue of this conference. In this regard, we can certainly share our experience and best practices in this conference.

Finally, I would like to thank you all for participating in the conference. May we have fruitful discussions today.

Chairperson,

Dr. Putu Sudira
## Contents

<table>
<thead>
<tr>
<th>Title</th>
<th>Background</th>
<th>Chairperson Speech</th>
<th>Content</th>
<th>Invited Speaker</th>
<th>Paper Presenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>Background</td>
<td>Chairperson Speech</td>
<td>Content</td>
<td>Invited Speaker</td>
<td>Paper Presenter</td>
</tr>
<tr>
<td>Title</td>
<td>Background</td>
<td>Chairperson Speech</td>
<td>Content</td>
<td>Invited Speaker</td>
<td>Paper Presenter</td>
</tr>
<tr>
<td>Title</td>
<td>Background</td>
<td>Chairperson Speech</td>
<td>Content</td>
<td>Invited Speaker</td>
<td>Paper Presenter</td>
</tr>
<tr>
<td>Title</td>
<td>Background</td>
<td>Chairperson Speech</td>
<td>Content</td>
<td>Invited Speaker</td>
<td>Paper Presenter</td>
</tr>
</tbody>
</table>

### Invited Speaker

**PATTERNS OF INTER-INSTITUTIONAL AND INTER-ORGANIZATIONAL COLLABORATION. STRENGTHENING THE RELATIONSHIP BETWEEN VET AND LABOUR MARKET FOR DEVELOPING A PROFESSIONAL WORK FORCE**  
Thomas Köhler

1

**ROLES OF VET IN GENERATING A NEW ENTREPRENEUR INCREATIVE ECONOMY SECTOR**  
N.V. Lomovtseva

12

### Paper Presenter

**Theme 1:**  
*Strategic VET Responses To Meet Environmental, Natural, and Socio-Cultural Changes*

**MEDIA TEACHING DEVELOPMENT THROUGH INTERACTIVE WHITEBOARDBASED ON VIRTUAL LABORATORY IN VOCATIONAL EDUCATION**  
Sapto Haryoko, Hendra Jaya, Lu’mu, Mustamin

19

**OPTIMIZING THE INTERNET TO ENHANCE TEACHERS’ PROFESSIONAL DEVELOPMENT OF VOCATIONAL SECONDARY SCHOOL**  
Istanto Wahju Djamiko

28

**3D SIMULATION LABORATORY MODEL OF WEB-BASED INTERACTIVE TO IMPROVE ACCESSIBILITY, DESIRE TO LEARN, AND COMPETENCEOF STUDENT VOCATIONAL SUBJECT**  
Hendra Jaya, Sapto Hartoko

34

**IMPROVING THE QUALITY OF PRACTICE LEARNINGTHROUGH COMPETENCY-BASED LEARNING WITHCOLLABORATIVE SKILL APPROACH ON VOCATIONAL EDUCATION**  
Dwi Rahdiyanta

43
EXPERIENCING TOOLS PROJECT THROUGH PBE (PRODUCTION BASED EDUCATION) SYSTEM IN VOCATIONAL INSTITUTION
Gamawan Ananto, Yosep Adiyyanto, Edi Suherdi ................................................................. 48

COMPARISON BETWEEN THE DACUM AND WORK PROCESS ANALYSIS FOR VOCATIONAL SCHOOL CURRICULUM DEVELOPMENT TO MEET WORKPLACE NEED
Bernardus Sentot Wijanarka ...................................................................................................... 53

WORK-BASED LEARNING OF ROLLING AND INTEGRATED MODEL ON VOCATIONAL EDUCATION OF DIPLOMA III AUTOMOTIVE
Budi Tri Siswanto ...................................................................................................................... 59

Theme 2:
VET Learning Process for Generating a New Entrepreneur

THE HOTS-BASED AFL MODEL TO INCREASE OF HIGHER ORDER THINKING SKILLS OF STUDENT TEACHERS OF CLOTHING VOCATIONAL EDUCATION
Widihastuti .................................................................................................................. 63

INNOVATION IN CONDUCTING SKILL LEARNING OF STUDENTS CHARACTER DEVELOPMENT IN VOCATIONAL HIGH SCHOOLS
Riana T. Mangesa ....................................................................................................................... 74

STUDENTS’ ENTERPRENEURIAL BEHAVIOR IN THE IMPLEMENTATION OF PRODUCTIVE ENTREPRENEURSHIP FOR GASTRONOMY VOCATIONAL SCHOOL
Badraningsih Lastariwati, Pardjono, Sukamto ............................................................................ 79

THE DEVELOPMENT OF LEARNING MODEL OF WEB PROGRAMMING COURSE WITH PROJECT BASED LEARNING
Mustari .......................................................................................................................................... 88

ENTREPRENEURSHIP INTEGRATION IN PRODUCTIVE CULINARY LEARNING
Kokom Komariah ......................................................................................................................... 94

EVALUATION MODEL OF ENTREPRENEURSHIP EDUCATION OF VOCATIONAL HIGH SCHOOL
Edy Supriyadi ............................................................................................................................. 101
ENTREPRENEURSHIP TRAINING BASED LOCAL POTENTIAL TO INCREASE STUDENT MOTIVATION ENTREPRENEURIAL VOCATIONAL HIGH SCHOOLS (VHS) IN SOUTH SULAWESI
Hasanah .......................................................................................................................................................... 107

STUDENT WELDING SKILL COMPETITION DEVELOPMENT MODEL WITH KKNI AND COMPETENCY CERTIFICATION APPROACH IN VOCATIONAL SCHOOL
Putut Hargiyanto, Riswan Dwi Djatmiko, Arif Marwanto ............................................................... 112

NATURAL COLOUR BATIK HANDICRAFT IN SRAGEN, CENTRAL JAVA (A STUDY TO IMPROVE HANDICRAFTER’S WELFARE)
Riani Anastasia S., Sarah Rum H., Sri Murni................................................................................... 122

Theme 3 : VET Program for Economic Growth

VOCATIONAL EDUCATION PERSPECTIVE ON CURRICULUM 2013 AND ITS ROLE IN INDONESIA ECONOMIC DEVELOPMENT
M. Agphin Ramadhan, Sulaeman Deni Ramdani ........................................................................... 122

THE TRAINING OF DEVELOPMENT DESIGN AND DIVERSIFICATION PRODUCT TO STRENGTHENING EXPORT SARUNG GOYOR BASED OVOP IN SRAGEN
Rahmawati, Soenarto, Anastasia Riani S., Sri Wahyu Agustiningsih ........................................... 131

Theme 4 : VET Management and Organization to Fulfill Demand Market Trade

EFFECTIVENESS OF WEB-BASED LEARNING MODEL AT VOCATIONAL EDUCATION
Saliruddin ....................................................................................................................................................... 139

THE POLICY OF PROFESSIONAL EDUCATION FOR VOCATIONAL TEACHER IN EAST-INDONESIA
Sunaryo Sunarto .......................................................................................................................................... 150

FINDING THE MISSING LINK IN THE DESIGN OF POLYTECHNICS COMPETENCE-BASED CURRICULUM
Peni Handayani ........................................................................................................................................... 157

WEB-BASED SCHOOL SELF EVALUATION FOR QUALITY IMPROVEMENT IN VOCATIONAL SCHOOL
Muhammad Ali, Lantip Diat Prasojo ....................................................................................................... 166

IMPROVE EMPLOYABILITY SKILLS VOCATIONAL STUDENT THROUGH IMPLEMENTATION OF CURRICULUM 2013
Rina Febriana .................................................................................................................................................. 173

BEDARFSORIENTIERUNG IN DER BETRIEBLICHEN WEITERBILDUNG
Ikhfan Haris .................................................................................................................................................. 180

PRAXIS OF VOCATIONAL TECHNOLOGY EDUCATION IN INDONESIA MAZAB
JOHN DEWEY AND CHARLES PROSSER
Putu Sudira ................................................................................................................................................... 190

INDUSTRY INTERNSHIP IN LOCAL INDUSTRIES TO IMPROVE ENGINEERING
DESIGN COMPETENCE OF UNDERGRADUATE ENGINEERING STUDENTS
Sudiyatno ....................................................................................................................................................... 201

CURRICULUM INTEGRATION OF VOCATIONAL TRAINING AND
APPRENTICESHIP BASED TRAINING TO FULFILL COMPETENT WORKFORCE
MARKET
Cahyani Windarto, Sukiyo ..................................................................................................................... 207

ISSUES IN CURRICULUM DEVELOPMENT AND
DECENTRALIZATION OF
VOCATIONAL EDUCATION TO NATIONAL ECONOMIC GROWTH:
THE CASE OF INDONESIA
Sutarto Hadi Prayitno .................................................................................................................................. 216
PATTERNS OF INTER-INSTITUTIONAL AND INTER-ORGANIZATIONAL COLLABORATION
STRENGTHENING THE RELATIONSHIP BETWEEN VET AND LABOUR MARKET FOR
DEVELOPING A PROFESSIONAL WORK FORCE

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Abstract

The relationship between Vocational Education and Training (VET) and the labor market is crucial for developing a professional work force. The paper investigates relational patterns of inter-institutional and inter-organizational type. Such collaboration is a strength of the German vocational education system but is recently challenged by both demographic and technological trends. After a more theoretical introduction of the European Framework for Education, the author discusses two specific approaches to highlight recent developments in a conceptual way, using a case study design. Case study I deals with a TVET-Stakeholder online community and Case study II with an apprenticeship-trainer online platform.

Subsequently both case studies are used to address challenges and related approaches for structural developments of the VET in Germany and beyond, discussing what it means to develop such linkage further in the age of the knowledge society and web 2.0, virtual enterprises and online education. The recent trend of introducing web2.0 technologies in vocational education as well as in the industry itself opens quite new opportunities for strengthening collaboration between VET and the labor market. This is especially necessary because in 2014 for the first time in Germany the number of those starting academic training has exceeded the number of those entering vocational education.

All in all patterns of inter-institutional and inter-organizational collaboration receive additional importance in TVET. Only recent developments concerning both, new organizational principles and new media technologies, allow the development of better solutions for the near future.

Keywords: Vocational Education and Training, Knowledge Society, Web 2.0, Online Education, Inter-institutional Collaboration, Virtual Organization, Case Study, European / German Qualification Framework

1. Introduction

Inter-institutional and inter-organizational collaboration are serious strength of the German vocational education system. Concerning the organization of the vocational and technical education a core component of the TVET is the strong inter-organizational, even inter-sectorial linkage between vocational institutions and industry. The principle of the German model is to interlink training components coming from both sides, VET and Industry. Whereas in some other European states more than 50% of the workforce received a mainly academic training, taking place at a colleges and universities, in Germany the majority of the workforce is trained within the VET programmers. Due to the core role of the two key players, VET and Industry, this approach is labelled as the "Dual System".

What does it mean to develop this linkage further in the age of the knowledge society and web 2.0, virtual enterprises and online education? The recent trend of introducing web2.0 technologies in vocational education as well as in the industry itself opens quite new opportunities for strengthening collaboration between VET and the labor market. This is especially necessary because
in 2014 for the first time in Germany the number of those starting academic training has exceeded the number of those entering vocational education. Overall these and further influences do currently lead to a renewed attention given to the VET in Germany. The paper will discuss approaches to highlight recent developments conceptually. Subsequently the author uses case studies to address both, challenges and related approaches for structural developments of the VET in Germany.

Theoretical background is the European Framework for Education, an 8-step-scale that defines how to interlink the different levels of any education provided in Europe. Indeed the German national VET scheme sometimes did not plan continuing education, when a learner has reached the highest vocational level and the transfer to other educational routes would not be allowed. It has only partly been discussed what positive consequences such a unified qualification scheme does have for the collaboration in general (Lave & Wenger, 1991; O-Reilly, 2005, Mohamed & Köhler, 2011) and the Dual System in VET and how the German educational sector tries to keep up, perhaps even advances by adopting it.

Case study I (TVET Stakeholder online community) addresses the challenge that different regulations need to be applied to determine the targets and contents of the VET. All in all industry, TVET sector, unions, policy etc. need to define the needs and goals of any new TVET program jointly. Therefore, the author introduces a research project of Dresden University of Technology, one of Germany's leading academic institutions in the TVET sector, which aims to promote social interaction between all before mentioned stakeholders. This is not so much a didactic approach of learner-teacher-exchange but moreover a collaborative endeavor to encourage the building of vocational stakeholder-communities online, including practitioners who are located at different places but need to exchange knowledge and information.

Case study II (Apprenticeship-trainer online platform) shows an already successfully implemented socio-technical solution. It deals with need of an improved collaboration of VET and industry within the training process. Here the duality leads to specific challenges because one institution does not deliver education only. To overcome such limitation that the measure aims to promote social interaction between learners and teachers in VET. Specifically we encourage the building of vocational online-communities of learners and teachers in vocational education but also of vocational trainers located in the training enterprises.

2. Theoretical background: re-framing education in Europe with the help of inter-institutional and inter-organizational patterns

How can we combine different sectors of education within a single pattern? Europe is demonstrating that for a re-framing we need to allow combining different layers of education, including TVET, within one system. Such provides as well new linkages of inter-institutional and inter-organizational educational collaboration (Köhler, 2006; 2012).

The European Qualifications Framework for Lifelong Learning (EQF) is a relatively new eight-step scale that defines how to interlink the different levels of any education provided in Europe. The EQF, which is intended to act as a vehicle for linking the various national qualifications system via so-called National Qualifications Framework in order to create greater understanding of national qualifications at a European level profiles (cf. EUROPEAN COMMISSION, 2008). Following the recommendation of the European Parliament and European Council of 23 April 2008 on its establishment the European Qualifications Framework for lifelong learning should be linked to the national system of qualifications until 2010. However, the new scheme does not directly fit the German legal situation as defined by the Vocational Training Act (cp. Federal Ministry for Education and Research, 2005).

Overall, the European Qualifications Framework for lifelong learning delivers "a common reference framework which assists in comparing the national qualifications
systems, frameworks and their levels. It serves as a translation device to make qualifications more readable and understandable across different countries and systems in Europe, and thus promote lifelong and life-wide learning, and the mobility of European citizens whether for studying or working abroad.” (cf. http://ec.europa.eu/eqf/home_en.htm)

To implement this new European specification in Germany it has been agreed to develop a national qualifications framework, the DQR [English term: GQF for German Qualification Framework]. Following the adoption of the DQR (see DQR Working Group, 2011) in the group, DQR also been afforded an opportunity to begin the mapping of national qualifications levels to the DQR. As described by Esser (2012) already during the phase of drafting the DQR drew, a dissent in the positions between the TVET affiliated institutions and the Standing Conference of the Education of the German states (KMK) occurred. In particular, the allocation of professional qualifications and general university entrance qualification could not be resolved, even until now.

The two figures on the next page give further insight into the European Qualifications Framework for Lifelong Learning, separated for its levels 1-4 versus 5-8 (cp. http://ec.europa.eu/eqf/). Each of those eight levels is defined by a set of descriptors indicating the learning outcomes relevant to qualifications at that level in any system of qualifications. The EQR may be applied toward any educational activity independent of its sectorial heritage.
Figure 1. The European Qualifications Framework for Lifelong Learning, Levels 1-4 (cp. http://ec.europa.eu/eqf/home_en.htm)

Figure 2. The European Qualifications Framework for Lifelong Learning, Levels 5-8 (cp. http://ec.europa.eu/eqf/home_en.htm)
Indeed the subsequent VET leads sometimes to dead ends of education, when the highest vocational level is reached but the transfer to other educational routes would not be allowed. However: “Bridging frameworks depend on the existence of separate sectorial frameworks which are governed by sectorial interests. There is a stronger form of linkage, which gives an NQF the role of bringing together the sectorial frameworks into a new integrating framework. These frameworks are a formal link between different education and training sectors and are represented by a single set of levels and descriptors covering all education and training sectors. Each sector uses this common set of levels and descriptors as its own framework. No separate sector frameworks exist.” (Cp. EQF Note 2, 2010, pg. 29)

Figure 3. Types of Qualification Frameworks (EQF Note 2, 2010, pg. 29)

Subsequently we will apply such a unified qualification scheme for TVET, specifically toward developing the so-called Dual System of TVET that is the specific German vocational education approach (Kersten et al., 2011). As described by Köhler (2012) three specific tasks concerning the implementation of the DQR, i.e. the German Version of the EQF, are pending and have particularly importance for TVET:

1. Allocation of Qualifications: In accordance with the agreement of the federal, state and social partners of January 31st 2012 the already agreed upon by consensus assignments, made especially to level six (e.g. bachelor, college, specialist, master).

2. Development of competence-based order means (measures): The recommendation of the European Parliament and of the European Council in April 2008 provides for the definition and description of qualifications a learning outcome-oriented approach. In that context, the German TVET has a need to define the qualifications of the training in the future in so-called competency-based order means (measures) for all general-education degrees.

3. Designation of a national focal point: According to the recommendation of the European Parliament and of the European Council, a national infrastructure for the implementation of EQF / DQR needs to be developed. Of particular importance, here fore is the creation of a national coordinating body to ensure, in particular the linking of the DQR associated qualifications to the EQF. It shall also ensure that all relevant stakeholders are involved in the implementation process in accordance with national legislation and practice.

3. Case I: TVET Stakeholder online community

Aim of the so-called AOK community project is the modelling and assessment of competencies of academic qualifications in terms of their labor-market effectiveness. The sub-goals of AOK community share these include in the theory-oriented modelling and transfer-oriented validation example:

- Theory-based determination of structural indicators of academic qualifications in terms of European / the German Qualifications Framework EQF / DQR, National Educational Panel NEPS and Bologna study documents (European study book, student card, Diploma Supplement)
- Generic (structural) competence modelling based on online portfolio
- Concept of the involvement of stakeholder groups in the modelling with a particular focus on labor mark close, professional / operational requirements
- Development and testing of a prototypic method in the above Professional community
- High school Cross-validation in the context of "Education portal Saxony", which is Germany's largest academic learning platform with >100,000 students and covers all the universities of the Free State of Saxony.

Objectives of the project AOK community deal with the conceptualization of generic competency models as well as the development and testing of measuring instruments for the assessment of competencies. The here newly developed methodology of the labor market-oriented competence-modelling for academic skills in communities is based on the structural elements of existing models of academic education (study documents in accordance with Bologna, EQF / DGR and the indicators of the National Educational Panel). Linked to these elements we address a portfolio-based online methodology for a profession-independent, structurally oriented approach to competence modelling of academic qualifications.

In particular, the method proposed here is that the operational / professional stakeholder groups will be included in one joint community of labor market-related social partners (chambers, associations, employers, unions, etc.). Such is effective in the definition of competence profiles and will be extended by education scientific research in particular related to the new methodology of the portfolio-based online skills assessment in the dual vocational training (see www.blok-online.org). Here for the first time a completely online-based assessment of individual competencies in TVET has been implemented successfully.

Target group of the project AOK community are students in the bachelor and master phase (Bologna phases I + II). Such are the one hand, extensive structural requirements for the competence modelling, which have already been introduced in practice. On the other hand, this group is numerically very extensive and very relevant. In principle, the method chosen here is also applicable to doctoral students (Bologna Phase III) - however, the doctoral study conditions are relatively heterogeneous in Germany and comparable with the US-system (Köhler et al., 2011). In addition, that target group is possibly rather small and thus an effective transfer and validation would be different.

The aim to use the portfolio as a tool of competence modelling is related to the Personal Development Planning (PDP). The basic approach of PDP, which is originally used to promote executives, may be located in a competence development that helps the developed to orient toward personal development objectives. In contrast, the portfolio work is based on the structured collection of qualification certificates, which acquires the learner in its formation history and the document his current skills profile. In the project AOK community, these two complementary approaches are combined in the context of academic training to a standardized procedure for individualized study and educational planning.

With high probability, the expected benefit within the conceptual context of the Bologna framework, the permanent promotion of ownership and the motivation to study will help the students with the acquisition of relevant work-related skills reduce student dropout rates. We predict a significantly increased labor market relevance of the skills profile of the graduates, as well as in reflexive effect are improved quality and a demand-oriented design of studies and service offerings of the colleges. After the development of conceptual and methodological foundations of the use of portfolio-based development, planning is investigated empirically with students of different professional cultures and forms of higher education in the Free State of Saxony. The aim is to demonstrate the successful applicability of portfolio-based development planning in the academic qualification scientifically. By that, its comprehensive potential benefit for future adoption can be addressed. As a result, the project AOK community will also provide generic planning principles and tools for implementation of portfolio-based
development planning at other German universities. The following figure 4 gives an overview of framing conditions plus the modelling approaches at both the individual and community (i.e. organizational) levels:

![Diagram showing framework and modeling approaches on an individual and community level]

**Figure 4. Framework and modeling approaches on an individual and community level**

4. Case II: Improving collaboration of VET and Industry in the training process by web 2.0 methods

As described by several authors continuous training is one of the most rapidly growing sectors of education. It has become even stronger under the label of lifelong learning in Europe (cp. Frindte et al., 2001; El-Gamal&Köhler, 2009). Köhler (2012) outlined that vocational education learning contents and as well, as study contents hardly meet the operational specifics of work-related training where rather short periods of training activity are needed. To explore the potential that is given by the application of new online technologies in the field of vocational training we present the online vocational portfolio as an example. This online vocational portfolio is not a direct transfer of the traditional vocational educational and training model into the context of virtual teaching and learning. Moreover, it is a solution to improve the organization and documentation, and the way students deal with the individual reflection of the educational and training process – as shown by the table 2.

The online training certificate was developed within the R&D project „Online record book for strengthening the place of learning cooperation“ (cp. http://www.blok-online.org/; Albrecht et al., 2012) and sponsored with a grant from the Federal Ministry for Education and Research within the context of the national program „Web 2.0 in Vocational Education“. In the center of the project stands the redevelopment of an existing instrument used by every German trainee, the paper-based training certificate book, with the help of innovative online communication technology. Primary objective is to strengthen the cooperative learning location between businesses and schools through a unified and common information base. Overall, the online record book links all stakeholders participating in the vocational...
education scheme, including students, teachers, vocational trainers and members of the examination committees at the chambers of trade.

The online record book is the digital conversion of paper-based form of the report booklet in a Web 2.0 application that can be used anytime, regardless of current place of learning of the trainee. As usual with the classical form of report specifications, the trainees also document in the web form on a regular basis the temporal and material process of its apprenticeship. The special feature is the virtual representation of the entire process of using the record book. This means that not only the time and location independent performing and reading the report booklet is made possible through the online training certificate, but also the (legally binding) acceptance of the report issue by the instructor and the transfer of the record books contents to the examiners in the respective chambers and guilds.

Figure 5 shows a screenshot of the report book in the weekly issue. Besides the view of a single weekday, there is a possibility to select the form of training and the type of presence (for example, vacation or illness). In addition, the trainee can insert an unlimited amount of additional contents (notes, documents etc.) in his record book, which allows building an extensive but highly individual documentation.

Figure 5. Implementation of the report in the online record of formal qualification
Main goal is the reliable collection and presentation of subject-specific competences in the context of the vocational training. The measure of professionally applicable, well-trained competencies is based upon the trainees' initial assignment in the record book. Here the entries are linked to so-called qualifications, i.e. vocational training positions from the regulations, which are stored in the system according to the professions' temporal and subject-related structure. This assignment requires active reflection of the training content edited by the trainees and can thereby strengthen their ability to reflect their own vocational development. Captured by the accumulation in the record book and the professional profiles positions assigned work or study hours in each area, the corresponding actual state is represented as achieved by the trainees. With the target / actual status indicator both the trainees and trainers are able to identify whether the trainee has worked according to training policy / curriculum at the particular time and on the necessary activities to a sufficient extent. Through the resulting transparency, differences may be easily detected and corrected by the student in a mostly self-determined way.

5. Conclusions

The German vocational education system offers a strong basis for a high quality approach to TVET when principally involving both, the schools and the industry. However, the system does also show some weakness in the context of an effective collaboration of both partners. Another demand is linked to the localization of the TVET in the overall education system.

So far, the collaborative portfolio approach received no or little attention in vocational training, so that the potential of the portfolio work for the self-determined design of learning processes remained unused (see Elsholz & Knutzen 2010). The only known cure for the documentation of the training course of trainees is the paper-based record book, which documents the material and temporal course of vocational training, but it often takes only the function of justification and control. Aware of this shortcoming the peculiarity of the presented portfolio approach in direct support of the portfolio-based consists collaborative measurement methods for competencies at the established vocational training record book, which each trainee must complete and which is controlled by the instructor. In this case, the requirements of the training regulations are initially implemented and the tasks completed must be assigned to the competencies and skills listed by the trainees themselves. In this respect, the e-portfolio is optimally adapted to the practice of vocational training, so that an essential aspect outlined by Elsholz & Knutzen (2010) toward e-portfolio work is taken into account.

Following Klampfer & Köhler (2013), the author argues that in order to transfer the potentials toward lifelong learning it appears beneficial to consider success factors of the media-didactic conceptualization of the online vocational training certificate. Here it is necessary to explain the vocational training in Germany that is constructed (as in some other European countries) as a „Dual System“ of periods in the vocational schools plus practical periods in the closely connected enterprises. However, both institutional partners have a separated responsibility for the period under their supervision and are often enough invisible for each other. Only recent online technology may become a stable infrastructure for collaborative education and training activity. Therefore, one key success factor is to bridge the time, content, and spatial proximity within the training process through the utilization of the e-portfolio. If one addresses this need within the labor process, it is obvious that a corresponding development portfolio should be placed directly in the working environment.

All in all patterns of inter-institutional and inter-organizational collaboration receive additional importance in TVET at the interface between the education sector and industry. Only recent developments concerning both new organizational principles and new media technologies
allow the development of better solutions for the near future. As well, one may expect a slight renovation of Germany’s dual system that is eventually even triggered by its classical strengths. Moreover, such provides additional opportunities to re-define the role of the trainee as a self-steered and self-reflected learner who becomes more and more an active partner of both, the teacher and the vocational trainer and develops to a knowledge carrier for its professional colleagues. By that, we expect a strengthening of the organizational relationship between TVET and labor market toward developing a professional work force.

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ROLES OF VET IN GENERATING A NEW ENTREPRENEUR INCREATIVE ECONOMY SECTOR

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Abstract

In this article examines the role of vocational education today. Discusses the results of analyze of economy of vocational education on all level (lower vocational education, secondary vocational education, high vocational education). In recent years there were marked changes in the structure of training. The proportion of graduates in lower vocational and secondary vocational education decreased while the proportion of higher education graduates increased. Also discusses issues the needs of the economy in area of vocational education and development of applied bachelor in the vocational education. The presented material contains the main indicators of educational institutions’ activities in the Russian Federation: contingent of students in vocational education programmes, personnel potential, condition of the infrastructure and financial resources. Data on the relation between education and the labor market is included.

Keywords: Vocational education, lower vocational education, secondary vocational education, high vocational education.

1. Introduction

Education is one of the most important areas of human activity. By level of education the population of Russia has a leading position in the world. The educational attainment of the employed population is rather high. According to the 2010 census over 78.7 % of the employed population had professional education, including higher and postgraduate education (31.7%) and secondary vocational education (36.6%). At the same time the proportion of the employed having secondary (complete) general education was almost 16% and that for basic general education – about 5% [2]. This data is twice the average for the specific weight of the population with a higher education (including after-school) and secondary vocational education, according to the Organization for Economic Cooperation and Development (OECD). In these countries, this indicator is equal 30% on average [8].


2. Definitions

Vocational education is the kind of education aimed at the acquisition of knowledge, abilities, skills and competence formation of certain level and volume in the process of basic professional educational programs. That allows to conduct professional activities in a particular area and (or) to perform work on specific profession or specialty.

Vocational training is the kind of education aimed at the acquisition of knowledge, abilities, skills and competence formation required to perform certain labor, official activities [3].

Education in the Russian Federation is divided into:
- General education;
- Professional education;
- Additional education;
- Professional learning.

It provides the opportunity to realize the right to education throughout life (lifelong learning).

Also set the following levels of vocational education.Vocational education includes 4 levels:
• Secondary vocational education;
• Higher Education – Bachelor;
• Higher Education -Specialist and Master;
• Higher education – training highly qualified personnel (including training of the teaching staff and programs of residency, and programs of internship).

Law abolished the concept of “LOWER vocational education” and significantly expanded the concept of “SECONDARY vocational education”. Due to the cancellation lower vocational education it equivalent to secondary vocational education based on training programs for skilled workers. Secondary vocational education it equivalent to secondary vocational education based on training programs for mid-level professionals.

However, this does not mean that such training will not be taken into account: mastering of working professions will take place at organizations of secondary vocational education and in educational centers and in the workplace.

**Vocational training** is aimed at acquisition of professional competences (skills and qualifications) by people of different age groups who are going to work with specific equipment and technologies, hardware, software and other professional tools.

**Vocational training** is aimed at acquisition of professional qualifications by workers or employees without changing the level of education.

**Vocational training** can be carried out [3]:

• through the programs of vocational training for occupations and positions of workers or employees who have previously had no profession (Part 2. Article 73);
• through the programs of retraining workers and employees for those who already have a profession (Part 3. Article 73);
• through the programs of advanced training for individuals who already have a profession (Part 4. Article 73.).

Vocational training is free of charge (Part 5. Article 73.).

3. Mainstatistical indicators of vocational education

The system of vocational education is designed to provider requirements of staff in the economy of country. Educational institutions of vocational education in training specialists should focus on the demands of labor market. At the moment the economic potential of the country is largely determined by the quality of labor force, which can indicate the three most important vectors of education, professions and skills [1]. These three interconnected components determining the professionalism of any person.

Observed in the last decade, the crisis of professionalism in various spheres of the national economy is largely a resulting from the crisis of Russian education in system of vocational education at all levels (lower vocational education, secondary vocational education, high vocational education) [1]. This is confirmed by analysis (monitoring) of the Institute for Statistical Studies and Economics of Knowledge National Research University "Higher School of Economics" [7].

In 2011, the training of skilled workers and employees with lower vocational education carried out in 2870 by educational institutions on programs of lower vocational education, of them in 2040 with the educational institutions of lower vocational education. During 2000-2011 a network of educational institutions of lower vocational education has been reduced almost twice.

The number of students on programs of lower vocational education for the same period was decreased by 758 thousand persons or 45.2%. Enrolment in lower vocational education programmes in the same period was decreased by 37% and graduates of lower vocational education was decreased by 32.3%.

At the beginning of 2011-2012 academic year training with secondary vocational education was carried out in 2925 educational institutions of secondary vocational education and 518 branches of these institutions. State educational institutions and municipal educational institutions of secondary vocational education was 2665 and private institutions was 260. In a comparison with 2000-2001
academic years, the number of state and municipal institutions increased by 3%, private institutions by 2.3 times. However, the network of private educational institutions of secondary vocational education is still small. Number of preparation of graduates in private institutions are about 5% with depending of the population and enrollment of students with secondary vocational education.

The number of students in secondary vocational education decreased in recent years in Russia. The number of students has decreased by almost 20% if to compare to 2005 and 2006 academic year. These tendencies are characteristic for as state educational institutions and as private educational institutions and it provide training specialists with secondary vocational education.

The 1080 educational institutions of higher vocational education work at the beginning of 2011-2012 academic years in the country. State educational institutions and municipal educational with higher vocational education was 634 and private institutions was 466.

The number of state educational institutions and municipal institutions increased by 4%, and private institutions was increased by 25% with compared on the 2000-2001 academic years. However, in recent years one would notice a tendency of decreasing of the number of higher education institutions. This is related from changes in system of the higher vocational education. Started the process combining educational institutions of higher education. The purpose of combining the reduction of a large number of higher education institutions and also improve the quality of students through the integration of financial and material and technical and intellectual resources.

The number of training of students in private institutions are insignificant and constitute about 16% of the number of students and 12% of the enrollment of students and 20% of the graduate of specialists with secondary vocational education.

The number of students enrolled in vocational education has increased on a third with compared to 2000 year. The unfavorable demographic situation has caused a decreasing of enrolment of students in universities in the 2008-2009 academic years. But in the following year began to decrease and the number of students. In 2011-2012 academic years it was reduced on 13.6% with compared to 2008-2009 academic years [4]. Also like to tell about the financing of vocational education. In 2011 the budgetary funds were over 80% in the structure of funds of state and municipal secondary vocational education institutions, and about 60% – for higher education institutions. In private education institutions the proportion of budgetary funds was about 1%. The lower vocational education institutions received 92% of financing from the budget. This is results you can see in table 1 in appendix. A table presenting the latest statistical information on the progress in vocational education [2].

4. Summary

Thus, as a result of the implementation of the State Program of the Russian Federation "Development of Education" from 2013-2020 a network of institutions and organizations of professional education will become a structure corresponding to the realities of present economy. In most universities, along with the educational programs of undergraduate and graduate programs will be implemented applied baccalaureate.

By 2020, all students will learn on individual curricula, including a significant proportion of independent work using information technology.

I would particularly like to note that the last few years, employers expanded their cooperation with these vocational education institutions. The percentage of companies that cooperated with universities has increased from 33 % to 43 % [8].

Employers coherently and sequentially evaluate your professional knowledge of graduates of university as "satisfactory". Opinions business leaders from different sectors of the economy are very similar. On the other hand, managers believe that graduates have a high ability to learn. They can learn new knowledge and to acquire job skills. The main form of cooperation between employers and
universities remains organization of practice periods and practice for students [5, 6]. Thus, we can expect that the quality and flexibility of modern vocational education in modern society will be achieved only with the active participation and students, and their families and employers. Now the Russian economy in need in staff of high qualification that can provide vocational education today. For change the role of vocational education needs new modern and innovative approaches and the use of methods of project, the use of network forms of integration of education, science and production, allowing to jointly developing innovative development program, corresponding to world level. Also needs use of technology platforms as innovative research and educational facilities and form regional clusters, providing economic conditions in a networked environment.

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Table 1. Main statistical indicators of professional education development[2]

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<td>Number of institutions with doctoral courses, end of year</td>
<td>117.7</td>
<td>142.9</td>
<td>147.7</td>
<td>147.7</td>
<td>154.5</td>
<td>157.4</td>
<td>156.3</td>
</tr>
<tr>
<td>Doctoral courses enrolment, end of year, thousands</td>
<td>492</td>
<td>535</td>
<td>579</td>
<td>593</td>
<td>598</td>
<td>602</td>
<td>608</td>
</tr>
<tr>
<td>Youths enrolled in lower vocational, secondary vocational, higher and postgraduate education programmes (enrolment in lower vocational, secondary vocational, higher education institutions, postgraduate and doctoral courses as a percentage of the population aged 15–34 years)</td>
<td>4.2</td>
<td>4.3</td>
<td>4.1</td>
<td>4.2</td>
<td>4.3</td>
<td>4.4</td>
<td>4.6</td>
</tr>
</tbody>
</table>

*Beginning with 2010 including students studying according to commercial contracts.*
MEDIA TEACHING DEVELOPMENT THROUGH INTERACTIVE WHITEBOARD BASED ON VIRTUAL LABORATORY IN VOCATIONAL EDUCATION

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Abstract

Vocational School (SMK) is designed to prepare students or students who are ready to enter the world of work and be able to develop a professional attitude in the field of vocational, and must be able to provide the competencies or skills that can improve the quality of graduates to achieve success. In this study was developed through a practicum teaching media based interactive whiteboard with a virtual laboratory as a means of utilizing computer animation and 3-dimensional simulations along with the development of hardware-based touchscreen. This requires the development of a research model development Cennamo and Kalk. The design of the display design of Virtual Laboratory (LaVir) can be used to support activities in the laboratory practice. Activities that occur in the virtual lab consists of modifying the circuit, building a circuit, put the circuit, take measurements and subsequent component is an evaluation of a series that have been made. The next stage is how the virtual laboratory can be used by teachers and students of SMK through an interface that is touchscreen media. When teachers or students carry out practical activities on the interactive whiteboard cursor movement will be followed by a cursor that exist in the virtual laboratory. The results of the assessment of teaching practice through interactive media-based virtual lab whiteboard expert judgment obtained responses comprising the content aspect, practical design aspects, aspects of the display (Audio Visual), the virtual aspect, programming aspects, and aspects of electronics shows the overall mean score highly rated better.

Keywords: Media Teaching, Interactive Whiteboard, Virtual Laboratory

1. Introduction

The development of today's educational world is entering an era marked by incessant technological innovation, so it requires the adjustment of the education system in tune with the demands of the workplace. Vocational School (SMK) is designed to prepare students or students who are ready to enter the world of work and be able to develop a professional attitude in the field of vocational, and must be able to provide the competencies or skills that can improve the quality of graduates to achieve success [1].

Success in SMK size can not be separated from the name of the learning process and the lab. Some practical subjects other than the need to know the basic concepts and theories supporting, also must perform experiments / experiments in the laboratory to understand a certain concept or the basic theories that have been studied in order to have a broader understanding level. To carry out a lab activities will require several factors, including laboratory space in accordance with the practice subjects, facilities equipment, and a complete practice materials.

Fact the field after the observation is found that there are many vocational equipment and materials that have very minimal practice, teaching media is still using conventional methods, there are even schools that do not have laboratory space,
so that the lab is not running optimally. Hope students are gaining the knowledge and experience of learning outcomes, while the teacher’s expectations are practical learning process toward the achievement of cognitive changes, psychomotor, affective, and life skills enhancement students.

To overcome these problems, in this study will be developed as a means of teaching media animation and 3 dimensional simulations along with the development of hardware-based touchscreen. To develop this, we need a media research development [2].

Based on the description of the background, so in this study some of the problems can be formulated as follows: 1) how to develop media that can enhance critical thinking skills and life skills of vocational students; 2) how to design media that can enhance students’ critical thinking skills.

2. LAVIR Planning Methodology

This research is the development of research [3]. Software development models such as the medium of instruction for the virtual laboratory[4][5][6], carried out with the engineering approach where the stages are: analysis, design, implementation, and evaluation. Having produced a model of teaching media.

This study is a type of research and development. In accordance with the understanding that this research aims to produce a product. The products produced in this study is in the form of interactive media and instructional practices touchscreen devices are expected to address the practical activities carried out using conventional equipment.

The conceptual model is the embodiment of a multimedia and lab materials that make up the model LaVir (Figure 1). The development of this LaVir consider a few things, namely: 1) audience. Users of this application are the teachers and students of SMK; 2) output equipment. Because the learning materials will be used by teachers and students independently, then the required format suitable for interactive use, the touchscreen-based; 3) image. Display with 3D images, such as backgrounds and illustrations that need to be made using 2D and 3D graphics software; 4) audio. This application does not use a specific audio recording, but the recorded audio with the video as a whole; 5) video. Video used in this application is a video showing the working principle of the working of a system or process that will be more easily understood and explained as compared to using a text; 6) animation. 3D animation that shows the form in accordance with the scope of lab materials is practiced; 7) simulation. Practicum requires a process of selecting the components, assembling components, and perform testing of components through measurement tools. All processes that occur simulated in accordance with the real situation; 8) interactive tools. This application requires an interactive tool that is a button to switch to a specific view; 9) virtual. Components and design rooms in the 3D shape is made equal to the real situation in terms of coloring, shape and perspective. So that would bring students into the atmosphere like a real laboratory practicum.

Production of CD-ROM is a multimedia stage where the whole object is created. To develop a program of measures required LaVir design as shown in Figure 1.
Making an application based on storyboards, navigation structure, or flowchart derived from the design stage. At this stage of the design created storyboards that depict the look of each frame. Interactive because that will be made is not simple, it is necessary navigational structure that can be used to define links from one frame to another frame as well as the effects of virtual visualization depicting a similar situation with the real reality. After the creation of application-Virtual Lab, all lab materials stored on a CD-ROM to be duplicated. While the hardware needed for the manufacture of such measures in Figure 2 as follows

![Fig. 3 Design Media Teaching from Touchscreen](image1)

![Fig. 4 Position for the calibration process](image2)

The series of touchscreen consists of 2 parts namely the transmitter (TX) and receiver sections (RX), the communication between them using Bluetooth communication. For the communication process between them using the installed software testing is then performed either software (software) or hardware (hardware) prior to calibration for the touchscreen.

**Display Design for Virtual Laboratory**

Before the beginning of the product development process is a step that must be passed by a collection of material. Collection material can be done in parallel with the production phase. At this stage, the collection of materials such as animated videos that match the topics lab, for background audio, video and others needed for the next stage. If the material sought is not found, then it should make your own by using software that has been predetermined.

Researchers in producing software LaVir media using a combination of measures of development measures which have been proposed by Borg and Gall, to adopt instructional design instructional Dick and Carey, and multimedia development in the adoption of Lee &
Owens. In outline at developing measures undertaken by researchers in this development is to construct a flowchart, storyboard, CD packaging, and manufacturing series of touchscreen. Products made using the main software Macromedia Flash MX, Macromedia Flash prof. 8, swift 3D, 3Ds Max and then produced the initial product LaVir media. LaVir initial product developed with the material presented by 10 lab experiments.

The design of the menu display design model development and then used as the basis of the Virtual Laboratory (LaVir) to generated a learning software that can be used in practice to support activities in the laboratory as shown in Figure 5.10. Activities that occur in the virtual lab consists of modifying the circuit, building a circuit, put the circuit, take measurements and subsequent component is an evaluation of a series that have been made.

[Diagram: Activity Diagram in the Virtual Laboratory]

**Display Virtual Laboratory (LaVir)**

Facilities and content developed in LaVir based storyboard and flowchart. For that to realize a virtual laboratory for the manufacture and animation programs are always based on the storyboard. The following will discuss about creating a virtual lab:

a. Home, is the first open page-This Virtual Lab program. This page will direct the user to enter the main menu page as shown in Figure 6.

b. Main Menu page, a page that will display the entire form to be explored. This page consists of a few buttons by function buttons respectively. First, the
"clues" to see the Virtual Laboratory guidelines. Second, the "component" to go to form a short introduction to the components used in digital electronics. Third, the "tools and materials" to go on the form provides information on the tools and materials used in electronic circuits. Fourth, the "practice" to go to form a virtual laboratory practicum. Fifth, the "material" that goes inside the material matter relating to lab activities.

c. Practice page, a page that will bring students to carry out practical activities. Form in Figure 8 is made as if the user or student taking the components and put them interactively. This page consists of several frames which are merged to form the video display in the form of SWF files. Perspective display provides an atmosphere as if it were in the room. It aims to deliver virtual effects / virtual.

d. Component Guidelines page, contains the steps that must be done before the start of practice activities. Page instructions shown in Figure 9.

e. Exercise and test pages, contains the exercises and tests given at the end prcobaan as shown in Figure 10. Given test consists of two tests in the form of the essay and a multiple choice test.

f. Workscreen page, a portion of the practice page. On this page students can assemble the circuit as shown in the upper right of the screen.
In the above picture students can draw (Drag) red dot where it wants and put it (Drop) to the corresponding point on the circuit like. When the draw point it will be followed by a line to illustrate the real-world "establish the connection / jumper cables".

**Programming Virtual Laboratory**

To make interactive programs the need for programming activities in Macromedia Flash action script known. Macromedia Flash application program developed for more interactive learning-based user interface as a means of communication between humans and computers (Human Computer Interaction), because the program is to provide tools that can be developed by the developer.

Page-screen menus work in Figure 5.16 is designed with interactive pattern where the user is given the freedom to manipulate the circuit, doing trial and error, look at the output and execution (running the program).

```javascript
on (release) {
    //manghasilkan variabel i=1, i=2, i=3, i=4, i=5
    for (i=1; i<5; i++) {
        //jamban_user = dikomporan
        if (root["jawabn_user"] == "tekbung") {
            if (root["jawabn_user2"] == "tekbung") {
                if (root["jawabn_user3"] == "tekbung") {
                    //tandai panel ke frame 1
                    gotoAndPlay(1);
                }
            }
        }
    }
}
```

![Fig 12. Salah satu Action Script pada menu simulasi](image)

**4. Interface Design**

After designing software that LaVir, next is how the virtual laboratory can be used by teachers and students of SMK through an interface that is touchscreen media. Interface in the form of hardware (Hardware) LaVir consists of several components, namely: 1) touchscreen receiver section referred to as the RX-TCS; 2) touchscreen transmitter section known as TX-TCS.

![Fig 13. Transmitter TX-tcs](image)
The standards to be achieved in this design are: 1) when the TX-TCS serves emit infrared signals when measured or give off light when viewed on a mobile phone camera; 2) Monitor, wide projection screen (LCD), or whiteboard can be touched and controlled like a touch screen using a TX-TCS; 3) once the LED lights will light up captured by TX-TCS as a single click, double click two times the mean, the next flare will continue to be perceived as click and drag (click and drag).

Touchscreen transmitter (TX-TCS) will emit a signal via Bluetooth to the communication process between the RX-TCS and computer. When teachers or students carry out practical activities on board touchscreen cursor movement will be followed by a cursor on the laptop. The following will be shown in the parts of the touchscreen transmitter (TX-TCS)

Specification consists of a number of components: 1) the power button connector; 2) connector direction buttons; 3) A key connector; 4) the volume button connector; 5) speaker connectors; 6) key connectors 1 and 2; 7) LED. Touchscreen is designed in this study using the wii remote application technologies are developed. The main feature of this series is the infra red receiver pixart camera that serves to capture the motion of the waves generated by infrared rays led, other features are integrated with bluetooth connector series TX-TCS. Motion carried by the RX-TCS captured by the camera is then translated into the form of coordinates via software applications that are built into the computer, so the movements performed by the RX-TCS followed by the mouse pointer movement on the computer screen.

Position TX-TCS should be right in front of the touchscreen display that can be read coordinates, or can be placed next to the screen with menyerong position to the right or to the left as shown in the Figure below.
(b) Fig 17. Position of TX-tcs
a) oblique to the left; b) right in front of the touchscreen display; c) oblique to the right

(c) Fig 18. Product Testing

From the results of product testing conducted, it was found that Black Box testing test results as presented in Table 1 below.

Tabel 1. Product Testing Results

<table>
<thead>
<tr>
<th>NO</th>
<th>DESCRIPTION</th>
<th>EXPLANATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Bluetooth connectivity</td>
<td>[ Success ]</td>
</tr>
<tr>
<td>2.</td>
<td>Touchscreen calibration Board</td>
<td>[ Success ]</td>
</tr>
<tr>
<td>3.</td>
<td>Drag process</td>
<td>[ Success ]</td>
</tr>
<tr>
<td>4.</td>
<td>Drop process</td>
<td>[ Success ]</td>
</tr>
<tr>
<td>5.</td>
<td>Suitability movement of the cursor</td>
<td>[ Success ]</td>
</tr>
<tr>
<td>6.</td>
<td>The accuracy of placement</td>
<td>[ Success ]</td>
</tr>
<tr>
<td>7.</td>
<td>Response RX-TCS</td>
<td>[ Success ]</td>
</tr>
<tr>
<td>8.</td>
<td>TX-TCS circuit works fine</td>
<td>[ Success ]</td>
</tr>
<tr>
<td>9.</td>
<td>This series of RX-TCS function</td>
<td>[ Success ]</td>
</tr>
</tbody>
</table>

CONCLUSION

Conclusions obtained in this study are: 1) The steps used in developing a virtual laboratory (LaVir) is through the analysis of the needs that exist in vocational lab, virtual lab development be done with attention to methodological aspects in the making of virtual-based learning to the writing program which then results of the prototype was tested through test expert (expert judgment): media expert, the expert material, and electronics experts. The products produced in this study is a virtual laboratory software (Lavir) for subjects Digital Electronics, CD-Interactive LaVir, CD-Tutorial, guide books LaVir, Instructional materials, textbooks, draft patents, scientific articles and presented at national seminar and internationally, as well as draft articles for national journals and international journals; 2) Development of a virtual laboratory is done through the touchscreen-based architecture and organizations that exist in a virtual laboratory which include studio rooms, user interface, virtual simulation modeling, interactive tools, visual representation, virtual workspace, and authoring tools. 3)
aspects of programming and electronics aspects showed a mean overall score with a very good assessment.

ACKNOWLEDGMENT

Gratitude to the Higher Education which has provided the opportunity to continue the study until the 2nd stage.

REFERENCES


OPTIMIZING THE INTERNET TO ENHANCE TEACHERS’ PROFESSIONAL DEVELOPMENT OF VOCATIONAL SECONDARY SCHOOL

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Abstract

This paper is written in order to contribute an ideas regarding to the importance of the Internet as a part of professional development of vocational school teachers. Teachers have a strategic role on empowering and learning in schools. Nowadays in Indonesia, teachers as a profession, consequently they should be aware to improve performance, competency, maintain and also their professionalism. On the other hand, rapidly information technology development allows the Internet can be used as an alternative medium for teachers’ professional development. Varied information can be retrieved openly and quickly via internet. But the question is, how can teachers convert information from internet into useful knowledge to: their self development, produce scientific papers, and to work innovatively. Those are a product of teacher professional development. To be effective information into knowledge, knowledge management is required to vocational secondary teachers, which can be briefly stated as “learning to know what we know”. This paper will describe knowledge management approach as a strategy to optimize the information from the Internet into useful knowledge for teachers’ professional development of vocational secondary schools.

Keywords: teachers’ professional development, vocational secondary school, internet.

1. Introduction

Nowadays, all nations in the world are faced to globalization era characterized rapidly changes in science and technology. According to [1], in early 21st century has grown information age or usually called the digital age that will gradually shift into knowledge age. At this knowledge age, knowledge is main resource in any economic activities. Shifting in digital and knowledge age should be anticipated by the world of education, especially vocational education, which oriented to prepare learners to be able to work in accordance with job market demands

In the information age, lifelong learning and collaboration are essential aspects of most innovative work that will generate many knowledge workers (k-workers). Information technology is not only transforming our workplace but also on educational system. Refer to [2], in the information era, there are three main components of the collaborative work environment in the ICT-oriented workplace, i.e. digital works, digital workplaces, and digital workforce. Intersection among those of components is needed that called computer-supported co-operative work (CSCW). CSCW addresses how collaborative activities and people coordination can be supported by means of computer systems.

Computer systems which drive a lot of information also have potentially to help students and teachers to learn much of what they need to improve their knowledge. In particular, computer-based systems on the Internet can be designed to capture knowledge as it is generated within a community of practice and to deliver relevant knowledge when it has beneficial. Data of [5] showed that in July, 2013, Indonesia ranked 8th of the world internet users with penetration of internet usage 19.0% of the total Indonesian population, and 1.7% compared to penetration of the world internet users. These data indicated that education in Indonesia has vastly
opportunities to use the Internet as a knowledge repository.

In the context of education system in Indonesia, there are two terms associated with the world work-oriented education, i.e. vocational education in secondary education level such as Sekolah Menengah Kejuruan (vocational secondary school) and vocational education in higher education level such as diplomas and polytechnics. Meanwhile, traditionally according to [4], the main objective of vocational education was to prepare students to work using competency-based education approach. Be different to [5], that education for the world of work should prepare workers to meet the new needs of industry in the information age that will requires different knowledge and skills of people and creates shifts in the nature of employment. It means vocational education will have endeavored to better prepare people in the new era by facilitating ICT infrastructures as new models in supporting learning process. These concepts can be argued that vocational education is organized for special education students to be ready to work in a productive and professional and able to plan to develop their career in a particular expertise area. Vocational education is an education that is always dynamic and adaptive to the growth of the labor market and the development of science and technology.

Above descriptions can be understood that the Internet as a knowledge repository has very beneficial in learning process at classroom. Teacher should have triggered their curiosity to explore further uses of the Internet as a learning tool through using the Internet itself. The most exciting feature of the Internet is how it easily can be used as a communicative device, because those of important for a teacher’s and student’s life and it is a powerful tool to enhance teaching and learning. Here are teachers will have very strategic role in effort to convert and transfer information from the Internet into knowledge sources that have beneficial to themselves and their students in learning. This means that teachers are required continuously to develop their professionalism to be able to maintain and improve their professional competences. Therefore, teachers must have basic knowledge management capabilities to optimize information into useful knowledge for their career development and professional interests.

2. Internet as a Knowledge Repository

There are two important terms that should be understood in this section, i.e. knowledge and internet. Before discussing about knowledge, it would be better understand to distinguish between data, information, and knowledge. Refer to [6] that data typically represent symbols or facts out of context, and thus not directly nor immediately meaningful. Data placed within some interpretive context acquire meaning and value as information. Knowledge is the meaningfully structured accumulation of information.

In general, internet means of interconnecting among computer to any other computer anywhere in the world via dedicated routers and servers. When two computers are connected over the Internet, they can send, receive, and retrieve all kinds of information, such as text, pictures, graphics, voice, video, and computer programs. Refer to [7] the Internet is a “network of networks” that a global system of interconnected computer networks that use the standard Internet protocol suite (TCP/IP) to link millions of private, public, academic, business, and government networks, of local to global scope, that are linked by a broad array of electronic, wireless, and optical networking technologies.

In the internet world, any kind of information can easily be searched and found what it's needed. Just type the keyword in search engine and you can find a lot of information about it.

The Internet is recognized as a rich information source, which can be easily tapped by any person who has skills to use the Internet. The rapid development of Information and Communication Technology has yielded an almost unlimited variety of databases and multimedia platforms that are able to supply multifarious needs, including knowledge, edutainment, entertainment, leisure
activities, consumer facilities, interpersonal interaction, etc.

There are many knowledge centers in the net like which can be accessed and used by people. There are virtual library and also on-line discussion boards which are useful tools for academic exchanges. Thus, the use of internet by students and teachers is perceived as a vehicle to increase knowledge and skills necessary for successful negotiation of tasks presented by 21st century. Hence the Internet is truly a knowledge repository.

Refer to [8] described a knowledge repository as a database of knowledge assets that are systematically organized to facilitate searching and retrieval. Furthermore, the reference [9] stated that the knowledge repository represent a valuable means to manage the explication, sharing, combination, application, and renewal of organizational knowledge. Thus, knowledge repository means a place to store and to retrieve knowledge easily using the Internet facilities.

3. The role of Management Knowledge in Teacher Professional Development

Teachers who had surfing through the internet would got a lot of information their desired, so that its would accumulate as useful knowledge for themselves and others. Obtaining meaningful knowledge is sometimes difficult to be expressed and felt for others verbally, which is called tacit knowledge. However, there is also the acquisition of useful knowledge is easily communicated, received, and others into new knowledge, which is commonly called explicit knowledge.

As stated in [10], tacit knowledge refer to personal knowledge embedded in individual experience and can be extremely difficult to transfer, whereas explicit knowledge is knowledge that is easily articulated and transmitted. Tacit knowledge is more personal knowledge, while explicit knowledge is knowledge that can be shared and developed into new knowledge. Tacit and explicit knowledge are needed in the work-based learning. More clearly in [11] of the Nonaka's premise that tacit knowledge is subjective and experience based knowledge that cannot be expressed in words, sentences, numbers or formulas, often because it is context specific. This also includes cognitive skills such as beliefs, images, intuition and mental models as well as technical skills such as craft and know-how. Explicit knowledge is objective and rational knowledge that can be expressed in words, sentences, numbers or formulas (context free). Thus, to be explicit and tacit knowledge becomes meaningful for teachers to carry out the work in accordance with their expertise; they are required to have a knowledge management capability.

In [12] defined knowledge management as the process of capturing, developing, sharing, and effectively using organizational knowledge. Similarly this definition described on [13] that knowledge management is a tool, technique, and strategy to retain, analyze, organize, enhance, and share expertise, because knowledge is an infinite asset that will increase the knowledge being presented to the others. In the shortly statement, in [14] defines knowledge management about “learning to know what we know”. This means, the knowledge management is the key to find new ways to convert data into useful information so that it becomes knowledge.

To realize an organized and structured knowledge, knowledge management of Nonaka's model is one of strategy that can be used to convert tacit knowledge and explicit knowledge into useful knowledge. Figure 1 shows an illustration of conversion of knowledge based on the Nonaka's model of knowledge. There are four knowledge conversion processes, namely: tacit knowledge - tacit, tacit - explicit, explicit - explicit, and explicit - tacit.
Description of the four knowledge conversion process based on Figure 1 can be described in [12], [15] and [16] that Socialization (tacit-tacit) is a process of sharing experiences and converting new tacit knowledge through shared experiences such as technical skills, observing, and imitating. Externalization (tacit – explicit) is a process of articulating tacit knowledge into explicit knowledge such as through dialogue and reflection, creating metaphor and analogies, and modeling. Combination (explicit – explicit) is a process of systemizing concepts into more complex and systematic sets of explicit knowledge such as best practices and methodology creation. Internalization (explicit – tacit) is a process of embodying explicit knowledge into tacit knowledge such as access to codified knowledge that closely related to “learning by doing”. Furthermore, in [3] concluded that when experiences through socialization, externalization and combination are internalized into individual’s tacit knowledge bases in the form of shared mental models or technical know-how.

Above descriptions can be concluded that the knowledge management ability is necessary needed for vocational education teachers in the learning process because it requires four knowledge conversion processes of the Nonaka’s model of knowledge. The internalization process of knowledge is required in the process of learning in vocational education. Process “learning by doing” is an appropriate learning process for vocational education. Vocational education teachers must be able to realize the internalization process in the learning process. This is in accordance with objectives of vocational education that prepared students to work relevant to their expertise. Of course, teachers are able to carefully manage knowledge will be useful for the improvement of his or her competence and professional development as well as improvement in the quality of teaching and learning activities.

4. Essential of the Internet in Enhancing Professionalism of Teachers’ Vocational Secondary School

Knowledge is a subset of information. Information can be easily retrieved, shared, and sent through the internet. Internet technology utilized to support the needs of students’ and teachers’ requirement who have limited space and time to be able to enjoy education. Many benefits can be gained through the Internet in education, such as: (1) accelerate and simplify to transfer science and technology, (2) more varied and attractive when used in the learning process, (3) encourage students and teachers more actively in seeking information and knowledge, and (4) obtain information that are always new and actual.

As mentioned above, the Internet as a knowledge repository, it means knowledge widely spread anywhere, anytime, and to whom knowledge is needed. In case teacher is able to collect and internalize knowledge in carrying out his or her duties means teacher has strengthened professional ability themselves. Teachers as practitioner in learning activities have responsible to solve any changes in class. As stated in [17] that teacher is faced with rapid changes, high standards and quality improvement demand required teachers to update and to improve their skills through in-service learning that carried out these activities in in-service education and training.

According to [18] professional development is opportunity for teachers to learn what they needed to know and what to do to help students to achieve their desired competencies. This means that professional development is required teachers to improve their pedagogical
knowledge based on specified standards. The results of teacher’s professional development are expected to improve their teaching and learning qualities.

Furthermore refer to [19], teachers of vocational education are agent of change in schools. This statement suggests that teachers are required to undertake self-development in order to be able to adapt to changes that occur in performing their duties. Thus, teachers professional development is one part of personnel development cannot be separated from the role of schools. According to [20], the personnel development is an important in part of vocational education that conducted in three ways, i.e. professional development, technical development, and general development. Professional development is to improve teachers’ ability that is expected to contribute in improving education quality. Technical development is to effort in increasing teachers’ technical ability in learning process relevant to the work world development. General development is to increase in teachers’ ability with regard to written and oral communication.

Clearly, above descriptions can be concluded that personnel development for vocational education teachers through professional development is meaningful and leads to new knowledge, skills, and practices that will enable them to better serve their students. In the context of teachers’ professional development in Indonesia, including teachers' vocational secondary school, there are three kinds of activities in teachers professional development, i.e. self-development, scientific publications, and innovatively work. Self-development is an activity in participating in a functional education and training and in conducting teachers’ board. Publishing activities are to produce scientific papers as the results of their research and to create book's publication. Innovative work activities are realized in some activities such as finding an applied technology, creating artistry, create / modify learning facilities, etc. All activities require a variety of information to be able to realize each product. Internet is an appropriate means to support teachers’ professional development in improving teachers and school quality.

5. Conclusion

The development of hypertext-based technology through the World Wide Web provided means of displaying text, graphics, pictures, animations, or other information, and easy search and navigation tools that also triggered a worldwide Internet's explosive growth. The internet is a knowledge repository. A variety of information from the Internet can be collected and developed into useful knowledge for students, teachers, and also education. One to be proud of when the teacher is able to perform search, retrieve, and process a variety of information through the Internet and convert them into useful knowledge for the teaching and learning process as well as improving their professionalism.

Optimizing the information from the Internet into useful knowledge for teachers' professional development is required a knowledge management approach. The Nonaka's model of knowledge can be used as a reference in order to make internalization processes of knowledge into the knowledge of technical know-how that is useful for learning activities in vocational education. Finally, the questions of all, how can teachers convert information into useful knowledge from the internet to: their self-development, produce scientific papers, and to work innovatively. All of these activities were personnel development as of teachers' professional development.

References


32


3D SIMULATION LABORATORY MODEL OF WEB-BASED INTERACTIVE TO IMPROVE ACCESSIBILITY, DESIRE TO LEARN, AND COMPETENCE OF STUDENT VOCATIONAL SUBJECT

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Abstract

The development of today’s educational world is entering an era marked by incessant technological innovation, so it requires the adjustment of the education system in tune with the demands of the workplace. Some practical subjects other than the need to know the basic concepts and theories supporting, also must perform experiments / experiments in the laboratory to understand a certain concept or the basic theories that have been studied in order to have a broader understanding level. Urgency (virtue) of this study are: 1) The creation of a laboratory model of a web-based interactive 3D simulation, is expected to address issues such as limitations on conventional lab time and place to implement practical, resource constraints are capable of teaching control of productive subjects, lab equipment and materials is minimal and difficult to establish because of the high cost of equipment / materials and maintenance costs, improve the competence of vocational students especially for productive subjects and 2) increasing the critical thinking skills of vocational students through the use of web-based 3D simulation lab before entering the industry. From this research a product produced laboratory models simulating three-dimensional interactive web-based which can be used in productive in vocational subjects. Products such as display / web pages on the implementation of the practice on the subjects of Analog, Digital, and Industrial Electronics SMK designed in 3D interactive connected to the internet on-line. Evaluation results show that the validation of the product by the average expert judgment obtained excellent ratings and the students’ response to the media very well.

Keywords: 3D simulation laboratory, web-based, interactive

1. Introduction

The development of today’s educational world is entering an era marked by incessant technological innovation, so it requires the adjustment of the education system in tune with the demands of the workplace. Vocational School (SMK) is designed to prepare students or students who are ready to enter the world of work and be able to develop a professional attitude in the field of vocational, and must be able to provide the competencies or skills that can improve the quality of graduates to achieve success.

Success in SMK size can not be separated from the name of the learning process and the lab. Some practical subjects other than the need to know the basic concepts and theories supporting, also must perform experiments / experiments in the laboratory to understand a certain concept or the basic theories that have been studied in order to have a broader understanding level. To carry out a lab activities will require several factors, including laboratory space in accordance with the practice subjects, facilities equipment, and a complete practice materials.

Fact the field after the observation is found that there are many vocational equipment and materials that have very minimal practice, there are even schools that do not have laboratory space, so that the lab is not running optimally. Hope students are gaining the knowledge and experience of learning outcomes, while the teacher’s expectations are practical learning process toward the achievement of cognitive changes, psychomotor, affective, and improving the competence of students through on-line learning.

To overcome these problems, in this study developed a laboratory model simulations by using an online network / website as a means of animation and 3 -
dimensional simulations interactively. To develop a laboratory model of a web-based interactive 3D simulation of this, we need a research development.

The purpose of this research is: 1) know the process of developing a laboratory model of a web-based interactive 3D simulations that can improve vocational competence vocational students; 2) obtaining results of laboratory model design web-based interactive 3D simulations that can improve vocational competence vocational students. The development of information and communication technology (ICT), especially the Internet provides an opportunity to access a variety of educational information, either in the form of text, image, simulation, and sound. Integration of information technology in education, especially packaging web-based learning environment in PBL (Problem Based Learning) brought a new revolution and enabling the achievement and higher learning outcomes [1].

Emphasized that the World Wide Web [2] is often called the web into a powerful environment to distribute information, and many educational institutions use it to transmit knowledge to the stakeholders. The opinion supports who considered the information and communication technology innovations change the rules in the creative and send academic learning resources.

The website has several functions, namely: communication function, the function of information, entertainment functions, and functions of the transaction. Various functions held by a website cause its development flexibility for various purposes, especially for improving the quality of teaching and learning (PBM) in the school. PBM activities in the main high school in SMK more stress to the lab. Processes more practical in SMK 70% compared with 30% theory [3]. Practicum is one of the important factors in the success of students in participating in the process of teaching and learning activities. To achieve this there needs to be a complete laboratory facilities, combined with the utilization of information technology such as the internet that can be done anywhere and at any time based on-line [4]. Moreover, the characteristics of the developed laboratory-based 3-D simulation is applicative, communicative, interactive, and able to develop critical thinking skills than just the ability observation alone.

2. Laboratory

The emergence of more complex interactive multimedia supported by the development of computer technology which gave birth to the more complex types of media as well as the combination of audio media, video and communications, known as multimedia computers that can be used as an alternative medium of supplements lab at the school referred to as laboratory simulation.

Laboratory is a scientific research, experiments, measurements or scientific training done. Laboratories are usually made to allow such activities in a controlled manner. Scientific laboratories are usually distinguished by the discipline, such as physics lab, chemistry lab, biochemistry labs, computer labs, and language labs.

3. Simulation Model

Simulation is the imitation of the operation, according to the time, a real-world process or system. According to Law and Kelton (1991) simulation is a technique mimics the operations or processes that occur in a system with a computer and guided by certain assumptions so that the system can be studied scientifically. Simulation can be interpreted as imitating a real system that is full of complex probabilistic nature without having to experience the real situation [5]. Furthermore, the simulation model is basically a learning strategy that provides a more concrete learning experience through the creation of a clone-done form experience approaching the real atmosphere. From the definition of the experts above, it can be concluded that the simulation is a form of presentation by manipulating an object and make copies for the purpose of reducing misperceptions of the material-the material is complex or abstract. Variety of learning media will be able to turn the learning environment, encourage and facilitate the learning motivation understand abstract concepts or complex [6].
The simulation model consists of two types, namely the analog simulation and symbolic simulation. According to Sunarno (2008) analog simulation uses the physical representation to describe the characteristics of a problem, while the simulation of mathematical models that emulate symbolic solution using computers, called computer simulations. Simulation is generally used to solve a variety of problems: difficult to be solved by analytical means such as the complex electrical circuits; has a data size and high complexity; very difficult to implement directly since it requires very expensive, when the relationship between variables is not linear, and when the model has a random variable.

In the simulation approach, to solve complicated problems will be easier to do when starting to build an experimental model of a system. Learning model simulation aims to: (1) specific skills training is both professional as well as for everyday life, (2) gain an understanding of a concept or principle, (3) trained to solve problems, (4) increase the activity of learning, (5) motivate students to learn, and (6) foster students' creative power. [7]

Model simulation approach [8] are presented in Figure 2. Boxes in the figure is a key stage in the research consists of: 1) real world (problem), is an implementation of the solution and/or understanding gained; 2) conceptual models, a description of the model will be developed; 3) computer models, a simulation model is applied to the computer; and 4) solutions/understanding, is the result of a process of experimentation.

Motivation in performing a simulation is the recognition of some of the problems that occur in the real world that would cause concern for it is necessary to run for a simulation, to propose a model that is suitable to handle it. Thus, conceptual modeling consists of the following sub-processes:

1. Develop an understanding of the problem situation
2. Determine the purpose of modeling
3. Designing conceptual models: input, output and content models
4. Collecting and analyzing the data needed to develop a model

In the model coding conceptual model is converted into a computer model. Here, coding is defined in the most general sense and does not have to mean computer programming. In contrast refers to the development of computer models. The model can be encoded using a spreadsheet, a special simulation software or programming language. The assumption here is that the simulation was built and performed on the computer. It should be noted that other forms of physical simulation is the simulation. Once developed, experiments performed with simulation models to gain a better understanding of the real world and/or to find solutions to real-world problems.

One of the models developed in the study are presented by Figure 1. Consists of material, discussion forums, progress reports, examinations, assignments, exercises, and additional files search. All of which will be presented in the form of a website through a virtual learning activities.

4. Characteristics Simulation

The desire to do interactivity, active involvement and support of navigation in the simulation are important characteristics that contribute to the educational outcomes of these tools. In addition, an important characteristic of simulation is its validity. Various types of validity can be distinguished. Content validity revealed the degree of simulation environments in accordance with the relevant aspects, activities and operational parameters of the real environment to simulate, construct validity reveal the level at which the construction, the knowledge and skills

![Fig 1. Key Stages and Process of Simulation [8]](image-url)
students should have evolved in a simulated environment resembling that we use in the real world.

As according [9], simulations are used to demonstrate something (skills) so that students feel like being in a real situation. Simulation is widely used in the learning material harm, difficult, or costly, for example, to train pilots or fighter aircraft.

Riyana and Asra (2011) simulation model has several characteristics, namely:

a) the operation of the process is something the tools, the creation of a particular product;

b) consists of a procedure in the form of a particular system;

c) learn how to use the tools, procedures and specific measures;

d) aims to prove something through a process of experimentation;

e) modeling and simulation showed sequentially;

f) in the form of analysis, synthesis and application;

g) require careful observation process;

h) focuses on achievement of affective and psychomotor aspects;

i) requires the evaluation of practice and observation.

The points above are general provisions which are required the use of computer-based learning media simulation model to help teachers convey the message of learning to students. In the simulation model, students menggunakan computer and obtain learning materials are packaged in the form of animations that can strengthen the responsiveness of students to instructional material that is packaged in the form of animations that can strengthen the responsiveness of students to the learning material.

Basically different simulation programs with drill and practice programs, the simulation program, the students did not respond to questions but rather on creating an atmosphere closer to the actual situation, which is probably the real situation that is too expensive or too dangerous to be done by the student, but with the use of simulation it can be overcome, because the strength of the simulation is the fact that response by the computer based on the choices made by the students themselves.

Some of the objectives of the simulation activities are as follows: 1) to improve student learning by engaging students in learning situations.
almost similar to the actual occurrence; 2) to train students on specific skills, both professional and is essential for everyday life; 3) To train solve the problem; 4) To provide stimulation or excitement of student learning (Ahmad and Prasetya, 1997: 83).

The simulation model is divided into four categories, namely: physical, situations, procedures, and processes where each category is used in accordance with specific interests. This is in accordance with that proposed by Alessi and Trollip (2001): simulations play divide into four categories: physical, procedural, situational, and process. A physical simulation models some aspect of physical reality, such as an airplane cockpit, with which the learner must interact. Procedural simulation present a series of actions that constitute a
particular procedure to be learned, such as diagnosing faults in automotive electronic circuits. Situational simulations represent human interactions with the environment or other people. Process simulation allows the learner to experiment with "what if" situations in a safe environment.

Simulation has a good transfer of learning, as studied in simulations usually good transfer to the real situation. 3) efficient. The definition of efficient is far more worthy of examination, are as follows:

- a) The other way to increase the efficient learning is to equip students with an environment that is more conducive to study one of the real activity;
- b) simulation offers other advantages as well. Simulation is safe, comfortable, and can be controlled;
- c) simulation is also more convenient in the real world activity. Usually a little, always available, can be repeated and time-consuming bit. Simulations can also be controlled and can be compared in a simulated life situations but not just an imitation of reality but also to make a simple simulation. This is necessary because in reality it is impossible to replicate every detail becomes simple is an advantage for learning;
- d) the simulation can be used as a test.

Many studies suggest that computer simulations can help students eliminate misconception. In this simulation, students can manipulate the data, collecting data, analyzing data, and drawing conclusions. If the simulation students get different data with predictions, will have conflicts. With this conflict, students are motivated to ask why. The use of simulation is very beneficial because students can repeat themselves outside the classroom and students can change misconceptions quickly becoming a true and complete concept.

The reason the authors chose the simulation model, because it has the characteristics: 1) simulation model according to [10], is basically one of the learning strategies aimed at providing a more concrete learning experience through the creation of simulations that experience shape approaching the actual atmosphere and takes place in an atmosphere without risk; 2) simulation models of computer-based learning is relevant to learning digital electronics that have the characteristics of concrete in which there are laws, formulas, theories, and concepts are very complicated. Digital electronics lesson as the writer explained in chapter I are subjects that are considered by students as subjects abstract and difficult to understand. Something that is expected by the authors of this simulation model is to evoke the spirit of the students in the study of digital electronics, as well as to improve student learning outcomes.

5. Advantages and Disadvantages of Computer-Based Simulation

Application of a model is very dependent on the condition of the media and the learning environment. There is no perfect model or good in any model of applied learning in the classroom. Each model has definite advantages and disadvantages of each.

5.1 Benefits Simulation Model

The advantages of the simulation model is as follows (Ferro, 2005: 25:1) creating excitement learners to learn; 2) foster the creativity of learners; 3) foster courage and steadiness appearance learners; 4) channel that gets pent up feelings of satisfaction, freshness and mental health; 5) as a provision in community life; 6) reducing the things that are abstract and displays real activity; 7) can be found new talents in acting or acting.

In addition to the advantages described earlier, another advantage of the simulation method are: a) the fun of students; b) encourage teachers to develop students’ creativity; c) foster critical thinking; d) allow experimentation lasts without requiring the actual environment; e) does not require complicated alignment and depth; f) Potential positive response from students who slow / less capable [11]; g) reducing the things that are abstract and displays real activity [12].

Furthermore, according to [13] that there are many benefits to be gained by using the simulation model are: a) compressed time (saving time), meaning that if an activity performed requires significantly longer periods of time, if the use of simulation, then quite a few minutes; b) control sources of variation (to oversee the sources vary), the point in the simulation, data collection and processing
on a computer can be obtained from various sources that vary quickly and concisely; c) in measurement error correction (correcting errors in calculation and measurement) digital electronics means in practice, at the time of measurement of a component of a more valid and do not need to doubt that the components measured are damaged, otherwise the simulation, the computer rarely found error - error in the calculation process, especially when the numbers taken from the computer regularly and freely; d) stop and restart the simulation (can be stopped and started again), that computer simulation can be terminated for such purposes without having a negative impact on the simulation program, and then quickly run back; e) easy to replicate (easy to be repeated), the intention is with the computer simulation experiments can be done at any time and can be repeated. Learning activities can be carried out repeatedly in accordance with the time and opportunity that students.

Furthermore, [14] states that there are some advantages and disadvantages of using a simulation model of learning. Excess simulation model is as follows: a) the simulation can be used as stock for the students to face the real situation in the future, both in the lives of families, communities, and face the world of work. Simulation can develop the creativity of students, because through simulation the students are given the opportunity to play a role appropriate to the topic being simulated; b) simulation can cultivate courage and confidence of students; c) enrich the knowledge, attitudes, and skills necessary in the face of problematic social situations; d) the simulation can enhance arousal permbelajaran students in the process.

Furthermore, Ministry of Education (Pramod, 2008) mentions some of the benefits of media simulations, which are as follows: 1) provide a knockoff when performed on real equipment is too expensive or dangerous (e.g., simulation of the form of electrical voltage with an oscilloscope or simulations to practice flying the aircraft with simulated); 2) shows an abstract process where the user wants to see the effect of changing a variable to the process (e.g., changes in the frequency of the alternating electric voltage through a capacitor or inductor).

Some of the advantages of simulation in the teaching media are: 1) simulate a real situation when viewed too dangerous (e.g., simulation of nuclear reactors); 2) simulate a real situation when viewed too expensive (e.g., aircraft simulation); 3) mimicked a difficult situation to be repeated significantly (e.g., volcanic eruptions or earthquakes); 4) if the situation mimicked in practice requires a long time (e.g., plant growth teak); 5) mimicked the extreme natural conditions (e.g., conditions at the poles) and so on.

There are several advantages of using the simulation as a teaching method, according to the Supreme (2009) include: 1) the simulation can be used as stock for the students to face the real situation in the world of work; 2) simulation to develop students' creativity; 3) simulation can cultivate courage and confidence of students; 4) enriching the knowledge, attitudes, and skills necessary in dealing with various situations DU/AT; 5) simulation to increase the excitement of students in the learning process.

Excess simulation method according Munadi (2008:166) are: a) the students can acquire knowledge about the concept of covering the rules of principle, of its constituent parts, process, outcomes and impact in a fun way; b) provide an opportunity for students to think, to imagine, to show new ideas and original seamlessly and provide an opportunity to master the motor skills; c) students can participate actively and actually be creative.

5.2 Weakness Simulation Model

The simulation model can be our weakness rincikan as follows (Ferro, 2005: 26): 1) requires a flexible grouping of students; 2) simulation experience is not always appropriate to the reality on the ground; 3) simulation as a learning tool into a tool of entertainment sometimes overlooked; 4) a sense of shame, doubt, and not confident will result in stunted simulation; 5) requires high imagination.

The weakness of the simulation method can be detailed as follows: a) effectiveness in advancing student learning cannot be reported by the research; b) the
cost is too expensive; c) give rise to the relationship between teacher and student information which exceeds the limit (Roestiyah, 2001:23); d) the simulation experience is not always appropriate to the reality on the ground; e) simulation as a learning tool into a tool of entertainment sometimes overlooked; f) requires high imagination [12]

In addition to having the advantages, simulation also has drawbacks, according to the Supreme (2009) include: 1) the experience gained through the simulation is not always appropriate and in accordance with the reality on the ground; 2) poor management, simulation is often used as a means of entertainment, so that the learning objectives to be neglected; 3) psychological factors such as fear and shame often affect students in performing simulation; 4) simulation requires the imagination of students and teachers are adequate.

The advantages and disadvantages of this simulation method is a provision in the consideration of the use of simulation methods. Shortages owned by simulation methods not mean this method can not be used. Simulation methods in certain things will greatly help create a pleasant situation in the teaching-learning interactions in the classroom. Perform basic competencies of electrical wiring and lighting improvements by teachers deemed suitable to be applied using the method of simulation, partly because the material is abstract.

CONCLUSION

Simulation has a good transfer of learning, as studied in simulations usually good transfer to the real situation. a) The other way to increase the efficient learning is to equip students with an environment that is more conducive to study one of the real activity; b) simulation offers other advantages as well. Simulation is safe, comfortable, and can be controlled; c) simulation is also more convenient in the real world activity. d) the simulation can be used as a test can further improve the accessibility of web-based, desire to learn anytime and anywhere.

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IMPROVING THE QUALITY OF PRACTICE LEARNING THROUGH COMPETENCY-BASED LEARNING WITH COLLABORATIVE SKILL APPROACH ON VOCATIONAL EDUCATION

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Abstract

Learning is the core of education. It means solving the problem on technology and vocational education cannot be separated from the demand of innovations that focus on the improvement of learning quality. Competency-based learning of practice with a collaborative approach is one of learning innovations which is relevant to be conducted in vocational education. It is in line with the main objective of vocational education i.e. to provide productive competence for the learners to become graduates who are ready to compete in the corporate world.

Principally, the implementation of competency-based learning of practice with a collaborative approach is by dividing the students into groups. Each member of the group has the task to work on one component, which is then combined into its group to be one unit.

The advantages of this learning model were: 1) the existence of positive interdependence among learners, 2) promoting intensive face-to-face interaction, 3) developing a sense of personal responsibility, and 4) stimulating students' collaborative skills.

Keywords: collaborative skills, learning practices.

1. Introduction

Vocational education as part of the national education system plays a strategic role for the realization of a highly skilled workforce. Based on this fact, it is the responsibility of vocational education to produce competent graduates. Therefore, the competencies will be developed through a process of learning should refer to the competencies required by the industry.

Based on the fact that there are in the manufacturing industry, that the process of making one unit of the product requires the collaboration of various skills (collaborative skills). Without the cooperation is good then the final result of the expected product can not be achieved. One attempt to instill attitudes and behaviors related to the competence of learners demanded by the industry is to develop a model of practice learning skills through collaborative approaches. As described above, that the competencies required by the industry is not only one competence alone, but combined (collaboration) of some ability to produce one unit of a particular product. This provides feedback that the model of learning and teaching materials are provided in the learning process in vocational education must adapt to what is implemented in the industry.

In order for the learning process in vocational education in sync with what is happening in the industry, it is necessary to the selection of an appropriate learning model. One model of learning that is appropriate to what is done in industry is a competency-based learning model with collaborative skills approach.

Implementation of competency-based learning model with this skill collaborative approach is deemed feasible and important to do because it has advantages such as: 1) familiarize students with the climate system and work in the industry, 2) the expected competencies in the learning process can be mastered by learners to the maximum, 3) the delivery of competency in the learning process can be carried out effectively and efficiently in order to create graduates who are ready to use, 4) establish a culture of collaboration in the learning process so that the practice of increasing learners' learning motivation, 5) improve the learners'
learning achievements. Based on various studies and research result shows that the model of learning by doing with this skill coollaborative approach can provide a positive contribution to improving the quality of teaching practice in vocational education. Therefore, the learning model must be implemented on vocational education in order to produce graduates that really fit with the demands of the job market.

2. Discussion
2.1. Vocational Education

According to Calhoun and Finch (1976: 2), that the definition of vocational education developed the concept of translation vocational education and occupational education, which means an educational program that is directly linked to one's preparation to enter the workforce, or for additional preparation required in a career. Furthermore, according to Finch and Crunkilton (1979: 2) vocational education is defined as education that provide supplies to students in order to work in order to sustain his life.

According Hoachlander and Kaufman (1992) education experts from NCES (National Center for Education Statistics) USA: vocational education is intended to help prepare students for work, both inside and outside the home, many educators believe it has a broader mission: to provide a concrete, understandable context for learning and applying academic skills and concepts (http://nces.ed.gov/pubs92/9269.pdf.10–2012).

Based on these opinions means that the vocational education needed to prepare students to be ready to work both inside and outside environmental community, the primary mission of educators and policy makers are preparing a strong foundation in the learning process for the learners to mastery and application of academic skills and concepts needed by the workforce; 4) an assessment of the success of learners should be on "hands-on " or performance of the work; 5) a close relationship with the world of work is the key to successful vocational education; 6) are responsive and adaptable to the advancement of technology; 7) more emphasis on " learning by doing " and hands-on experience; 8) require sophisticated facilities for practice; and 9) require investment and operational costs outweigh public education.

Based on the various opinions on the above, it is clear that the emphasis of vocational education is to equip students with a set of skills and abilities (competencies) that can be used to work in a particular field or develop themselves according to their expertise. Thus, preparation of standard competencies appropriate to particular areas of expertise is needed as a reflection on the competence expected of all graduates of vocational education. So the future of vocational education contributed greatly to the progress and development in all areas of human resources puts us in a respectable position parallel to other nations.

2.2. Competence-Based Learning

Competency-based learning is the learning undertaken by learners competency achievement orientation. So the end result of learning estuary is increasing competence of learners that can be measured in a pattern of attitudes, knowledge, and skills (Purnomo Sidik:http://kidispur.blogspot.com/2009/01/prinsip-pembelajaran-berbasis.html). The concept of competency-based learning requires a clear formulation of competencies that should be possessed or displayed the students after participating in learning activities. With the achievement of competence benchmarks in learning activities learners will avoid unnecessary study material is material that does not support the achievement of mastery of the competency.

Achievement of each competency is closely linked to the learning system. Thus the minimal components of competency-based learning are:

a. The selection and formulation of appropriate competencies.
b. Specification of indicators to determine the achievement of competence assessment.
c. Development of delivery systems that are functional and relevant to the competency and assessment system.

Associated with the learning aspect, Ministry of Education (2002) states that the competence-based learning has the following five characteristics: (1) Emphasis on achievement of the competence of learners, both individually and classical, (2) results-oriented learning and diversity, (3) Submission in learning approaches and methods that vary, (4) sources of learning not only professors but also other learning resources that meet the educational elements, (5) emphasizes the process and learning outcomes in an effort to control or achievement of competence.

Characteristics of competency-based learning demands educators to constantly innovate and improvise in determining methods and learning strategies appropriate constantly innovate and improvise in determining methods and learning strategies are appropriate. In the learning process experienced many obstacles, professors are required to seek and find new approaches are effective and efficient. But at this point the teacher/lecturer is still considered to have the stock of knowledge is less didactic, methodical, and creativity in the learning material (DediSupriyadi, 2001). In such conditions, the selection of the learning model must be adapted to the ability of professors, lecturers work and not burdensome. Furthermore, according to the National Professional Certification (BNSP), there are four (4) dimensions of competence that must be considered, namely: (1) Task Skill is the ability to perform key functions of a job, (2) Task Management is the ability to manage different types of tasks to support the work, (3) Contingency Management Skill: the ability to respond to and manage irregular events or problems from a job, and (4) Job/Roll environment Management Skill is the ability to adapt to environmental responsibility work.

2.3. Competency-Based Learning Model with Collaborative Skills Approach

According to Ted Panitz (1996), that collaborative learning is a philosophy of learning that allows learners to cooperate, nurture each other, learn and change together, and move forward together anyway. This is the philosophy that it takes a global world today. This means that collaborative learning easier for students to learn and work together, each contributing ideas and responsible for the achievement of learning outcomes as a group or individually. In contrast to conventional learning, collaborative learning is a major pressure "learn together".

Structure-based collaborative learning goals are characterized by a number so large that interdependence among students in the group. In collaborative learning, students said "we as well as you", and they will reach the goal only if the other students in the same group can achieve their common goal (Arends, 1998; Heinich et al., 2002; Slavin, 1995; Qin & Johnson, 1995). Collaborative learning can provide opportunities to get to the success of learning practices. As for learning technology (technology for instruction), collaborative learning involves the active participation of learners and minimize the differences between individuals. Collaborative learning has added momentum formal and informal education of the two forces met, namely: (1) practical realization, that life outside the classroom requires collaborative activities in life in the real world; (2) raise awareness of social interaction in efforts to achieve meaningful learning.

According to the Johnsons (1974), there are at least five basic elements that occur in a collaborative learning groups, namely:

a. Positive interdependence. In this lesson each student should feel that it depends positively and tied with among fellow members of the group with responsibility: 1) control of learning materials; and 2) ensuring that all members of his group was mastered. They feel will be successful when other students are also not successful.
b. Direct interaction between learners. Learn the best results can be obtained by verbal communication among participants learners are supported by positive interdependence. Learners should face each other and help each other in achieving the learning objectives.

c. Individual accountability. To be in a group of learners can contribute, support and help each other, each student is required to master the material which is used as the subject. Thus each member of the group responsible for studying the subject and is also responsible to the group learning outcomes.

d. Collaboration skills. Social skills of students is very important in learning. Learners are required to have the skills to collaborate, so the group created a dynamic interaction to learn from each other as part of a collaborative learning process.

e. The effectiveness of the group. Learners effectiveness of group learning process by explaining the actions which can contribute to learning and which are not, and make decisions or actions that can resume needs to be changed.

Thus collaborative skills can be defined as a blend or combination of various abilities or skills. It can be explained that the skills of collaborative product is a product produced from several types of jobs with different skills. Implications in practice learning is embodied in the learning material or the material he taught. In machining practice learning, learners are given job-sheet to work on a work-piece with machine tools. To implement practice-based collaborative learning this skill, the learning material in the form of job-sheet must be developed in order to meet the criteria of collaborative skills. This means that in practice the learning process, the students were divided into groups, where each member has the task of working on one component can then be paired in the group into a single unit of work piece. Thus students will be more motivated to implement the learning and actually leverage in trying to master the competencies, because the group's success is the success of each individual so that they feel will be successful when other students are also not successful.

The importance of competency-based learning with a collaborative approach to learning skills to be implemented in practice are based on a variety of related research, which was carried out by: 1) Paryanto and EdyPurnomo (2007) prove that the industrial climate in the process of integrating learning activities and practices can improve learning achievement learners; 2) Mauly Halwat and Qanitah Masykuroh (2006) prove that the implementation of collaborative learning method can improve the independence and ability of learners in essay writing; 3) Wagiran and Nurhadiyanto (2003) found that the application of problem-based learning model Learning proven to improve learning achievement of learners and able to reduce the occurrence of misconceptions; 4) Sahat Saragih (2002) reported that the application of cooperative learning in the learning method able to increase the motivation of learners, interest in learning, self-confidence, and understanding of the material; and 5) Dwi Rahdiyanta, et al. (2012), found that the practice learning model with CBT approach (Competence Based Training) is able to improve the performance and motivation of learners. From various studies and theoretical studies mentioned above, the implementation of competency-based learning with collaborative skills approach can provide a positive contribution to outputs and outcomes to improve quality of practice learning to produce graduates that really fit with the demands of the job market.

Closing

The rapid development of science and technology as well as the challenges of the global era demands of vocational education institutions should really be able to produce graduates who are able to compete, adaptive and anticipatory of a range of changes and new situations.

To produce quality manpower can not be discharged from the learning system used. So the process of learning in vocational education in sync with what's happening in
the world of industry, then do the selection of appropriate learning model. Implementation of competency-based learning model with collaborative skill approach can provide solutions in an effort to improve the quality of vocational education in order to produce graduates that really fit with the demands of the workplace.

References


EXPERIENCING TOOLS PROJECT THROUGH PBE (PRODUCTION BASED EDUCATION) SYSTEM IN VOCATIONAL INSTITUTION

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Abstract

Bandung State Polytechnic for Manufacturing (POLMAN), as a high education institution in vocational, implements up to approximately 60% practical program in order to build the students skill for manufacturing process. For those, product media are created from structured exercises that referred to students competency levels needed and also initiated from external inquiries through collaboration with industrial parties, in a system called Production Based Education (PBE). With industrial product handling setup in organization, the QCD necessity for the customers are embedded in the system. Since job shop is a kind of product that met with the facility design in Polman, special tools is the suitable product media for this kind of education. Supported with necessary theory session either in operation management and technical matters during the learning process, students will experience the comprehensive tools project. They learn not only processing skill but also introduced to other related production issues such as material and component preparation, operation planning, scheduling, managing and control the project, etc. This model might be implemented and developed to the other high education vocational and VET institutions with certain condition, in order to make the students be more professional and responsible workforce in the future.

Keywords: PBE, production based education, tools project

1. Introduction

Bandung State Polytechnic for Manufacturing (POLMAN), as a high education institution in vocational, had the concept to implement up to approximately 60% practical program in order to build the students skill for manufacturing process. For its practical product media, the institution might create a structured exercise that referred to students competency levels needed and also initiate from external inquiry through collaborating with industrial parties. This collaboration concept between academia and industry called Production Based Education (PBE), as a model of education program that aimed to provide workforces with new competencies and qualifications that suit for the new manufacturing generation [1].

Providing exact learning media helps university or polytechnic to achieve student competencies always relevant to what the industries asked and validate the education process, since its products/services are always pushed to meet the industrial need [2]. Moreover, educational activity collaboration with industrial demand for the students kept an adequate loading works, and from other side industrial customers could utilize the educational institution capacity and capability as one of their vendors role to produce or develop product for supporting their needs [3].

With industrial style of order handling setup in the organization, all customers’ inquiry that agreed to be produced will be followed up in proper and professional way, therefore the QCD (quality-cost-delivery) necessity for the customers are embedded in the system. In manufacturing field, ‘job shop’ is the common type of product for students practical media due to its wider challenges and flexibility for variety requirements, therefore the facility design of workshop/laboratory in Polman is made to this type of product. As categorized in job shop, special tools like stamping dies, injection moulding or fixture is the suitable product media for vocational education in Polman. There are more things could be learned in tools
project besides machining or fabrication process skill only.

2. Methodology

Analogized with IPO (input-process-output) concept, learning process of Tools Project had common ‘5M’ for input and support or adder. Except product, there are also skills, competencies and experiences - either for students and lecturers- as its output, as shown on “Fig. 1”.

![Figure 1 IPO Concept in Tools Learning](image)

In Diploma-3 (D3) program that had 6 semesters period, this Tools Project is scheduled on semester 4 and 5 where ‘321’ program concept is adopted. This 321 program idea stated that students will get the first 3 semesters for basic matters needed, the next 2 semesters in integrated project program continually and the last 1 semester for finalization and the additional enrichment items [4]. Basically, instead of doing machining or other learning process respectively, on this semester 4 & 5 of ‘321’ a few subprograms are defined with no interrupting with any theory week nor surrounding from one kind of machine program to another.

3. Discussion

3.1 Production Based Education system

Through PBE Polman acts as an industry partner for components, tools and machine making. Since in general basic concept these activities are created to follow the present and update technological needs of industries. Generally, “Fig. 2” shows the flow of order handling in organization scope. The inquiry from customer should be followed up with calculation and other related necessary tasks by institution board or managementby considering its feasibility and organization policy interconnectedness. As soon as the proposal or quotation is agreed, the order should be planned for scheduling and controlled in executing.

On planning stage, referred to the common production planning and control procedure, there are few issues that have to be done such as exploring the product technical specifications in more detail, operation and process plan, scheduling and other. The related department then execute the order appropriate withtheir duty, following the planning made before. Design and technical drawing are initiated with approval from user or customer before continuing to the material/ component preparation and shop process like machining, fabrication and assembly.

Like in the real industry, the necessity of QCD (quality-cost-delivery) control is the important things to be paid attention. Therefore product quality check for its dimensions, tolerances and functional check is a compulsory thing before delivery to the customer. After submitting the goods to the customer it is following with necessary things related to management business between both parties such as invoicing, payment initiation, contract closing administrative etc. For those, all procedures and work instructions are bonded in an organization Quality System that each document described general steps in production activity. All parties that involved in production process refer to such procedure and work instruction, since it is made and documented in order to ensure that all steps are on the right way or method.

![Figure 2 Order Handling setup](image)

All these product data have to be well recorded in proper documents as a part of mentioned procedure in a Quality System frame because necessary action afterwards, in case something is not correct, has to be referred to these traceable product
documents. In principle, manufacturing organization are required to ensure that their processes are continuously monitored and products quality are improved in order to survive and be able to provide customers with good products [5]. As well known, quality can be defined as fulfilling specification or customers requirement without any defect.

3.2 IPO components in Tools Project learning

As described, in Polman Diploma-3 (D3) program that has 6 semesters of period adopted '321' concept, where on semesters 1,2,3 -as the first 3- and semester 6 -the last 1 semester- the program schedule is arranged respectively with 2 weeks for practical and 1 week theory session by turns. Semester 4 and 5 are defined for integrated project program continually, no interrupting with any theory week. Since special tools like stamping dies, injection moulding or fixture are categorized in job shop that met with the policy and facility design in Polman, this kind of product is used for learning education process on semester 4 and 5. Analogizing IPO (input-process-output) concept, learning process of Tools Project had common '5M' for input and support or adder whereas product, competencies and experiences -either for students and lecturers- as its output.

It is no doubt that material as the first 'M' is needed for making the tools in the project, not only the active parts like punch, dies or cavity but all standard components like screw, spring, base plate, guiding element etc are included in this category of material. The second 'M', man, are the parties that involved in the project; either related lecturers who have to make plan, control and supervising all production processes and students as direct executors in fabrication or supporting the lecturers in supervising and other managerial tasks. Money as the next 'M' could be got from the institution as planned capital, or form the customer as a normal certainty in 'business-like' activity.

Instead of described as input, the other 2 'M' had more support or adder function for the Tools Project learning process. Machines, equipments and other education facilities are used for realizing the agreed quotation or inquiry from the customer. Starting with planning and arranging on management level, designing and technical drawing in related Department, following with machining, fabrication and assembly on the shop floor, the office and machine resources are used for these value adding process for the inputs. The last 'M' are method that prepared for planning process and study program that assigning who will be involved on which project field related to the competency needed. Another method is theory sessions for endorsing the students knowledge; either technological matters for tooling, basic of management for production/operation and project management introducing that useful in tools project handling comprehensively.

The product of special tools is the one of this Tools Project Learning Process output that should be submitted to the customer. Except this product, there are also skills, competencies and experiences, for all involved parties. Students will obtain skills due to their assignment in machining or other process according to planned competencies they should get. This meant they will experiencing everything about the tools they involved. The lecturers will also get more and more experiences, insight and perspective since the special tool, from job shop characteristic point of view, is always 'new product' due to it is not repetitive product categorized.

"Fig. 3" is a simplified example program schedule in semester 5 [4]. One of shown subprogram is a 'tools project' for each subgroup (A, B, C and D) that composed in this case- for 6 students, since 1 group consists of 24 students. 'Tools Project' sub program consists of design, material preparation and floor shop executing such as machining and assembly. In 'material preparation' case students play the role as the assistance of their lecturer in PPC (production planning and control) tasks, such as ordering standard part and material to the warehouse, controlling the coming material either in quantity or technical specification, checking the actual machining schedule, etc.

With this model of education, students learn not only processing skills but also introduced to other related production and project management issues. This model
might be implemented and developed to the other high education vocational and VET institutions with certain conditions such as potential market around the place, product relevancy with the institution strategy etc, in order to make the students be more professional and responsible workforce in the future.

3.3 Further discussion

As mentioned, Polman’s Diploma-3 (D3) education program developed based on three phases arrangement that described by “Fig. 4”. ‘Problem-Based’ on semester 1 to 3 is started using standard product as a structured job to train the student in basic competencies fit to the standard with low-mid speed and ordered job in deepening a competences for more speed in delivering a product to the industry as a customer [2]. ‘Industrial Practice’ as second phase on semester 4 and 5 is operated as the real industry where students are working full time for 1 year or 2 semesters, as mentioned previously, according to daily industrial problem where the Tools Project is in. Last semester is used for finalization/strengthening remain planned matters, additional enrichment items and D3 final exam preparation.

As the competition on global workforce is getting higher and higher, the Diploma-4 (D4) is developed as well in order to preparing the next generation human resources for manufacturing. Education program should fulfill the new requirement of knowledge-based manufacturing, promote innovation and entrepreneurship, and focus on teamwork, leadership and integrity, global awareness and multicultural spirit [1]. Additional semester 7 and 8 on this D4 program described for broaden analyzing capability and engineering, completing the process skills, knowledge and what the students got on previous semester.

<table>
<thead>
<tr>
<th>Month-1</th>
<th>Month-2</th>
<th>Month-3</th>
<th>Month-4</th>
<th>Month-5</th>
<th>Month-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>BV, BV, JS1, JS2</td>
<td>D, D, M, P, P</td>
<td>P, P, P, P</td>
<td>P, A, A, PR, PR, PR, PR, PR, E</td>
<td></td>
</tr>
<tr>
<td>Group B</td>
<td>JS2, JS2, BV, BV</td>
<td>PR, PR, PR, PR, D, D, M</td>
<td>P, P, P, P, P, P, P, A, A, PR, PR, PR, JS1, JS2, JS2, JS2, BV, BV, E</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
- BV = bench vice product, in Batch lab
- JS1 = Jobshop Lab, external customer’s job
- JS2 = Jobshop Lab, external customer’s job
- PR = Research Project Lab, internal customer’s job
- D = design, drawing (Tools Project, TP)
- M = component & material preparation (TP)
- P = machining process (TP)
- A = assembly (TP)

Figure 3. Example of Practical Work Schedule For Semester 5 [4]

Figure 4. Program phases in education process

Moreover, the program on this period is run in learning or teaching factory where students are tasked to solve industrial demand/ order on their own project work in small groups (2-3 students) assisted by lecturer and supported by several operator who had been prepared. On this last semester, students could prepare their own business as a starting point on opening own venture based on their competencies in technology [2].

4. Conclusion

Bandung State Polytechnic for Manufacturing (POLMAN), as a high education institution in vocational, implements certain portion of practical program in order to build the students skills for manufacturing process in Diploma-3
(D3) program that had 6 semesters or 3 years period. Product media are created from structured exercises that referred to students competency levels needed and also initiated from external inquiries through collaboration with industrial parties, in Production Based Education (PBE) system. With industrial product handling setup in organization, the QCD necessity for the customers are embedded in such system. Special tools is the suitable product media for this kind of education, supported with necessary theory session in operation/production, basic of project management and technical matter during the learning process where students experiencing the comprehensive tools project.

Diploma-4 (D4) program is also developed where on this additional semester 7 and 8 students are pushed to broaden analyzing capability and engineering, completing the process skills, knowledge and what the students got on previous semester.

With this model of education, students learn not only processing skills but also introduced to other related production and project management issues such as material and component preparation, operation planning, scheduling, managing and control the project, etc. This model might be considered to implement and developed to the other high education vocational and VET institutions with certain conditions such as potential market around the location, product relevancy with the institution strategy etc, in order to make the students be more professional and responsible workforce in the future.

REFERENCES


Curriculum development to meet workplace need of vocational education can be reached through a number of procedures. A procedure for the development of the curriculum used by vocational education experts from ITB Germany is work process analysis (WPA). The result of WPA is the steps of the task. The education experts in the United States and Canada use DACUM (Development a Curriculum). The result of DACUM is: duties and tasks of an occupation. This paper will compare the two curriculum development procedures. The aspects to be compared are: the steps, the results obtained, the time required, the number of personnel involved, advantages, and disadvantages.

**Keywords:** work process analysis, DACUM, vocational

1. **Introduction**

According to Law no. 20 of 2003 on National Education System in Indonesia, the curriculum is a set of plans and arrangements regarding the purpose, content, and learning materials and methods used as a guide implementation of learning activities to achieve specific educational goals. The purpose of education is mainly determined by the type of education, namely: general education, vocational education, academic, professional, vocational higher education, religious, and special. Content and teaching materials developed in accordance with the level of education, while learning how to implement activities include teaching methods and evaluation of learning. Therefore, it can be said the quality of education at all levels and types depend on the implemented curriculum.

Development of curriculum content can be implemented in several ways, namely: philosophical approach, introspective, DACUM, functional, and analysis tasks (Soekamto: 90, 1988). Each expansion of the curriculum content has advantages and disadvantages. Advantages and disadvantages are closely related to the purpose of learning that is tailored to the type of education. The expansion of the public school curriculum and vocational education is different. Due to the different nature especially for educational purposes, it must be adapted to the needs of graduate competencies.

Philosophical, introspective, and functional approach normally appropriate to develop academic education curriculum content. While the DACUM approach and analysis tasks appropriate for developing curriculum in vocational education. DACUM use expert workers as participants who can be invited to discuss and develop some duties and tasks of a particular occupation. Approach to curriculum development is especially developed by the American and Canadian education.

Faculty members of vocational of technical education ITB University of Bremen produced a Work Process Analysis (WPA) to develop vocational education curriculum. WPA emphasizes the development process of a major expansion of work into the content of the curriculum through the process of observation in the workplace. WPA is the result of the measures implemented in the form of a specific job in the workshop.

Based on the above expression, then this article will be described in the development of curriculum content by using the DACUM and WPA. Based on the expression of these components are then compared to know the advantages and disadvantages of each process. The results
of this study are expected to contribute to curriculum development in vocational education in Indonesia.

2. DACUM

The first references to DACUM were in 1966 where it began in its very early stages as a new approach to curriculum development with Iowa Job Corps at Clinton, Iowa. Following used by Nova Scotia NewStart, in 1968. DACUM was adopted by Holland College in Charlottetown P.E.I Canada, in 1969 through the efforts of then-president Donald Glendenning and program specialist Larry Coffin (Norton and Moser, 2008).

DACUM is an acronym for developing a curriculum. It is a one or two day storyboarding process that provides a picture of what the worker does in terms of duties, tasks, knowledge, skills, traits and in some cases the tools the worker uses. The information is presented in graphic chart form and can include information on critical and frequently performed tasks and the training needs of workers (http://www.dacum.org/). Other expert state that DACUM (Developing a Curriculum) is a job-oriented task analysis process which seeks to answer what skills and knowledge are required to perform a particular job at a certain proficiency level.

The DACUM process provides information about theoretical knowledge, practical skills, and personal attitudes or dispositions needed to equip a person to perform at a particular level (Dixon and Stricklin, 2014).

DACUM is based on three logical premises (Norton and Moser, 2008:1): (1) expert worker can describe and define their job/occupation more accurately than anyone else, (2) an affective way to define job/occupation is to precisely describe the tasks that expert workers perform, (3) all tasks, in order to be performed correctly, demand the use of certain knowledge/skills, tools, and positive worker behaviors. Based on these three premises, the DACUM process is very effective for analyzing work in: professional, managerial, supervisor, technical, and skilled and semi-skilled levels. In other hand DACUM can use for conceptualize future jobs, and to analyze portions (selected duties) of one's occupation. At this time of the adoption of TQM, ISO 9000, the quality of the other's management system, DACUM is also often used to analyze several systems and processes in the industry. DACUM is used to find the duties and tasks for a job. The process of curriculum development using the DACUM follows the steps below Figure 1 (Norton, 2008: A-15).

![Figure 1. DACUM and SCID Process Flow Chart (Norton and Moser, 2008)](image-url)
The results of research conducted by the manager of vocational education show the use of DACUM for curriculum development. Dixon and Stricklin (2014) conducted a job analysis to identify the competency profile of an entry level CADD technician in North central Idaho. A total of seven expert workers from six companies participated. The results of the reach were: The DACUM research chart created consisted of 8 duty statements and 54 task statements. Conclusions of the studied: Effective facilitation helps to reduce self-serving biases. The panel of experts believed the modified DACUM expedited the development of a new DACUM Research Chart that is reflective of what is done in the region.

Another study conducted by Hyun-Sook at all (2012), study was done to analyze the job of clinical research coordinators (CRCs). In this study, the roles of CRCs were defined using the DCUM job analysis method. After CRCs’ job was defined and their duties and tasks were derived through DACUM job analysis, the duties and tasks were validated twice and finally, 12 duties and 78 tasks were obtained. For CRCs, the most important, difficult and frequent duties were participant management and research review/supervision organization administrative work, and the least important, difficult and frequent one was the management of research facilities and materials.

Johnsons (2010) developed job analysis for technicians in Geospatial in United States. This study was undertaken by the National Geospatial Technology (GeoTech) Center to assist in this effort to validate the DOLETA’s occupation-specific workforce requirements. Validation is performed using the DACUM (Developing aCurriculum) job-analysis technique, which relies on workers themselves to describe and define their jobs. Building on the strength of this approach, the GeoTech Center developed and applied a meta-analytic technique for consolidating multiple DACUM job analyses into a single national assessment. Using eight GIS technician job analyses from across the country, this assessment identifies 55 common task categories, 35 knowledge and skill categories, and 27 behavior categories that are ranked and documented. This helps to clarify the job responsibilities of GIS technicians and complements the DOLETA’s workforce information.

Based on some research results proved that the DACUM very effective in order to arrange the job analysis. According to Norton and Moser (2008:3), profit performing curriculum development using the DACUM than through interviews and observation are: (1) Group interaction-panel members freely share ideas and hitchhike on each other’s contributions; (2) Brainstorming power energized- the brainstorming process is used several time to maximum advantage to identify all of the duties and tasks; (3) group synergy-properly facilitated, members of the group motivate and empower each other to produce a high quality product; (4) group consensus- members of the panel with the facilitator’s guidance asses each contribution and refine it until agreement is reached; (5) future oriented- the panel is specially ask to specify future occupational trends and concerns that are likely to change their job in the future; (6) Employer/employee/learner buy-in – one the employer/employee/learner know that practicing expert workers identified the duties and tasks, support for the result of the analysis is greatly enhanced; (7) comprehensive outcome- when 5-12 expert workers are motivated and guided for two days by a qualified facilitator, all duties and task are usually identified along with the related general knowledge and skills, worker behaviors, tools and equipment, and future trends and concerns; (8) superior quality- it’s the combination of the features already mentioned plus the fact that whenever one panel member speaks, the other members who are well qualified to do so, asses and modify contributions so as to maximize quality; (9) low cost- because of the highly efficient procedures used, a DACUM analysis can usually be completed in two days, thus greatly reducing the overall cost.
3. Work Process Analysis (WPA)

Technological advances are happening very quickly now. The speed of technological progress can not be followed by the school world, so that what is taught in vocational schools is different to that of the world of work / industrial world. The gap will continue to happen when the content of curriculum development based on the concept that only happened in the past, but graduates will work in the future (3 or 4 years). WPA will solve the problem because the content of the curriculum based on the result of work in the industry, especially at shop floor level, which is currently taking place.

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analysis of overall occupational impact</td>
<td>Vocational educational scientific task analysis</td>
<td>Work process analysis Work process knowledge</td>
</tr>
<tr>
<td>Sector analysis case studies</td>
<td>Expert skilled worker Workshop 1</td>
<td>Expert workshop</td>
</tr>
<tr>
<td>Change of skilled work</td>
<td>Relevant work coherences and tasks</td>
<td>Knowledge and skills incorporated in occupational work</td>
</tr>
<tr>
<td>Dimensions of skilled work</td>
<td>Expert skilled worker Workshop 2</td>
<td>Differentiation of work tasks</td>
</tr>
<tr>
<td>(Occupational) Educational concept</td>
<td>Evaluation of work tasks</td>
<td>Work process studies</td>
</tr>
<tr>
<td>Interviews with sector experts</td>
<td>Evaluation/weighting of work tasks</td>
<td>Differentiation and vocational education plan</td>
</tr>
<tr>
<td>Structurization of work contents</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 2. WPA steps (Spöttl, 2007)

A work process is a complete flow of work aiming to complete an operational task and always has an output. Learning in vocational schools in Germany has changed from teaching and learning to focus on workplace (Schulte and Spöttl, 2012). WPA consists of three steps: (1) analyzing of overall occupational impact, (2) vocational educational scientific task analysis, and (3) work process analysis – work process knowledge. Third step is basically consisted of a case study and interviews, workshops twice with experts skilled worker, and a one-time workshop with experts. WPA step such as the Figure 2 (Spöttl, 2007).

The results of Spöttl (2007) studied on car maintenance workshop raised four levels of work, namely: (1) Level 1: the car is entity: the basic service; (2) Level 2: the car and its architecture: service and wear repair; (3) Level 3: the car and its aggregates: trouble shooting and repair; and (4) Level 4: the car and its construction: experts diagnosis and repair. Research result in recycling sector found four levels, namely: (1) level 1: recycling and the principle of the material flows; (2) level 2: material closed loops; (3) level 3: used material and their utilization; and (4) level 4: used material in recycling plants.

Based on the description above, it can be said that the WPA produce the level of work in a particular sector. Level depicts the development of a skill level from novice to expert. Each level contains learning opportunities which are determined by the corporate work tasks as a crystallization point of organizational forms of corporate processes and the business. Therefore, it can be argued that work-based learning process is needed in the vocational school. Skills and knowledge taught in a particular sector should be analyzed carefully in order to appropriate the necessary competencies among graduates of vocational schools and the world of work can be improved.

ITB, University of Bremen found WPA for the development of vocational education curriculum. Vocational education institutions in other countries have not implemented the WPA in the development the content of the curriculum.
4. Comparison between DACUM and WPA

Based on the description of the two processes of curriculum development above, it can be compared to the components (Table 1). The following will be compared regarding: the user, of participants, output, process, time used, and advantages.

Based on Table 1 it can be concluded that both the curriculum development process differs in: process, time, and the results obtained. About which one is better, can not be decided in this paper due to the use of a process is highly dependent on the objectives to be achieved.

5. Conclusions

From the description and comparison of the above, it can be concluded:
1) DACUM is appropriate to develop duties and tasks to the needs of the task analysis and curriculum development of vocational education
2) Work process analysis is appropriate to develop the level of occupation, especially in workshops level
3) DACUM and WPA have their own advantages and can be used both for the development of vocational education curriculum.

Recommendation

Development of vocational education curriculum, especially in Indonesia, should not only use the philosophy and introspection approach. DACUM and WPA should be used to develop vocational education curriculum in order to increase the relevance of what is taught in schools and the needs of the workforce.

Table 1. Comparison between DACUM and WPA

<table>
<thead>
<tr>
<th>Components</th>
<th>DACUM</th>
<th>WPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uses By</td>
<td>Community College, Universities, Training Center, Industries</td>
<td>ITB University of Bremen</td>
</tr>
<tr>
<td>Participants</td>
<td>DACUM facilitator, and expert workers (5-12 people)</td>
<td>Researchers, expert workers, and experts (the number of people is depend on sector of occupation)</td>
</tr>
<tr>
<td>Output</td>
<td>Duties and Tasks</td>
<td>Level of occupations</td>
</tr>
<tr>
<td>Overall Process</td>
<td>Focus Group Discussion</td>
<td>Analysis, interviews, workshops, observation studies</td>
</tr>
<tr>
<td>Time used</td>
<td>2 days</td>
<td>No specific time (depend on sector of occupation)</td>
</tr>
<tr>
<td>Advantage</td>
<td>Can use for all occupation</td>
<td>Use for shop floor work</td>
</tr>
<tr>
<td>Location of developmenmt process</td>
<td>Implemented in a discussion room, and not necessary to come to workplace</td>
<td>Discussion room / workshop. Must have unlimited access at the workshop</td>
</tr>
</tbody>
</table>

REFERENCES


WORK-BASED LEARNING OF ROLLING & INTEGRATED MODEL ON VOCATIONAL EDUCATION OF DIPLOMA III AUTOMOTIVE

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Abstract

This research aims at obtaining: (1) work-based learning model for Diploma III of automotive engineering; (2) the output of work-based learning with the developed model; (3) the response from the program director and company management toward the model. This study can be categorized as Research and Development as well as experimental research which was conducted at training center in various Brand Right Holder Agents (Agen Pemegang Merek/APM) for Automotive in Jakarta, Karawang, Tangerang, Bekasi. The population was automotive students who joined Industrial Practice in Yogyakarta and Central Java. Two groups of students of 100 were chosen by purposive sampling technique from 3 state universities and 3 private universities. The experimental study was conducted on July – October 2010 with factorial aspect of 2 X 1. Content Validation analysis was conducted by expert judgement. Construct validation was conducted by factor analysis and item reliability was determined by Cronbach’s alpha formula and KR-20. Data were analyzed with descriptive analysis, correlation, regression, path, and t-test using the SPSS program of 17. Suitability Test was using Structural Equation Modeling (SEM) with the help of the LISREL program of 8.80 at significance level of 0.05. The research results showed that Work-Based Learning of Rolling & Integrated was appropriate to increase the learning quality, (2) the output was higher significantly compared to the conventional one which covered automotive mechanic knowledge, professional attitude, working readiness, students autonomy, (3) the response from the program director and company management toward the model can be categorized as high in case of concept of work-based learning, the implementation and their perception.

Key word: Work-Based Learning of Rolling & Integrated Model, vocational education

INTRODUCTION

The holder of vocational education should keep enhancing the learning process to produce graduates in line with labor market demand. The development of technology and the dynamic of workplace have been a challenge to accomplish the core competence for the graduates of vocational education. The demand of corporate work are getting higher, this condition urge vocational education institutions to anticipate and deal with the changes by utilizing the existing capabilities. The challenge to have a high-quality vocational education is the background to implement Work-Based Learning approach in Diploma III of Automotive. This approach is utilizing workplace to restructure the experiences from the workplace as the contribution to the social, academic, and career development for the students as well as a supplement in learning activities. The experience learning from workplace is applied, smoothed, expanded for both in campus and workplace. By implementing this method, the students could develop their attitude, knowledge, skill, insight, behavior, habits, and associate from both contexts to create real-life work activities (Lynch & Harnish, 1998).

The quality of vocational education is strongly influenced by the learning approach. The implementation of vocational education cannot be separated from industrial area. The theories of experiential learning, teaching and learning context, and work-based learning are relevant in managing vocational education. Developing of vocational education with these theories is needed to improve the quality of learning outcomes, which in turn affects the quality
of learning outcomes and the quality of graduates.

The results of recent research concludes that the utilization of Work-Based Learning (WBL) has a positive effect on achievement, motivation, and continuing education (Bailey & Merrit, 1997). The research and evaluation studies on WBL showed that there is a relation between the students' outputs and outcomes and learning structure in school and industrial experience in the workplace. If the purpose of the program, the curriculum and work-based experience are designed and applied with capable support staff as well as combined with regular evaluation, the program will have a positive impact (Lynch & Harnish, 1998; Fallow & Weller, 2000; Braham & Pickering, 2007; Garnett, 2008).

The role of the Automotive Diploma program as the place to prepares young engineers who fulfill the industrial standard are developed by implementing work based learning approach in partnership context to findout its role to improve the quality of learning results and graduates. It consists of : (1) a model for organizing work-based learning in vocational education programs of Diploma III Automotive, (2) the outcomes of work-based learning implementation model.

THEORITICAL FRAMEWORK

Work-Based Learning

Work-Based Learning (WBL) is used as the terminology in different countries as one of school or college programs to gain experience of the corporate world (WBL Guide, 2002). It is also for young people to be ready in the transition period to learn the reality of working activities so they could make the right choices for working. Work-based learning is a training that relates directly to the requirements of the job on offer in your organization” (Glass, Higgin, & McGregor, 2002). Medhat (2008 : 8) defines program WBL as "a process for recognising, creating, and applying knowledge through, for, and at work which forms part (credits) or all of a higher education qualification. Mean while, Raelin (2008) states that WBL combines action learning and organizational learning context or organisasi learning organization.

WBL become a trend in education, because it affects learners' satisfaction and increase the role of tutors in learning (Woltering, Herrler, Spitzer, & Spreckelsen, 2009). Learning can be expanded with the realistic equipment/environments and supported with learning models such as learning situation which is conditioned, associative, systemic, simulative, and constructivist (Sharpe, 2006). According to Gray (2001), WBL is a learning process at university level as learning to work. Such as job placement, in-house training, and learning through work (eg. work-related to accredited colleges or credited like co-op program).

Work-Based Learning Model

There are various models of WBL such as apprenticeship opportunities, career mentorship, cooperative work experience, credit for prior learning (CPL), internship, job shadowing, practicum, school-based entrepreneurial, service learning, teacher externship, tech-prep, vocational student organizations, volunteer service, worksite fieldstrip (isEEK, 2008). According to Guide (2002), WBL is a planning connection and it is supervised from class experiences with expectation and work place reality. Work-based learning is a continual process starting from classroom lecturing until competitive placement. The cycle is as follow, classroom lecture - informal interview - industry tour - job visit - entry level work experience - on-the-job (OTJ) training - approved apprenticeship program-competitive employment.

Work-based learning model, a standard program maintenance system is, equipment training infrastructure facilities already meet the minimum standard requirements for competency trainingmodel, field instructors and counselors available model, good organization of its human resources model, the environment and security situation safe and adequate work model, and other means of support for learning on the job completion.

The implementation model of WBL is a WBL program model which has the standard of operation, adequate equipment to address competency standard, the availability of instructor and supervisor, good organization of human resources, occupational safety and health & other
supporting facilities. All requirements are available at the training centers in various automotive industries as cooperation partner. Thus, this model can be considered as the reference for the implementation of WBL program.

**Work-Based Learning of Rolling & Integrated Model**

The implementation of Work-Based Learning of Rolling & Integrated is a model application, planning, execution, monitoring & supervising and learning program evaluation based working context which is conducted by organizing management of vocational education Automotive Diploma III on field practicum to give industrial experience with working industrial partnership and working context. Work-Based Learning of Rolling & Integrated is development model from the current industrial practicum, the improvement itself covers, (1) expanding the duration, practicum period from 3 credits or one and a half month or equivalent with 256 hours is added into 3 months or 90 days in 3 different places; (2) grouping implementation by placing in dormitory with the goal of unity, time and place efficiency and discipline training as well as teamwork; (3) rolling implementation, groups of student gain experience from 3 different places in order to obtain complete experience in automotive spectrum and also to give the students better understanding of any corporate culture in reflection process, abstraction & generalisation, and transfer in experiential learning by repetition or accumulation of experience in three different industrial places; (4) integrated implementation, there is theoretical material provided on each location that is considered as credit and the material presenter is a qualified instructor from industrial spectrum while the material itself adjusted with industrial characteristic. Integrated hypothetical model of Work-Based Learning of Rolling & Integrated obtained from technician inputs and it was adjusted to the condition of some APM consist of: annual training program, target, facilities, instructors and other developed into final model of Rolling & Integrated WBL Model through several field testing.

**Review of Related Studies**

Many scholars have conducted research on work-based learning such as Bragg (1995), Bailey & Merritt (1993), Andrew A Rezin & N. L. McCaslin (2001), Julie Chadd & Marcia A. Anderson (2005), and Mallika Modrakee (2005). Rezin & McCaslin found that among graduate diploma/automotive tech-prep at Ohio in 1993-1994, the apprenticeship model significantly determined in the implementation of vocational education, the success of industrial job market, and graduate satisfaction. Mallika Modrakee concluded that WBL program have the potential to solve any problems of career development. Also, WBL had crucial role to the participant for decision making.

**Conceptual Framework**

There are several factor that influence the success of work based learning implementation among the students of Automotive Engineering (Diploma III). Based on the theories above, the relationship among the variables can be drawn as follow.
This study was using Research and Development (R&D) (Borg & Gall, 1983:772) and continued by experimental stages through conceptual model, theoretical models, hypothetical model, and the final model. This model was called Work-Based Learning of Rolling & Integrated with FGD (Focus Group Discussion) activities as well as Delphi technique and experimental approach. Development method in this study referred to the recommended model from Borg & Gall (1989) and Plomp (1997). Concordance test was using Struktural Equation Modelling (SEM) technique with goodness-of-fit criteria. Product test was conducted to gain information whether the model was better than the conventional one.

The experimental design was Randomized pretest-posttest control group design. The structural model was using as analysis technique for Concordance test of the research to find out the influence of exogenous variable and endogenous variable (Jöreskog & Sörbom, 1996:11). Standardized factor loading from observed variable was ≥ 0.3 (Borden & Abbot, 2009:459) and T-values with the score of ≥1.96 (Wijanto, 2008:137). Hypothetical model of Work-Based Learning of Rolling and Integrated on vocational education of Automotive (DIII), development stage Work-Based Learning of Rolling & Integrated Model, and Model can be drawn as follow on the figure 2, 3 and 4.
Figure 3. The stages of Work-Based Learning of Rolling and Integrated model (Adapted from Plomp)
Description:

\[ \xi_1 (\text{Ksai 1}) = \text{The managing performance of the director/ organizer} \]
\[ (x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10}, x_{11}, x_{12}, x_{13}, x_{14}, x_{15}) \]

\[ \xi_2 (\text{Ksai 2}) = \text{The culture of student organization} \]
\[ (x_{16}, x_{17}, x_{18}, x_{19}, x_{20}, x_{21}, x_{22}, x_{23}, x_{24}, x_{25}, x_{26}, x_{27}) \]

\[ \eta_1 (\text{Eta 1}) = \text{Learning quality of WBL} (y_1, y_2, y_3, y_4) \]

\[ \eta_2 (\text{Eta 2}) = \text{Quality of WBL learning result} (y_5, y_6, y_7, y_8) \]

Figure 4. Final Model of Work-Based Learning of Rolling & Integrated Model
Hypothesis and Research Questions

Major Hypothesis: Work-Based Learning of Rolling & Integrated Model has significant influence on the quality of learning result

a. How effective is the model of Work-Based Learning of Rolling & Integrated to improve the quality of learning result among the students of WBL Diploma III of Automotive?

b. What are the outputs aspects of WBL learning result quality with the developed model?

c. How high is the output aspects of Work-Based Learning of Rolling & Integrated Model which consists of mechanical knowledge of automotive beginner, students’ professional attitude, job readiness, and students autonomy?

RESEARCH RESULT AND DISCUSSION

SEM analysis was using to find out the influence of exogenous latent variables: the management performance of the organizer, students’ organizational culture toward the endogenous latent variables: WBL learning quality, and the quality of WBL learning result with the assistance of LISREL 8.80 program. As the requirement of fit model, the overall fit of the instruments were conducted by consulting goodness of fit index criteria. The indicator was to measure fit model which was based on: (1) Root Mean Square Error of Aproximation (RMSEA) ≤ 0.08 showed good and fit; (2) p-value ≥ 0.05; (3) Goodness of Fit Indices (GFI) ≥ 0.90 & 0.80 ≤ GFI, 0.90 marginal fit; and (5) Comparative Fit Index (CFI) ≥ 0.90, Normed Fit Index (NFI) ≥ 0.90 (Jöreskog & Sörbom, 1993; Solimun, 2002:80; Imam Ghozali, 2008; Wijanto, 2008).

The stages of the research were (1) hypothetical model validation, (2) the trial of implementation models, and (3) outputs test of the learning outcomes of Work-Based Learning of Rolling & Integrated Model. The first stage was validation of hypothetical model as concordance testing for the model with SEM which consisted of several activities, i.e. testing the validity of cost-effectiveness models, (2) observing the tendency of the quality change of learning outcomes among WBL participants. The second stage was testing the relationship between variables with simple and multiple regression tests. The third stage was testing the quality of the learning outcomes of Work-Based Learning of Rolling and Integrated model.

Test of the Validity of Cost-Effectiveness Models

The result of testing model with the assistance of LISREL 8.80 program showed that Test for Goodness of Fit Index data (N=100) to all variable categorized as fit. Output test showed Chi Square coefficient of 970.13 with probability of (p) at 0.07, acquisition p> 0.05, which indicates that the obtained empirical data had similarity with the theoretical foundation based on SEM. It means that the model had empirical support or fit model. Goodness of Fit Index result on the other parameters are shown as follow

<table>
<thead>
<tr>
<th>No</th>
<th>GOF size</th>
<th>Cut of Value</th>
<th>Observation result</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kai kuadrat (p)</td>
<td>small (p &gt; 0.05)</td>
<td>970.13 (P = 0.15), 1.124.20 (P = 0.23), 1.667.35 (P = 0.31)</td>
<td>achieved</td>
</tr>
<tr>
<td>2</td>
<td>RMSEA</td>
<td>≤ 0.08 (min)</td>
<td>0.07, 0.06, 0.06</td>
<td>achieved</td>
</tr>
<tr>
<td>3</td>
<td>NFI</td>
<td>≥0.90</td>
<td>0.94, 0.95, 0.97</td>
<td>good</td>
</tr>
<tr>
<td>4</td>
<td>CFI</td>
<td>≥0.09</td>
<td>0.40, 0.37, 0.20</td>
<td>achieved</td>
</tr>
<tr>
<td>5</td>
<td>PGFI</td>
<td>&gt;0.06</td>
<td>0.48, 0.56, 0.66</td>
<td>achieved</td>
</tr>
</tbody>
</table>
Testing result showed that hypothetical model was appropriate and consistent with the obtained data from the field on the first, second, and third observation. Also from the results of multiple regression three factors, the determinant coefficient (R²) of the three independent variables KMP (X1), CDE (X2), and BOM (X3) on KHB variable (Y) is 0.250, 0.119, and 0.255. Thus, the variable quality of WBL learning outcomes can be explained by three independent variables for first observation was 20.0%, 11.9% for second observation, and 25.5% for third observation.

Meanwhile, the result of t-test between group and observation were presented on the table 2. It showed significant difference that implementation of Work-Based Learning of Rolling & Integrated model improve the quality of WBL learning.

Table 2
Summary of T-Test from all variables (significant 0.05)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Observation 1</th>
<th></th>
<th>Observation 2</th>
<th></th>
<th>Observation 3</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Management performance of the organizer (X1)</td>
<td>t</td>
<td>Sig.</td>
<td>Observation</td>
<td>t</td>
<td>Sig.</td>
<td>Observation</td>
</tr>
<tr>
<td></td>
<td>.077</td>
<td>.046</td>
<td>Significant</td>
<td>.324</td>
<td>.001</td>
<td>Significant</td>
</tr>
<tr>
<td>Student organizational culture (X2)</td>
<td>2.843</td>
<td>.105</td>
<td>Not Significant</td>
<td>4.940</td>
<td>.004</td>
<td>Significant</td>
</tr>
<tr>
<td>The quality of WBL learning (X3)</td>
<td>.253</td>
<td>.013</td>
<td>Significant</td>
<td>1.974</td>
<td>.006</td>
<td>Significant</td>
</tr>
<tr>
<td>The quality of EBL learning result (Y)</td>
<td>3.152</td>
<td>.093</td>
<td>Not Significant</td>
<td>6.307</td>
<td>.275</td>
<td>Not Significant</td>
</tr>
<tr>
<td>mechanical knowledge of automotive beginner (Y1)</td>
<td>.757</td>
<td>.700</td>
<td>Not Significant</td>
<td>.002</td>
<td>.885</td>
<td>Not Significant</td>
</tr>
<tr>
<td>students' professional attitude (Y2)</td>
<td>.364</td>
<td>.748</td>
<td>Not Significant</td>
<td>.743</td>
<td>.469</td>
<td>Not Significant</td>
</tr>
<tr>
<td>job readiness (Y3)</td>
<td>1.112</td>
<td>.767</td>
<td>Not Significant</td>
<td>4.558</td>
<td>.146</td>
<td>Not Significant</td>
</tr>
</tbody>
</table>
a. The effectiveness of Work-Based Learning of Rolling and integrated model to improve the quality of industrial practice on the students of Automotive (Diploma III) were on (1) the mean of 3.6 on a scale of intensity at 4, (2) the mean 3.7 out of 4 on a scale of efficiency, (3) mean of 3.7 out of 4 on a systematic scale, (4) the mean of 3.8 on a practical scale of 4 (5) the mean of 3.5 on a productive scale of 4.

b. The outputs form work-based learning of rolling and integrated model, i.e. mechanical knowledge of automotive beginner, students’ professional attitude, job readiness, and students autonomy on the final observation showed (1) the mean of mechanical knowledge of automotive beginner (24,84-significant), (2) students’ professional attitude (45,03-significant), (3) job readiness (85,59-significant), and students’ autonomy was very high (96,35-significant)

The description of the direct and indirect influence as follow:

![Diagram of causal relationships]

The results of the calculation of empirical causal relationships between variables

Description:
X1 : Management performance of the organizer (according to the students)
X2 : Students Organizational culture
X3 : The quality of WBL learning
Y : The quality of WBL learning result

1. Direct influence
   \[ p_{x1x} = 0.343 \]
   \[ p_{x2x} = 0.523 \]
   \[ p_{x1x} = 0.315 \]
   \[ p_{x2x} = 0.386 \]
\[ p_{yx3} = 0.461 \]

2. Indirect influence

\[ X1 - Y \text{ through } X3 = px3x1. \, pyx3 = 0.343 \cdot 0.461 = 0.157 \]

\[ X2 - Y \text{ through } X3 = px3x2. \, pyx3 = 0.523 \cdot 0.461 = 0.241 \]

**Discussion and Suggestion**

Experimental test result showed that the implementation of Work-Based Learning of Rolling & Integrated had significant influence towards the quality of learning result which covered some aspects, such as beginner automotive mechanical knowledge, professional attitude, readiness of working mentality and students’ autonomy. Experimental class had higher mean point for those variables compared with control class which implementing conventional apprentice method for its field practicum program.

In this recent period, industrial or field practicum puts more emphasis only on cognitive and skill aspect. Meanwhile, by implementing WBL method, affective, working readiness, and autonomy aspects were significantly improved. Progress also happen in other aspects which influence learning result quality as well, i.e. working performance of organizer management (based on students’ perception), WBL learning quality, and students’ organizational culture. This result showed that Work-Based Learning of Rolling & Integrated was effective to improve the learning quality. It has similar implication with some studies about the implementation of work based learning in some countries at some schools and colleges (Bragg, 1995; Rezin & McCaslin, 2001; Mallika Modrakee, 2005).

The response of organizing management towards the implementation of Work-Based Learning of Rolling & Integrated is also categorized as high. It means acceptability level for this model to be applied on their training center was good. High category was also obtained on their perception toward Roll-Int WBL model, WBL program, and soft skills which should be trained in this model. Are the other outcomes beyond the aspects that have been examined also high? For instance, competence of automotive mechanical practicum, attitude towards mechanical profession, attitude toward automotive carrier area, and so on. Further research can be conducted to reveal those aspects.

By adding the duration of industrial experience into 3 months and applying 3 places rolling, the learning process has better-quality, students’ perception toward organizer working performance is higher, and students’ organizing culture is improved and at last the learning result increased significantly. The students obtain better tutoring either individually or group. Besides, the students attain longer-term experience and it makes the students have deeper reflection, generalization & abstraction, and transfer in experiential learning. In this model, the learning experience is so complete such as, togetherness in daily life (in dormitory), mentoring (group or individual), autonomous learning (making productive training program supervised by an industrial mentor), adequate training facility (in training center) and a conducive atmosphere for studying (working environment, time discipline, teamwork, clear learning target).

The result findings will be appropriate to be applied in APM which has complete training Centre, such as adequate mess with high discipline regulation, well-organized CSR program, human resource management standard, and complete facility. However, essentially, this model can be applied to some APM workshop in rural areas which has no dormitory. Generally, the workshops of APM in rural area have applied after-sales service standard, such as selling, service, and spare part. There is no big difference among the standard of workshop/service after-sales or the facility between the center workshops and workshop in rural area. In addition, in rural area, they already had standard and continual mechanical quality control, well-procedure operation standard, broad networking, and well-established corporate culture. Although Work-Based Learning of Rolling and Integrated have not
covered all automotive spectrum (only light vehicle engineering, auto body engineering, and Autotronic engineering), the researcher believes that this model can be applied to two other spectrums. By having participation from various APM in broad spectrum, Work-Based Learning of Rolling & Integrated has a great chance to be applied and the students’ competence combination will be more complete, if there are various APM getting involved. The combination of three of five automotive spectrums will give interesting point to be applied in various implementations.

This model proves effective for industrial practicum course (PI/KP/PK/PKL) with the cooperation and commitment of various APM in Jakarta, Karawang, Tangerang and Bekasi. Suggestion: (a) applying this model broadly either in big cities or other cities by utilizing main dealer, local training, or authorized sales service in some areas which generally also hold regular training with a broader spectrum of automotive. (b) the result of Rolling and Integrated Model is a terminal destination not a final destination; (c) It is necessary to conduct similar research on other related area of work based learning implementation in vocational education.

Final Model of Work-Based Learning of Rolling & Integrated can be seen at figure 6.
CONCLUSION
Based on the data analysis and the discussion, several conclusions can be drawn as follows:

1. Based on the testing and development, Work-Based Learning of Rolling & Integrated on vocational education of Automotive (Diploma III) was able to improve the quality of learning result on industrial practice program. Work-Based Learning of Rolling & Integrated was effective to improve four aspects of learning result i.e. mechanical knowledge of automotive beginner, students’ professional attitude, job readiness, and students’ autonomy.

2. The outputs from Work-Based Learning of Rolling & Integrated model i.e. mechanical knowledge of automotive beginner, students’ professional attitude, job readiness, and students’ autonomy were significantly higher than the conventional class. The testing result of Work-Based Learning of Rolling & Integrated model had met the requirements of research and development, such as accuracy, realistic, and benefits. Data and information were analyzed according to scientific techniques such as validity and reliability of the instrument, respondents, group of the experimental and control class, documentation, and requirement fulfillment and the prerequisite of other researches.

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THE HOTS-BASED AFL MODEL TO INCREASE OF HIGHER ORDER THINKING SKILLS OF
STUDENT TEACHERS OF CLOTHING VOCATIONAL EDUCATION

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Abstract

This study aims: (1) to develop a model of HOTS-based AFL which can be used to increase higher order thinking skills (HOTS) of student teachers of clothing vocational education in college; (2) to investigate the effectiveness of the developed model of HOTS-based AFL to increase of higher order thinking skills (HOTS) of student teachers of clothing vocational education. This study is a development research, using HC-ADDIE modification model that is the collaboration and modification of the research, development, and diffusion (RDD) of Hopkins & Clark model with ISD-ADDIE model and the classroom action research. The stages of research include analysis and needs assessment. The stages of development include designing prototype models, validating model, testing reliability, training lecturer/observer, conducting limited and extended trials as implementation, analysis, and evaluation through the classroom action research. The stages of diffusion include the dissemination of research results through seminars and journals. The subjects of this study were student teachers majoring in the field of clothing of vocational education in the first semester of 2012/2013 at Clothing Technical Education Program, Faculty of Engineering, Yogyakarta State University. The data analysis used the descriptive statistical techniques with the presentation in the form of tables, graphs, and diagrams, as well as using inferential statistical techniques namely one-way ANOVA. The process of data analysis used Excel and SPSS for Windows 17.0 program. The results of this study are as follows: (1) The HOTS-based AFL model for the learning of clothing to the student teachers of clothing vocational education is successfully developed through the HC-ADDIE modification model. (2) The HOTS-based AFL model is effective to increase the student’s HOTS.

Keywords:AFL, HOTS, studentteachers of clothing vocational education.

Introduction

The era of globalization followed by the era of knowledge and a very fast changing world has implications for many areas of life, including of clothing vocational education in college. Faced with these conditions, clothing vocational education in college should be able to prepare the next generation in order that they have the higher order thinking skills (HOTS) so they able to critical thinking, researching, problem solving, decision making, and good character, appropriately and wisely. This is in line with the opinion of Delisle (1997, p.4) that in order to face of the rapidly changing world, education in the 21st century should develop the habit of thinking, researching, and solving problems. Similar feeling were expressed by Rose & Nicholl (2002, p.13) namely that in order to deal with change very quickly, then the students need to be given about how the provision of learning and how to think.

Clothing vocational education in college also must be able to prepare graduates to be able to enter the work force as per the requirements specified. Cotton (1993, p.2) and Robinson (2000, pp.1-3) states that to enter the world of work, the candidate must have a workforce readiness, abilities, and skills required by employability skills, one of which is HOTS. According to Robinson (2000, p.3), by having HOTS then some one will be able to learn, provide precise reason, creative thinking, make a decision, and solve problems.

Some of the capabilities mentioned above can be achieved if someone is able to applying the knowledge, analyzing problems, evaluating problems, and drafting alternative solutions based on knowledge and understanding which has been owned. Some indicators of this ability are summarized in...
HOTS, so this should HOTS shared by all students, including student teachers of the clothing vocational education in college. Therefore, the development of HOTS be a very important thing to be considered in the curriculum of clothing vocational education in college.

Related to the above, Thomas & Litowitz (1986, p.1) stated that the main focus in all areas of education today is the impact of education on students' ability in using HOTS. Understanding and increased knowledge, cognitive abilities, and the placement of the lead, organize, and form effective action in the workplace, family, and community is a significant issue for vocational education. This suggests that HOTS be a very important thing that should be implemented and improved in vocational education programs, including clothing vocational education in college.

Accordingly, the HOTS development of students of clothing vocational education in college demands that must be done, given the characteristics of work in the field of fashion, among others, is to produce a clothing (fashion) related with the fashion world that is in need of creative and critical thinking skills. Because, the process creation of fashion either mass-produced or individually require problem solving and long process that started from: (1) developing the concept of the product, (2) designing products which include making product design, make construction product patterns, and tableware patterns corresponding product design, (3) selecting of raw materials, (4) determining of the technology used in the production process, (5) processing products, (6) controlling product quality, (7) finishing products, and up to (8) marketing products (promotional products). Therefore, students as prospective teachers of clothing vocational education must be ready and able to teach science in the field of fashion to the students well in the future in accordance with the demands of a globalized world.

The above is supported by the statement of Kerka (1992, p.2) in his article entitled Higher Order Thinking Skills in Vocational Education that HOTS is very crucial and needed in the field of vocational education, including clothing. The reason is that students are able to solve problems, make decisions, give reasons (arguments), and quickly adapt to the work environment and work. In addition, Kerka (1992, p.2) explains that the vocational education, including clothing vocational education in college requires learning strategies and assessment methods to develop new alternative HOTS of the students vocational education.

Accordingly, the development of the HOTS of students of clothing vocational education is one way to generate human resources in the field of fashion that critical and creative that is ready and able to adapt quickly in the world of work and be able to face increasingly complex global challenges. By having HOTS, the students will be able to resolve problems related to the field of work and life (Kerka, 1992, p.2). Therefore, the development of the HOTS of students clothing vocational education can be directed at the development of critical thinking skills, systematically skills, logical, applicative, analytical, evaluative, creative, problem solving, and decision making in an honest, self-confident, responsible and independent as candidates for professional employment in the field of fashion. The hope is that students have the HOTS can use these abilities for career development in the workplace and life.

In line with the above, Nevin (1997, p.15) in the Journal of Vocational and Technical Education (JVTE) explains that the strategy of collaborative learning in vocational education programs should be to develop the students' problem solving skills and HOTS in real-world applications related to the work. Referring to this, it may be mentioned that vocational education programs should emphasize the development of problem solving skills and HOTS for students who can be useful to solve problems in real life and work later.

The description of above is supported by the results of the Miarso's study (2009, p.7) that mapping vocational education graduates who concluded that in order to adapt quickly to the rapidly evolving work environment, vocational education programs need to be developed on the basis of extensive knowledge and technologies. The programs that are leading or narrow, less relevant to the demands of the workplace. Ideally, the program was developed not only oriented towards the development of skills alone, but also oriented toward the process
to develop the ability to think logically, ethical, and aesthetic, as well as the ability to adapt to the development environment and the demands of the workplace.

Looking at the above description, it can be said that HOTS is an essential skill for the success of the study, work, and live in the information age and technology of the 21st century. HOTS and its components can be developed and used well when studying a science. Therefore, the process of learning and assessment in the field of fashion colleges need to emphasize the development of students’ HOTS. In this case, the lecturer should ask the students to use the HOTS which includes the ability to applying, analyzing, evaluating, and creating for learning activities through: discussions, fieldwork, practicum, and students evaluate their own that skill.

Given the above, it is to be able to develop of students’ HOTS, the assessment system should be integrated in the learning process (assessment for learning-AFL) and lead to the development of critical thinking skills (HOTS-based AFL). Related to this above, the result of research Barak & Dori (2009) can to become a reference in develop of HOTS of students of clothing vocational education in college. The results of research Barak & Dori (2009) which examines how to improve HOTS science student teachers through embedded assessment in learning. Barak & Dori found that by implementing an integrated assessment of learning, it can increase the HOTS students. Referring to the research, then the development of students HOTS can be done through the application of the assessment model that integrated in learning system. The assessment model that integrated in learning and ongoing in learning processes called the formative assessment or often also called assessment of learning (AOL), AFL to be done ongoing in learning process. Thus, implementation of AFL integrated in learning process, so AFL have influence directly in learning of students with enforce the relationship between assessment and instruction (Goode, et.al, 2010, p.21). Superiority of AFL that is be able: to detect the students’ weakness and students’ strength, to detect students ability position in learning based on criteria not compare with another students, involve the lecturer and students in the implementation process, and be able to help the students and lecturer in achieved the expected of learning goal. In addition, the AFL be able to enhance of motivation, responsibility, self-confidence, independence, honesty, and achievement of students in learning (Moore & Stanley, 2010, p.21; ARG, 1999, p.7; Stiggins & Chappuis, 2005, p.11; Davies, 2000, p.12; Stiggins, 2002, p.9; Arter, 2002, p.2; Garies& Grant, 2008, p.8).

Whereas AOL more oriented at the results of learning and be done in the end of learning (summative assessment), to used confirm what the students have known, to shown were the students have achieved a standard of competencies that given, to know the students position in class that compare with others, and be intended to explain the students of learning results as form of report to parents and students about their progress in school (Earl, 2003, p.4). The characteristic of AOL have a weakness refer to the students' need and lecturer's need to improve learning quality. The students’ weakness and strength could not detected well done by lecturer so she is not help solve the problem of students.

Accordingly, the learning process of clothing in college necessary to implement AFL beside AOL that have done. The AFL model is suitable for all situations and can provide benefits for faculty and students in identifying next learning steps necessary to make progress, strengths and weaknesses of the student (CEA, 2003; ARG, 1999).

Meanwhile, HOTS which includes the skills to analyze, evaluate, and synthesize or create requires a variety of measures of learning and teaching that is different than just learn facts and concepts alone. HOTS include learning activities in deciding on matters that are complex thinking such as
critical thinking and problem solving. Although HOTS is difficult to learn and be taught, but must be included in the study because its usefulness is not in doubt. Therefore, the HOTS-based AFL model assessed suitable to be applied in the learning field of clothing (fashion) in college.

Accordingly, it is necessary to develop a models of HOTS-based AFL that can be applied in the learning field of clothing in college. Because, until now HOTS-based AFL model is not yet available. The model of HOTS-based AFL is a model of the assessment carried out during the learning progress (ongoing) to collect information about student learning conditions in order to improve the understanding and HOTS of students of clothing vocational education in college.

Looking at the above description, it is necessary to do a research on models of HOTS-based AFL in learning of clothing in the college. Related to this, the issues raised are as follows: (1) How to development procedures of HOTS-based AFL model in learning field of clothing in college? (2) How effectiveness of HOTS-based AFL model to increasing HOTS of student teachers of clothing vocational education in college?

Based on the issues raised above, the study aims: (1) to develop a model of HOTS-based AFL for the learning field of clothing in the college, (2) to investigate the effectiveness of the HOTS-based AFL model to increasing HOTS of student teachers of clothing vocational education in college.

The develop product of research is a model of HOTS-based AFL that can used as an alternative assessment model to learning field of clothing in college. The objective of the product research is to increasing HOTS of student teachers of clothing also learning quality in college. The HOTS-based AFL model includes: (1) the goal of model; (2) the characteristic of model; (3) the component of model; (4) the instrument of model; (5) the procedure (syntax) of model; and (6) the guidelines of model.

Accordingly, the results of this study would be useful to researchers, students, professors, clothing vocational education, institutional providers of vocational education in colleges, and the Higher Education, both theoretically and practically.

Methods

Types of Research

This study is a development research, using HC-ADDIE modification model that is the collaboration and modification of the research, development, and diffusion of Hopkins & Clark model with ISD-ADDIE model and the classroom action research. The stages of research include analysis and needs assessment. The stages of development include designing prototype models, validating model, testing reliability, training lecturer/observer, conducting limited and extended trials as implementation, analysis, and evaluation through the classroom action research. The stages of diffusion include the dissemination of research results through seminars and journals.

Time and Place of Research

This research was conducted in odd semester 2012/2013 during one semester namely September-December, 2013 at the Department of Clothing Technical Education, Department of Catering and Clothing Technical Education, Faculty of Engineering, Yogyakarta State University.

The Subject of Research

The subjects of this study were students majoring in the field of clothing of vocational education in the first semester of 2012/2013 at Clothing Technical Education Program, Faculty of Engineering, Yogyakarta State University, as many as 92 students and 4 lecturers.

Procedure

The procedure of this study is done through development procedures of HOTS-based AFL model which includes three steps: (1) a research stage, (2) development stage, and (3) diffusion stage. Stages of research include: (a) analysis of the problem, and (b) the analysis of needs (needs assessment) based on the results of the preliminary study and theoretical as well as empirical studies (research results related to HOTS, AFL, and vocational education), (2) stages development, include: activities of designing of prototype HOTS-based AFL model,
validation activities by experts, readability test models, training lecturers / observer, and trial activity of model (implements, analysis, & evaluate) approach through classroom action research (CAR) so as to produce models of HOTS-based AFL that fit, and (3) diffusion stages that include dissemination activities through socialization and journals.

Data, Instruments, and Data Collection Techniques
The research data in the form of quantitative and qualitative data. Quantitative data includes data of students’ understanding and HOTS. Data on students’ understanding and HOTS obtained through the provision of a HOTS-based matter/task completed with assessment rubric in the form of descriptions (essay), lab assignments, discussions, and task creation of fashion products, according to the learning objectives and competencies to be achieved. While qualitative data includes the data validation results obtained from the results of assessment of HOTS-based AFL model by the experts.

Data Analysis Techniques
The data analysis used the descriptive statistical techniques with the presentation in the form of tables, graphs, and diagrams, as well as using inferential statistical techniques namely one-way ANOVA. The process of data analysis used Excel and SPSS for Windows 17.0 program.

The Finding of Research
a. The Development Results of the HOTS-Based AFL Model
The model of HOTS-based AFL successfully developed through the development of research using HC-ADDE model modification model, and have been declare by experts that it is valid and reliable. The model of HOTS-based AFL is successfully developed through this research have the following specifications:
1. In terms of destination, the model HOTS-based AFL can be used to assess, increase, and develop HOTS of student teachers of clothing vocational education in college.
2. In view of the characteristics of the model, the model of HOTS-based AFL has the following characteristics:
a) Assessment process is integrated in the learning process and are on-going so that the weaknesses and strengths of students can be detected by either
b) Assessment process applying the concepts, principles, strategies, and the four elements (components) of AFL namely: (a) sharing learning goals, criteria of success, and the criteria of assessment, (b) using effective questioning, (c) self-assessment and self-reflection, and (d) the corrective and effective feedback.
c) The application of the model of HOTS-based AFL able to bring up information on learning about the students’ HOTs in the learning process
d) Assessment process aims to increase HOTs of student teachers of clothing vocational education, so the assessment process focuses on developing the ability to applying, analyzing, evaluating, and creating. Therefore, the problem / task given the emphasis on increasing and development of HOTs of students (based-HOTS)
e) Lecturers can provide about HOTS-based tasks such as problems to students for discussion and problem-solving activities to stimulate student thinking
f) Assessment activities can be applied to learning theory (by way of applying problem-based learning) and learning practices (by way of implementing project-based learning)
3. In terms of the components of the model, the model of HOTS-based AFL has components include:
a) Components teaching and learning, shall be composed of: students, faculty, teaching materials, syllabi and lesson plans, and instrument HOTS-based AFL (problem / task HOTS-based, scoring guidelines and scoring rubric, assessment sheets and students’ HOTS, self-assessment sheets and students’ self-reflection,
feedback sheet, and the sheet valuation report (student profile)

b) Implementation Guide Component
HOTS-based AFL

c) The process of assessment and observation using the instrument
HOTS-based AFL

d) Data assessment and observation

e) Provision of feedback to the students

f) Report assessment results can be used to improve and enhance the quality of assessment, learning, and HOTS of student teachers of clothing vocational education.

(4) In terms of instrument models, the model of HOTS-based AFL has instrument effectiveness (functioning) models, which are composed of:

a) Problem / HOTS-based tasks, scoring guidelines and scoring rubric

b) The assessment of the students' HOTS

c) The observation of student activities

d) The students' attitudes and behavior of student assessment

e) The self-assessment and self-reflection of students

f) The feedback

g) The report assessment results (Student Profile Sheet)

(5) In terms of procedure (syntax) models, the implementation and execution models in the HOTS-based AFL in learning field of clothing in college will be easier done by faculty and students if it has a clear procedure (syntax). Therefore, the syntax model of HOTS-based AFL is presented as a guide and guidelines for faculty and students in that used. The syntax models contains stages or steps are performed by students and faculty with a systematic and logical sequence and demonstrate the role of students and lecturer in learning and assessment.

HOTS-based AFL model also has advantages such as:

1. HOTS-based AFL model can provide an opportunity for lecturers to implement problem-based learning and project-based learning at the same time in learning, so that students can stimulate the activity of thinking.

2. Assessment activities in the model of HOTS-based AFL can be done through discussions, field work, lab activities, preparing lab reports, presentations, and projects creating a new product with a design concept (draft) products are true and correct

3. HOTS-based AFL model is able to effectively increase students' HOTS. This is evidenced by the results of the calculation of the one-way ANOVA (analysis of variance) showed a significant increased on the students HOTS.

4. HOTS-based AFL model is able to engage students to perform self-assessment and self-reflection over the state's ability to master their understanding of the material that has been studied.

5. HOTS-based AFL model can also provide feedback that is capable of correcting errors or clarify errors (corrective feedback) to the students

6. Model of HOTS-based AFL can display both student profiles (individual profiles and classes profile) comprehensively in a single sheet valuation reports. This valuation report includes profiles seen students' HOTS and profile comprehension and mastery of learning materials based on the results of students' self-assessment and self-reflection.

7. HOTS-based AFL model is able to detect the weaknesses and strengths of students in learning so that lecturers can provide help and guidance.

8. Model of HOTS-based AFL can provide feedback to the lecturer so that it can be used by lecturers to conduct self-reflection in order to improve the quality of learning and continuous assessment.

9. HOTS-based AFL model is able to support lecturers and students to always make improvements and improving the quality of self and learning.

b. Description of The Results of Assessment of Students' HOTS

The results of assessment of students' HOTS both in limited and extended trials comprehensively in high category, and had been around increase at class mean score in each cycle. The assessment of students' HOTS includes: applying, analyzing, evaluating, and creating. In detail, the increasingly of class mean score of students' HOTS in each cycle both in limited and extended trials showed in Figure 1.
The results of assessment of students’ HOTS showed that the model of HOTS-based AFL which implemented in the learning field of clothing in college was able to increase students’ HOTS. This is supported by results of students’ self-assessment and self-reflection when they done in completing a HOTS-based questions/task (job) that given by lecturer. The results of students’ self-assessment and self-reflection in understanding and getting of best of subject matter through the HOTS-based questions/task comprehensively both in limited and extended trials belonging to high category, with class mean score 1.39 (69.7%). It’s mean that comprehensively, students have understanding and getting of best of subject matters ≥ 66.5% it well. The results of students’ self-assessment and reflection showed in Figure 2.

c. The effectiveness of the HOTS-Based AFL Model to Increase Students’ HOTS

The effectiveness of the HOTS-based AFL model in this study is defined as a success of HOTS-based AFL model in increasing HOTS of student teachers of clothing vocational education in college. While the views of the student HOTS is students' ability to applying, analyzing, evaluating, and creating when solving HOTS-based problems or question/tasks.

The effectiveness of the model of HOTS-based AFL in increasing students’ HOTS, it can be determined through the effectiveness test of the model of HOTS-based AFL empirically. The goal is to determine whether the model of HOTS-based AFL capable and effective in increasing students’ HOTS. Test of the effectiveness of the model of HOTS-based AFL involves examining whether there are differences in the average value of the performance seen from the students’ HOTS between cycle 1, cycle 2, and cycle 3.

Referring to the above, then test the effectiveness of the model of HOTS-based AFL empirically is done by using one-way ANOVA. Measured variable is a good students’ HOTS in each cycle, which consists of cycle 1, cycle 2, and cycle 3, in each class. Based on this, the proposed hypothesis can be tested by analysis of variance of these lines, ie as shown in Table 1.
Table 1. Hypothesis Test Effectiveness of HOTS-based AFL Model to increasing students' HOTS

<table>
<thead>
<tr>
<th>Effectiveness Assessment</th>
<th>Hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOTS mahasiswa</td>
<td>Ho: There are not significant differences in the students' HOTS between cycle 1, cycle 2, and cycle 3.</td>
</tr>
<tr>
<td></td>
<td>Ha: There are significant differences in the students' HOTS between cycle 1, cycle 2, and cycle 3.</td>
</tr>
</tbody>
</table>

Criteria of Judgments: • If the value of probability (significant) > 0.05, then Ho is accepted. • If the value of probability (significant) < 0.05, then Ho is not accepted.

Table 2. Summary of Results of Effectiveness Test Calculations of HOTS-based AFL Model in Increasing Students' HOTS with One-way ANOVA

<table>
<thead>
<tr>
<th>Effectiveness Assessment</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students' HOTS</td>
<td>Between Groups</td>
<td>4,182</td>
<td>2</td>
<td>2,091</td>
<td>19.458</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>16,762</td>
<td>156</td>
<td>0,107</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>20,944</td>
<td>158</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Summary of Homogeneous Subsets of Effectiveness Test Calculations of HOTS-based AFL Model in Increasing Students' HOTS with One-way ANOVA

<table>
<thead>
<tr>
<th>Effectiveness Assessment</th>
<th>Cycle</th>
<th>N</th>
<th>Subset for alpha = 0.05</th>
<th>Means Plots</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students' HOTS</td>
<td>Cycle 1</td>
<td>53</td>
<td>2,287</td>
<td>1,000</td>
</tr>
<tr>
<td></td>
<td>Cycle 2</td>
<td>53</td>
<td>2,460</td>
<td>1,000</td>
</tr>
<tr>
<td></td>
<td>Cycle 3</td>
<td>53</td>
<td>2,683</td>
<td>1,000</td>
</tr>
</tbody>
</table>

While the results of the analysis of variance calculations, homogeneous subsets, and means plots for HOTS of students are summarized in Table 2 and Table 3.

Looking at Table 2 one-way ANOVA summary above, it appears that the probability value or significance of HOTS of student teachers is 0,000, which means < 0,05, so that Ha is accepted or Ho is rejected. This means that there are significant differences between students' HOTS in cycle 1, cycle 2, and cycle 3. Furthermore, to determine whether the three groups was significantly different cycle than other cycle groups can be seen from the output of homogeneous subsets in Table 3.

The results of homogeneous subsets output HOTS students in Table 3 show that the subset 1 contained only 2,287 cycles with number 1 as the lowest mean, which means students' HOTS in cycle 1 is different from the two other cycles. In the second subset contained only 2 cycles with a mean number 2,460, which means HOTS on cycle 2 different from the other cycle two, and the third subset contained only 3 cycles with a mean number 2,683 as the highest mean, which means HOTS students in cycle 3 is also different from two other cycles. This suggests that the HOTS students between cycle 1, cycle 2, and cycle 3 was significantly different, which means that in cycle 1, cycle 2, and cycle 3 has seen an increase in student HOTS significantly. More specifically, the development trend of HOTS students graph is presented in Figure 3.
Figure 3 illustrates that the development of HOTS students showed an upward trend and consistent, where each cycle an increase in the average score (mean). Trends in the development of the whole student including HOTS quickly, because the start cycle 2 has demonstrated an increase in mean score. In addition, almost reaching the maximum development that is at least indicated by the mean score in cycle 3 (last) by 2.683 (the maximum score is 3.0). In quality, students’ HOTS in cycle 1 was still in the criteria, but in cycle 2 and cycle 3 has been increased to high. Thus, it can be stated that the model of HOTS-based AFL able to effectively improve student of clothing vocational education in college.

Based on Table 2 and Table 3 and the above description, it can be concluded that the application of the model of HOTS-based AFL in learning field of clothing vocational education in college were able to significantly increase students’ HOTS. This is evidenced by the significantly increased at each cycle, so that it can be said that the model of HOTS-based AFL is effective to increase students’ understanding and HOTS. In addition, the development trend graphs of students’ HOTS also showed an increasing trend in each cycle. This suggests that the model of HOTS-based AFL capable and can serve to increase HOTS of student teachers of clothing vocational education in college.

Conclusions and Recommendations

Conclusions
1. HOTS-based AFL model to increase HOTS of student teacher of clothing vocational education in college successfully developed through HC-ADDIE modification model. This model is a model of collaboration and modification of Research, Development, Diffusion (RDD) Hopkins & Clark, with a model of Instructional System Design (ISD ) of the development paradigm ADDIE products, and approaches Classroom Action Research (CAR) at the stage of testing in the development phase. Stages of research include analysis activities preliminary studies, theoretical analysis and empirical study (the results of research related to HOTS, AFL, and vocational education), problem analysis, and needs assessment; development stage activities include design prototype models, validation, and test the approach CAR to implement and evaluate well in limited and expanded trials, so that the models and tools (instruments) the model is valid, reliable, and feasible to use both theoretically and empirically; and diffusion stages include dissemination activities through seminars and results journal publications.
2. The results of testing the effectiveness of the model of HOTS-based AFL in increasing HOTS of student teachers of clothing vocational education in college has shown that the model of HOTS-based AFL able to significantly increase HOTS of student teachers of clothing vocational education in the learning process in college. Thus it can be said that the model of HOTS-based AFL model has proven effective for increasing HOTS of student teachers of clothing vocational education in college. Therefore, the model of HOTS-based AFL is feasible to applied in clothing vocational education in college.

Suggestion
Specifically, the model of HOTS based AFL in learning field of clothing vocational education in colleges developed are used for the benefit of improving the quality of assessment and students learning and the quality of the vocational education field of clothing. The aim is that students have higher level thinking skills (HOTS). Nonetheless, it is possible that the model of HOTS-based AFL is used in the context of other interests more broadly.
The results of effectiveness test of the model of HOTS-based AFL has shown that the model effectively to increase HOTS of student teachers of clothing vocational education in college. Therefore, the model of HOTS-based AFL can be used and utilized as one of the alternative models of assessment for learning in the field of vocational colleges. In addition, model of HOTS-based AFL can be used as an effort to improve the quality of vocational education and general field of fashion, especially in the field of other vocational colleges.

**Recommendations**

All this time, learning assessment system policies in the field of clothing in colleges are still focusing on AOL (assessment of learning) that it still has a weakness, especially on students' HOTS capacity. Associated with this policy, it is recommended for managers at both the college courses, departments, faculties, and universities, that the valuation models namely HOTS-based AFL (assessment for learning) model can be incorporated in the policy assessment model to be applied in higher education. It is with this consideration that based on the results of the study as well as the characteristics and advantages of the model of HOTS-based AFL, then AOL weaknesses mentioned above can be solved by applying the model of HOTS-based AFL in learning of clothing vocational education in college. The model of HOTS-based AFL also empirically proven capable to increase HOTS of student teachers of clothing in college.

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INNOVATION IN CONDUCTING SKILL LEARNING OF STUDENTS CHARACTER DEVELOPMENT IN VOCATIONAL HIGH SCHOOLS

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ABSTRACT

One of several results through Research & Development in development of competence based learning integrated with character education is the development of learning process planning (Rencana Pelaksanaan Pembelajaran/RPP). Several activities contained in RPP is learning processes which aim to reach all competence indicators for each subject.

To integrate characteristic values into skill learning in vocational high school based technology, it is necessary to have analytical ability and new phenomenon planning in skill learning which based on workplace competence. Through innovation in learning, all learning methods can make both students and teacher activities becoming more active, creative and joyful especially if they use technology media in conducting learning process.

In relation with all activites in learning that allow students to build characteristic values into knowledge, construct clear, critical and good direction meaning, it is important to have innovation in RPP. Learning as one of mentality activity which carried out with active interaction with surrounding environment will produce permanent and remain change in knowledge, skill, values and attitudes.

Keywords: RPP development, learning innovation, characteristics eduation in Vocational High Schools

I. INTRODUCTION

The quality of education is closely associated with education programs on learning, curriculum and teaching staff, infrastructure, supporting even more. Based on the success of curriculum theory, as a wholer equires along process, starting from the study and analysis of various ideas and concepts about education, curriculum development, preparation and assignment of staff, even to systems including the assessment of learning. Some experts argue that the value of a curriculum is determined by its ability to provide educational services, to encourage students to achieve learning objectives.

Curriculum as the direction, purpose and philosophical foundation of education, the curriculum should be developed in accordance with the dynamic progress of science and technology (IPTEK). This requires the implementation of curriculum 2013 according to the progress of IPTEK, to the purpose of the task achieved vocational education in preparing students competence and have the character.

According to the Minister of Education and Culture that through the implementation of curriculum policy in 2013, will produce Indonesian people are creative, innovative, integrated reinforcement affective attitudes, skills and knowledge. So the development of curriculum 2013 is expected to overcome the weaknesses that existin the previous curriculum.

In 2013 a complete normative curriculum development based on the laws and regulations of Indonesian. 20 year 2003 on the national education system and the Regulation no. 32 in 2013 and no. 66 of 2013 concerning competency standards elementary and secondary education, complete with educational assessment standards.

Function of education in vocational high schools (SMK) in accordance with Regulation 17/2010 article 76 is to equip students in the ability of science and technology, as well as vocational...
skills according to the needs of society, the phenomenon requires a new learning program to achieve a passing grade on the attitude domain, knowledge and skills.

Benjamin S. Bloom (1956) stated that the concept of development of competency standard are based on the principles of learning which consists of three domains, namely cognitive learning (knowledge, comprehension and application), affective (attitudes, values and appreciation) and psychomotor (all behavior skills related to the ability for person).

Based on the statement Supriya, (2002:295) that vocational students are required to have flexible skills that enable to enter a variety of jobs, both in the industrialized world require diverse capabilities, which must be contained in the standard of competence to get the job done. Therefore learning in vocational skills related to competence, the spectrum is divided into several Competence Standard and Basic Competence (SKKD).

Vocational education that prepares graduates for employment and independent power ready on the field, in fact, can not be realized. It seems that the problems in some vocational caused by weak education system and because of the Tauran among students, which adversely affects the competence and lack of character values of the students. The problems associated with the learning system by mastery of skills as required competencies of the workforce and the lack of learning devices, encouraging the importance of changes in the learning system. Because it is in the implementation of the curriculum in 2013 required the development of lesson plans for each basic competency achievement and the ability of teachers to plan the implementation of learning in SKKD.

II. Concept Development Lesson Plan

According to Dick and Carey (2005: 1) to carry out effective learning, the learning system should approach that is logical and repeatable process that can be used to improve and enhance the quality of learning programs. Therefore, in planning the implementation of learning (RPP) begins with the preparation of lesson plans and plan evaluation (assessment). The intent and purpose of the preparation of lesson plans in order to create activities that support the primary goal of helping students learn the right, because students learn best when teachers prepare lesson plans well.

Efforts to improve the quality of learning in vocational, competency-based learning system integrated character values can be applied in practice learning program with the development of science and technology progress. Thus, in implementing the curriculum in 2013, the implementation of learning objectives directed at achieving competence with the values of the characters in each indicator of competence to be achieved. Through the development of lesson plans by integrating the spiritual attitudes, social attitudes, knowledge, and skills according to Permendikbud No. 54/2013, which involves the world of work and industry as users vocational graduates.

Munthe, (2009: 32) gives firmness that competency indicators should be formulated with the operational verbs that can be measured and made instruments of assessment. Thus, in designing the competencies/learning objectives in accordance with the competency-based curriculum, there are three components that must be formulated: (1) the standard of competence, (2) basic competence, (3) indicators, the level can be seen in Figure 1 below:
Figure 1 explains that in mastery of the competency standards specified by the mastery of basic competence and mastery evidenced by mastery of middle level indicator. Indicators are the basis of the specific competencies that can be used to determine the size of the achievement of learning outcomes.

The Regulation 23 of 2006 in connection with, concerning competence is defined as the ability to act, think and act consistently as an embodiment of knowledge, attitudes, skills of the students, the learning objectives are focused kepembentukan competence according to some experts; Sagala (2010); Benny (2009) is an activity of interaction with the environment, which is done to have competence in the form of skills and knowledge required.

According to the results of Thomas (2008) that students in following the practice learning shouldal ways wear work clothes and safety equipment, behave orderly, safe, courteous, polite, respectful, disciplined, understand all the rules and is responsible for machines and tools used. This gives the sense that vocational students should be prepared seriously to sharpen the character values that should appear in the learning system, in line with the competencies that are personal and social.

The changes that occur in connection with the implementation of learning phenomena in the field of electrical expertise in vocational deemed in adequate, then the purpose of this research is to produce a device developed learning on lesson plan on learning the electrical installation practices. Innovation implementation of learning with the values of character that is tailored to the purpose of the indicators to be achieved, it is considered use effectively to achieve the learning objectives invocational technology.

The quality of learning is determined by the results of the evaluation that teachers can do. Teachers can evaluate the strength so weaknesses of students in learning. The more quality lesson plans and methods used in the learning process more robust for decision making in improving the learning process.

III. Research Methods

This type of research refers to the methods of research and development (R & D). Borgand Gall(1983: 772), made clear that’s specialized in the field of education, Research & Developmental Model (R&D) is a process that can be used to develop and validate products in educational research. Learning device is part of the product developed, which is focused on the development of lesson plan electrical installation practices and assessment rubrics.

Stages of development of learning tools, adapting appropriate measures research and development proposed by Borg & Gall (1983) modified the following stages: (1) requirement analysis phase, (2) the design stage of learning, (3) the stage of
product development and (5) evaluation stage.

In accordance Research & Developmental stages of the model referenced in this study, it is at the stage of requirements analysis, to identify the competence of the work force in the electrical installation electricity through workshops, followed by a discussion with practitioners directly with some of the technical vocational school teachers in focus group discussions (FGD). Thus found competence profiles, in order to install electrical installation work which hexamined into outcomes: (a) basic competence (KD) and Blueprint competency matrix.

At this stage of product development, the development of learning activities on the instructional implementation of learning (RPP) are the values of the characters into each core activity goal achievement indicators corresponding to each meeting. The next stage, design the evaluation results with the design criteria of successful learning (Rubric assessment), to evaluate the level of achievement indicators.

Analysis using qualitative descriptive analysis techniques that expose the product development of learning tools for the installation of subjects and assessment instruments. All instruments in the form of sheet validation, investigated the validity of the theoretical through expert assessment/experts (validators) according to their expertise.

The research instrument was developed using four Likert scales as follows: The lowest score was given the number 1 and the highest score was given a score of 4 (Sugiyono, 2010:312). Grading scales expressed in every aspect of the assessment criteria on the instrument, are: (a) very well with the value of four; (b) either the value of the three; (c) fairly well with the value of two; (d) less well with the value one. Assessment interpreted into degrees of validity, by converting qualitative data into quantitative data, referring to the scores obtained were converted into scores on a scale of 4, modified as in Table 1 below:

<table>
<thead>
<tr>
<th>MeanScore</th>
<th>Criteria</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.51 ≤ M ≤ 4.0</td>
<td>Very Good</td>
<td>Can be used without revision</td>
</tr>
<tr>
<td>2.51 ≤ M &lt; 3.5</td>
<td>Good</td>
<td>Can be used with slight revisions</td>
</tr>
<tr>
<td>1.51 ≤ M &lt; 2.5</td>
<td>Enough</td>
<td>Can be used with many revisions</td>
</tr>
<tr>
<td>0.0 ≤ M &lt; 1.5</td>
<td>Imperfective</td>
<td>Cannot be used</td>
</tr>
</tbody>
</table>

Description: M = mean score for each aspect assessed.

To measure the level of inter-rater agreement (inter-rater reliability) of the results of the assessment/validation of research instruments, analyzed by Cohen's Kappa statistic Coefficients of Nitko and Brokhart (2007:80). Reliability of the instruments said to be reliable if the coefficient (r) ≥ 0.70. To calculate Kappa(K) using the following formula:

\[ K = \frac{\Sigma a - \Sigma ef}{N - \Sigma ef} \]

Description:
\[ \Sigma a = \text{the total number of agreements} \]
\[ \Sigma ef = \text{the sum of the expected frequencies of agreement} \]

**IV. Results and Discussion**

Conceptually through the analysis, development of learning tools can be used as feasible, because it has been qualified by rating validator kevalivan skilled in the art. Based on the results of the development and review of the final product, then the conclusion becomes the findings in this study is, learning devices
that meet the criteria of valid and reliable. Products in the form, lesson plans and evaluation tools that have been developed according to the indicators of competence to be achieved.

The results showed that with the innovation of the lesson plan and evaluation, learning can be effective if formed interact in varying factual concepts and work processes. Through the internalization of the values of characters in the lesson plans, the achievement of competence indicators in the realm of knowledge, attitude and skills will form the character of students on honesty, rigor, discipline, responsibility and creativity.

Referring to the results of research and regulatory in 2013, then in an effort to improve learning outcomes, implementation of learning skills in desperate need of a teacher’s ability to innovate RPP, so the redesign of learning with the goal of designing and implementing competency-based learning, in a manner characteristic of innovative contextual view.

References


STUDENTS’ ENTERPRENEURIAL BEHAVIOR IN THE IMPLEMENTATION OF PRODUCTIVE ENTREPRENEURSHIP FOR GASTRONOMY VOCATIONAL SCHOOL

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Abstract

The objective of this research is to develop students’ entrepreneurial behavior by applying entrepreneur process in the production class through the application of productive entrepreneurship learning method in Gastronomy Vocational Schools. Learning method used is active learning and project based learning. Entrepreneur process integrated in the gastronomy production class includes: exploration, business planning, action, and results. This research uses research and development approach procedure. The development procedure refers to Plomp’s development model consisting of preliminary investigation, model development (model design, model realization, final model, evaluation, and revision), and followed by implementation phase. This research is analyzed with descriptive statistic. The results of model test to extended groups regarding students entrepreneurial behavior (in the field testing) conducted in SMKN 1 Sewon Bantul Yogyakarta are as follows: the mastery of students entrepreneurial behavior through entrepreneur process integrated in the continental food preparation class consisting of exploration, business planning, facilitation, execution, and results. In the early phase of classical execution, the distinctive behaviors are responsibility, innovation, honesty, independence, creativity, leadership, discipline, cooperation, willingness to take a risk, and communication. There is a significant improvement through continuous repetition on every observed entrepreneurial behavior and the average of students entrepreneurial behavior belong in the category of ‘good’.

Keywords: behavior, productive entrepreneurial learning.

1. Introduction

One of education challenges in Indonesia’s Education is the development of quantity and quality of vocational education to meet local and national needs and the capability to compete globally. On the other hand, there’s an expectation that our education can produce creative human resource to develop creative economy. It makes entrepreneur education is important to be taught to vocational schools because their students are close to working world and therefore entrepreneurship can be one of their career options (1).

Entrepreneurs can reduce the growing unemployment rate and at the same time increase prosperity level and country’s income. Their courage to open a new business can reduce unemployment and poverty number (2). It shows that entrepreneurship is the best potential in economy and development.

Creative economy movement is expected to make entrepreneurial culture part of work ethos of Indonesian people. It will bear reliable, tough, and independent new entrepreneurs. It is important since entrepreneurship activity does not only lie in the level of micro-economy but also in macro-economy (3).

The vocational education programs do not merely provide skill lessons to some individuals in order to get a better living. Vocational education makes education relevant to society’s needs. There are two functions of vocational schools in preparing the working force needed. The first covers quantitative dimension. It has to do with the function of vocational school in providing educated and skillful working force according to the working demand. The second is qualitative dimension, i.e. to produce educated, trained, and skillful working force that will be the source of local
economic development motors (4). Vocational education is associated with working methods. It tries to improve people's technique and position in their environment through technology mastery. It is also strongly related to the job demand. Therefore it is considered giving strong contribution in the economy.

Creative economy development (Creative Economy Development or PEK 2010-2014) is characterized by the development of economic activities based on people's creativity, skills and talent to produce creative power with economic value which will affect prosperity of Indonesian people (4). Education in Indonesia is implemented with the orientation to cultivation, empowerment, and the formation of good characters, honesty, attitude, personality, or excellent characters and other various life skills. This paradigm treats, facilitate, and drives students to be responsible, creative, innovative, sportive, and to become entrepreneurial independent learners (Ministry of Education and Culture, 2013:6; Ministry of Education and Culture, 2013:2).

Indonesian entrepreneurship is relatively behind other countries that have stepped into information and knowledge century. According to the estimation of Ciputra Foundation, the number of entrepreneurs in Indonesia is around four hundred thousand (around 0.18%) (6). This number is lower than it is of world agreement number. According to Ciputra (6) and Moerdijanto (7), a country is considered developed when the number of the entrepreneurs is higher than 2% of its population. In order to improve this condition, we need some serious efforts. One of them is grabbing demographic dividend.

Demographic dividend will occur in 2020-2035 (8). To be able to win it, in2010-2035 Indonesia has to plant big investment in human resource development. One of the ways is universal secondary education (PMU). PMU Entrepreneurship strategy is one of components in PMU education system (8). As mandated by Law No. 20/2003 regarding National Education System (9), National Medium Term Development Planning of Ministry of National Education 2010-2014 (10) emphasis on the efforts to upgrade the quality of human resource including; the proficiency in science and technology as well as strengthening of economic competitiveness. Therefore, through the entrepreneurship lesson we can try to achieve the target of the number of entrepreneurs in Indonesia.

Entrepreneurship based education is education applying principles and methodology to internalize some values to the students through a curriculum integrated with development occurring both within the school and society as well as the usage of learning methods and strategies relevant to the objectives of the learning itself (11). Entrepreneurship learning can result in entrepreneurial behavior and leadership spirit strongly correlated to the ways of managing business in order to prepare students so that they can work independently(12). Entrepreneurship program in the vocational schools is basically one of learning programs which aims to instill entrepreneurship values through habit training, attitude instilment and entrepreneurship behavioral maintenance. Moreover, according to European Commission (2006), the mind set and entrepreneur skills can be promoted by learning by doing (experiencing entrepreneurship through some projects and practical activities) (13). Therefore it is expected that entrepreneurship would become attitude of life and characters of Indonesian people (6). Further, entrepreneurship education is one of the best ways to support and create job opportunity. This thought goes along with the most recent research in Europe in which 78% of entrepreneurship vocational school graduates can immediately work after they finish their education (14).

Nowadays entrepreneurship learning in vocational schools is one of supporting subject for theoretical training. The implementation of entrepreneurship in vocational schools is only around 1.93% out of total learning hours in those schools for six semesters. It hasn't been able to form independence and to fully instill entrepreneurship spirit among vocational school graduates. Therefore, the design of entrepreneurship subject in vocational
schools has to be re-studied, starting form curriculum, learning strategy, methods, media, and the way teachers teach entrepreneurship subject (15). To effectively instill entrepreneurship spirit, we need some improvement efforts, one of can go through productive entrepreneurship learning in gastronomy vocational schools.

This research focuses on the entrepreneurship education in gastronomy department of vocational schools. The learning development is conducted as a way to better entrepreneurship learning in gastronomy department of vocational schools which is expected to produce high quality human resource with entrepreneurial behavior. The integration of entrepreneurship steps into gastronomy production training uses nested approach and project based learning as well as active learning method. Therefore, students can really apply their entrepreneurial skills in their respective field and can learn some production skills at the same time. It is expected that entrepreneurship value, behavior and attitude can be instilled more deeply to the students of vocational school in the gastronomy department. The objective of this research is to develop students’ entrepreneurial behavior in production subject through the application of productive entrepreneurship learning model for gastronomy vocational schools.

2. Entrepreneurship Behavior

Entrepreneur attitude, character, spirit and value can rise in form of entrepreneurial behavior (16). Behavior is a function of direct interaction between individual and his/her environment. This interaction defines someone’s behavior (17). Behavior is purpose oriented. Therefore behavior is motivated by the will to achieve particular purpose (18). According to Bird & Schjoedt (19), behavior is an action. Therefore Bird describes behavior as individual’s activities. (the entrepreneur).

On the other hand, entrepreneurial behavior is reflected in the personality, capability to connect with other people, management, marketing, and financial skills (20). According to Lumpkin, et al (21) and Winklund& Shepherd (22), entrepreneurial behavior is not companies’ behavior. Instead, entrepreneurial behavior is proximate result of cognition and emotion of an entrepreneur. Entrepreneurial behavior is also proximate cause of individual’s self-esteem on seeing results of his/her efforts. Knowledge on entrepreneurial behavior is important for teachers, students, media, and creative workers. And entrepreneurial behavior is usually resulted from the creation of innovation (19). Entrepreneurial behavior can also be defined as a study of human behavior involved in identifying and utilizing opportunity by creating and developing new business (19; 23) as well as exploring and creating opportunity within the process emerging organization (24). Entrepreneurial behavior is getting more acknowledgment as social change support and as facilitator of innovation in established organizations (25). Therefore it can be inferred that entrepreneurial behavior is function of direct interaction between an individual with his/her environment. It’s someone’s behavior reflected in his/her personality in achieving particular objective.

Table 1. Behavior and Description of Value of Entrepreneurship Education.

<table>
<thead>
<tr>
<th>Entrepreneurial behavior</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independence</td>
<td>Attitude and behavior of not easily relying on other people in doing their job.</td>
</tr>
<tr>
<td>Creativity</td>
<td>Thinking and doing something to create different ways or to get results from what they already have.</td>
</tr>
<tr>
<td>Willingness to take a risk</td>
<td>Someone's capability to enjoy challenging job, willingness and capability to take a risk.</td>
</tr>
<tr>
<td>Orientation to action</td>
<td>Someone’s attitude and eagerness to transform some ideas into real action.</td>
</tr>
<tr>
<td>Leadership</td>
<td>Someone’s attitude and behavior of being open to</td>
</tr>
</tbody>
</table>
Entrepreneurial behavior | Description
---|---
input and recommendations, easy to socialize, work together and direct other people.

Honesty | Behavior which is based on some efforts to make him/herself as a trustworthy person concerning his/her words, actions, and works.

Discipline | Behavior showing discipline and obedience to rules and regulations.

Hard Working | Behavior showing serious efforts in accomplishing a job and resolving obstacles.

Cooperation | Behavior based on some efforts to make someone’s self able to build relationship with others in accomplishing their job.

Innovation | Ability to apply creativity in order to solve problems and to seize opportunity to enhance and to enrich life.

Responsibility | Someone’s attitude and behavior of willingness and capability to do their job and duties.

Perseverance | Someone’s attitude and behavior of not giving up easily achieving particular goal using various alternatives.

Communication | Action showing willingness to talk to others, socialize and work together.

The last pillar would be innovation. In a long run, life standard can be enhanced only by innovation (26). Innovation is important for economy (27; 28; 29; 26). Dyer, et al. (30) explains that innovative entrepreneur tends to actively inquire, to observe, to experiment, and to build network with various people. Entrepreneurs who apply entrepreneurial behavior would have four distinct behavioral patterns compared to their counterpart. Entrepreneurs would put forward challenging questions. Entrepreneurs would spend their time intensively to observe the world around them just to find some new ideas. Entrepreneurs would be intent in testing their ideas to different market background and perspectives.

The assumption of development of productive entrepreneurship learning model for Gastronomy Vocational Schools is that the formation of entrepreneurial behavior requires learning condition enabling students to carry out some exploration, to comprehend and to independently implement entrepreneurial value and attitude within working situation. This situation functions as integration media between hard skill and entrepreneur skill. The entrepreneurial behavior mastery should be followed by feedback and support. Positive habit training would shape positive habit and behavior as well.

3. Method of the Research
This research uses procedure of R&D (research and development) approach. The main element of this model is the implementation of entrepreneurship learning integrated with productive learning applied with project based learning and active learning. The development of productive entrepreneurship learning model for Gastronomy Vocational Schools uses Plomp’s approach (1997)(31). Common model of problem solving in education is mentioned above consists of preliminary investigation phase, design phase, realization or construction phase, test, evaluation, and revision phase, and implementation phase. This research is conducted in SMK Negeri 1 Sewon Yogyakarta and the subject is students grade XI of gastronomy department, in the continental food preparation class. This research is analyzed using descriptive statistic.
4. Result and Analysis
4.1 Peer Evaluation on Behavior
In this part, students’ mastery on entrepreneurial behavior is observed by their peers during learning process. Peer evaluation is an objective evaluation which comes from the students’ partners from the same group. This evaluation is conducted after productive entrepreneurship class is accomplished.

Peer evaluation on entrepreneurial behavior is conducted in five iterations during continental food preparation class in SMKN 1 Sewon. The changes of entrepreneurial behavior appear in every meeting. Following is general data on the application of productive entrepreneurship learning method in gastronomy vocational school.

Table 2. Evaluation of students’ entrepreneurial behavior in continental food preparation class.

<table>
<thead>
<tr>
<th>Entrepreneurial steps</th>
<th>Behavior</th>
<th>Median</th>
<th>Mean</th>
<th>Stdev</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exploration</td>
<td>Creativity</td>
<td>2.74</td>
<td>2.69</td>
<td>0.11</td>
</tr>
<tr>
<td></td>
<td>Innovation</td>
<td>2.8</td>
<td>2.77</td>
<td>0.09</td>
</tr>
<tr>
<td></td>
<td>Independence</td>
<td>2.77</td>
<td>2.79</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td>Responsibility</td>
<td>3.03</td>
<td>3.04</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td>Honesty</td>
<td>2.79</td>
<td>2.82</td>
<td>0.11</td>
</tr>
<tr>
<td>Business plan</td>
<td>Leadership</td>
<td>2.79</td>
<td>2.79</td>
<td>0.05</td>
</tr>
<tr>
<td>Facilitation</td>
<td>Perseverance</td>
<td>2.88</td>
<td>2.84</td>
<td>0.08</td>
</tr>
<tr>
<td></td>
<td>Honesty</td>
<td>2.86</td>
<td>2.87</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td>Responsibility</td>
<td>3.02</td>
<td>3</td>
<td>0.12</td>
</tr>
<tr>
<td></td>
<td>Discipline</td>
<td>2.95</td>
<td>2.93</td>
<td>0.08</td>
</tr>
<tr>
<td></td>
<td>Cooperation</td>
<td>3</td>
<td>3.03</td>
<td>0.07</td>
</tr>
<tr>
<td>Execution</td>
<td>Orientation to action</td>
<td>2.73</td>
<td>2.71</td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td>Discipline</td>
<td>2.89</td>
<td>2.88</td>
<td>0.09</td>
</tr>
<tr>
<td></td>
<td>Cooperation</td>
<td>2.97</td>
<td>2.98</td>
<td>0.04</td>
</tr>
<tr>
<td></td>
<td>Innovation</td>
<td>2.77</td>
<td>2.83</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td>Honesty</td>
<td>2.98</td>
<td>2.94</td>
<td>0.09</td>
</tr>
<tr>
<td></td>
<td>Hard work</td>
<td>2.68</td>
<td>2.72</td>
<td>0.09</td>
</tr>
<tr>
<td></td>
<td>Responsible</td>
<td>2.91</td>
<td>2.91</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>Communication</td>
<td>3.03</td>
<td>3.01</td>
<td>0.12</td>
</tr>
<tr>
<td></td>
<td>Willingness to take a risk</td>
<td>2.77</td>
<td>2.79</td>
<td>0.09</td>
</tr>
</tbody>
</table>

The changes in the students’ entrepreneurial behavior happen because there are some changes in the projects they have to conduct in each meeting (customized to basic competence as the target of competence mastery). It depends on the difficulty level of the projects they have to accomplish. Entrepreneurial behavior changes in SMKN 1 Sewon students show positive trend (table 1). Students are involved to assess behavior mastery occurring to their partners.

Behavior mastery based on the peer evaluation in the phase of exploration implemented in the exploration phase during continental food preparation class can be seen in picture 1. In the exploration phase the behaviors emerging are: responsibly, honesty, independence, innovation and creativity. It can be seen that responsibility get the highest score with mean of 3.04 whereas creativity mastery’s mean is 2.69.

If we take a look at the five behaviors observed, it can be seen that the development of entrepreneurial behavior mastered by the students in this exploration phase experiences some fluctuation. Based on that picture, it can be concluded that entrepreneurial behavior emerges differently in each phase. In the exploration phase, it is responsibility that they master
best, followed by honesty, independence, innovation, and creativity respectively.

Peer evaluation on students' behavior shows that leadership is a dominant aspect appearing in business planning phase. Leadership is self-directed process to give instruction or to influence others in a group in accomplishing some duties.

Further, in each phase students shows the tendency toward positive direction.

Figure 2. Students' mastery on entrepreneurial behavior in the phase of business planning.

Figure 3 shows the profile of students' entrepreneurial behavior changes. Eventhough there is some fluctuation in the behavior changes in the facilitation phase, in general students' entrepreneurial behavior in the facilitation phase of entrepreneur process grows toward positive direction.

During execution phase, entrepreneurial behavior mastered by the students are: orientation to action (mean 2.71); discipline (mean 2.88); cooperation (mean 2.98); innovation (mean 2.83); honesty (mean 2.97); hard work (mean 2.72); responsibility (mean 2.91); communication (mean 3.01); willingness to take a risk (mean 2.79); and independence (mean 2.84). If we take a look at behavior mastery in this phase, it can be seen that there are various behaviors with a very fluctuating change.

In the 'result' phase of entrepreneur process, we can see evaluation and reflection behaviors. Description of reflection and evaluation behaviors is the least frequent among students regarding entrepreneurial behavior. However after UKD is accomplished, the target of students' learning and projects have been totally accomplished. This phase is strengthened with final assessment from the teachers.

In short, students' mastery on entrepreneurial behaviors obtained from peer evaluation in SMKN 1 Sewon Bantul can be grouped as what presented in table (3).
Table 3. Classification of students’ mastery on entrepreneurial behaviors in SMKN 1 Sewon.

<table>
<thead>
<tr>
<th>No</th>
<th>Classification of students' mastery on entrepreneurial behaviors in SMKN 1 Sewon</th>
<th>f</th>
<th>f %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Poor</td>
<td>2</td>
<td>1.3</td>
</tr>
<tr>
<td>2</td>
<td>Fair</td>
<td>22</td>
<td>13.8</td>
</tr>
<tr>
<td>3</td>
<td>Good</td>
<td>117</td>
<td>73.1</td>
</tr>
<tr>
<td>4</td>
<td>Very good</td>
<td>19</td>
<td>11.9</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>160</td>
<td>100.0</td>
</tr>
</tbody>
</table>

The formation of entrepreneurial behaviors requires particular condition which enables students to explore, understand as well as independently utilize their entrepreneurial value and attitude in working situation. The situation functions as integration media between hard skill and entrepreneurial skills. Mastery on entrepreneurial behaviors should be followed by feedback and support. Positive habit training would shape positive habit and behaviors as well.

In the extended test upon productive entrepreneurship learning model in gastronomy vocational school, some entrepreneurial behaviors can be observed and inter-assessed among the students. Those behaviors have a great variety and consist of creativity, innovation, independence, responsibility, and honesty. Subsequently, entrepreneurial behaviors emerging during business planning phase is leadership. During facilitation phase perseverance, honesty, responsibility, discipline, and cooperation are observed. During execution phase the observed ones are orientation to action, discipline, cooperation, innovation, honesty, hard work, responsibility, communication, willingness to take a risk, and independence. Result phase is related to evaluation and reflection.

Responsibility gets the highest rank during UKD. The second is honesty. Honesty is an important element that has to be instilled during learning process. It is because honesty is an important aspect that every student has to possess. The third is cooperation. It is a behavior underlined by an effort to make someone’s self enable to build relation with others in the action and work. Cooperation can also become motivation in doing some given tasks in good and proper way. Discipline is a behavior showing order and obedience to rules and regulations. In the extended class test (UKD) students carry out some projects that have previously been agreed by the students and teachers.

Independence is behavior of not easily depending on others in doing their job. Innovation is behavior showing ability to apply creativity in order to solve problems and to seize opportunity to improve and enrich life. Creativity is a picture of behavior to create something new by adding some value admitted by the consumers of their product. The emergence of creativity communally increases in every phase whereas reflection and evaluation are least frequent behaviors among students’ entrepreneurial behaviors. However, when UKD is done, students’ learning and project targets have all been an accomplished. The ‘result’ phase of entrepreneurs is strengthened by final assessment from the teachers. Entrepreneurial behavior changes can also be observed in each phase of entrepreneur process.

5. Conclusion

There are three results of model test upon extended group (UKD) regarding students entrepreneurial behaviors (in the field testing) conducted in SMKN 1 Sewon Bantul Yogyakarta. (1) Behaviors observed in the implementation of entrepreneur process integrated in gastronomy production class (in the continental food preparation class) include: exploration, business planning, facilitation, execution, and result. (2) In early phase, classically, the behaviors appearing most obviously are responsibility, innovation, honesty, independence, creativity, leadership, perseverance, discipline, cooperation, willingness to take a risk, independence, and communication (3) There is significant improvement resulting from continuous repetition in each behavior observed and the average of students entrepreneurial behavior can be classified in good category.
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THE DEVELOPMENT OF LEARNING MODEL OF WEB PROGRAMMING COURSE WITH PROJECT BASED LEARNING

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Abstract

The purpose of this research is to develop a project based learning model on web programming course (PBL-Web). Specifically this study aims to remedy find web programming model of project based learning (PBL-Web). In order to achieve the objectives and targets set, this study is development of web programming model of learning in the context of Project Based Learning will be done using the R and D development model developed by Borg & Gall. R & D approach is to verify and assess various models of learning in teaching and learning in education institutions, including web programming model of project based learning (PBL-site) which will be developed in this research. Project-based learning is learning by implementing a project to improve the creativity of learners to produce a real work/real end product. Project-based learning in a course web programming is a constructive elearning approach to deepening project-based learning approach to real and relevant issues in the field web programming. Relevance learning web programming with Web programming model of the project is in need of real life examples in the form of web products, requiring programming skills, requiring the ability to think logically and problem-solving abilities. Project-based learning is very well developed web programming for field studies because (1) the final product web; (2) learners acquire useful knowledge to solve problems independently; (3) can learn actively and independently; (4) capable of critical thinking, and develop initiatives.

Key Words: Web Programming, Learning, Project Based

Introduction

Efforts to improve the quality of education is a continuous process undertaken and sustained. Improving the quality of learning meant that the national education goals can be achieved with either. Various attempts were made by the government to improve the quality of national education. These include efforts through the development and refinement of curriculum, evaluation system improvements, infrastructure improvements and the development of educational materials and learning model.

Learning web programming course is one of the things that deserve attention, especially the development of learning models. The importance of learning development courses web programming because this area is one area that has a very large role in the development of Information Technology (IT).

Information Technology is a field that is currently used in various sectors of life. IT is an absolute skill for without mastery of IT people of Indonesia will be excluded from global competition. The web programming course one area that has a very large role in the development of IT. It is undeniable that the development of IT in today's world, it is supported by the large role that the Internet sector where websites including the most popular Internet applications nowadays. Therefore learning web programming is an important thing to be studied.

The Web programming model of learning should be through a real example. A concrete example is in learning web programming this is a product. One model of learning that emphasizes a product is a project based learning. Project based learning (PBL) focuses on the role of students in the learning process as well as a product at the end of the lesson.
Studies on the development of project-based learning in a course on web programming course Information Engineering and Computer Education is very important to be done in order to improve student achievement and competence, applying oriented learning in the real world of work so as to improve the quality of learning in the field of technology and informatics.

Concepts and Learning Approach

Education is a human effort to produce the cultural continuity of the life of every generation. Every pluralistic nation always prepare citizens become educated citizens for the benefit continuity of generations. Human beings are creatures who deals with the education of so-called animal and animal educandumaducandus the man as being educated as well as being educational. [10]

Education is a conscious and deliberate effort to create an atmosphere of learning and the learning process so that learners are actively developing the potential for him to gain spiritual strength of religious, self-control, personality, intelligence, noble character and skills required. Therefore, education can be interpreted as an attempt to change the behavior of students in order to become a man who can live independently in the community as members of the surrounding natural environment [1].

Education is not only about the environment only intellectual but also personality development of the students as a whole. Therefore, a theory of education is needed in order to build the world of education. That education is the key assumptions : (1) education stems from the actual condition of individual learning and the learning environment; (2) normative education means education is focused on the things that are good; (3) education is a process of achieving goals and a series of activities that begins with the actual condition of the individual who learns to achieve the expected goals [1].

Therefore, please note the link between education and learning. Teaching can also be interpreted as an effort to help someone to learn something. Based on the above it can be concluded that the essence of education is an effort that is done in a planned and systematic way to change the behavior of human learners be able to live independently in the community and the surrounding environment by providing the knowledge, experience, understanding thoroughly.

Characteristics of project-based learning

In contrast to traditional learning models are generally characterized by short duration classroom practice, isolated, and lecturer-centered learning activities, project-based learning model or PBL more emphasis on learning a relatively long duration, holistic interdisciplinary, student centered, and practices and integrated with real world issues . In project-based learning (PBL), students learn in the real problem, which can deliver permanent knowledge. PBL is a model that can organize projects in learning [11].

PBL is a tool that can provide power to the students understand precisely what they are learning. To succeed in PBL, collaborative process in group work is emphasized [9]. Will provide a collaborative learning environment in which students work together with both the teacher and the student members of other groups to achieve certain goals as a project goal [12].

Project-based learning (PBL) can be prepared in collaboration with the instructor, while student learning in collaborative groups between 4-5 people. When students work in teams, they find the skills to plan, organize, negotiate, and make an agreement on the issues that task will be done, who is responsible for each task, and how the information will be collected and presented [5]. The skills that have been identified by these students is a skill that is very important for the success of his life, and as labor is a very important skill in the workplace. Due to the nature of work is a collaborative project, the ongoing development of these skills among learners.

Characteristics of PBL include topics, tasks, roles played by students, the context in which the project work done. Project Based Learning involves real-life challenges...
[4]. PBL can change the nature of the relationship between professor and student teachers. Project may reduce competition in the classroom and directing students more collaborative than working individually.

Project Based Learning has some advantages [5]. These advantages include (1) increase motivation. (2) improve the ability of solving the problem. (3) increase collaborative skills(4) improve the skills of managing resources. Learning Project implemented either give to students learning and practice in organizing the project, and make the allocation of time and other resources such as equipment to complete the task.

Advantage of Project Based Learning are as follows: (1) Increase motivation. Several reports on the project said many students exceeded the time limit due to preoccupation discuss projects they are working on, trying hard to achieve the project. (2) Improve the ability of solving the problem. Research on the development of high-level cognitive skills of students stressed the need for students to engage in problem-solving tasks and the need for specialized learning on how to find and solve the problem. (3) Increase collaborative skills. The importance of group work in a project requiring students and practicing it expands working group cooperative communication skills, evaluation of students, exchange of information online is a collaborative aspects of a project. (4) Improve resource management skills. Learning Project is implemented either give to students learning and practice in organizing the project, and make the allocation of time and other resources such as equipment to complete the task [7].

Thus far different project -based learning with hands-on learning with traditional background. Direct learning is one of the variations of alternative learning methods that are dominated by teachers. Direct instruction is designed to develop the knowledge centered teaching. Therefore, project-based learning (PBL) is different from traditional learning.

Discussion Characteristics of Web Programming Course

Courses web programming is a subject that studies about how to make a web. To find out how to make a web, a student must know the web programming languages and software support in making a web. The initial step is to know web programming languages involved in web programming such as HTML, XML, XHTML, CSS, Javascript, Ajax, PHP, JQuery, and others. In Web Programming course, students are given materials about creating dynamic websites.

The materials of web programming will include installation and configuration of the web application server and data base server, Server Side Scripting using PHP, MySQL database access, AJAX technology, and includes a website that has been made during the lecture to web hosting. By following this course, students are expected to provide solutions to the needs of dynamic website.

There are several components that are studied in a web programming course [3]:

1). HTML (Hypertext Markup Language)

HTML is a markup language that web structures. Students can learn HTML using notepad and a browser. Students type in HTML code in notepad, then save it in html format and a file that is opened will be displayed in the browser.

2). CSS (Cascading Style Sheet)

CSS is a web component that makes an interesting web interface. The analogy to HTML as the bones (functioning as a structure) of the human body, and CSS(Cascading Style Sheet) described as human flesh [Ducken]. CSS(Cascading Style Sheets) which gave the presentation and appearance of the people who saw from the web that are made.

3). Dynamic Programming

There are several dynamic programming can be done on the internet. The programming languages are PHP, ASP, Python, and many others. The most widely used is PHP. PHP also has a lot of documentation, so that if a student difficulty in making programs, can see that many sources on the internet. Programming
languages such as C/C++, Visual Basic, C#, actually can be used.

4). Data Storage

Data storage is a place that is used to store data on the web is made, either the user data, passwords, credit card data, shopping list, the data value of college, and others. There are many applications of data storage, such as MySQL, PostgreSQL, Oracle, etc. MySQL is the DBMS that is often used. But many other DBMS applications, DBM Stypically uses one language to access, SQL. SQL (structured query language) is a language that is used for data management in a DBMS.

Web programming is one of the principal subjects of the study program PTIK in Indonesia. The purpose of this course is web programming: (1) provide insight and knowledge to the students in developing web applications in depth, critical and systematic; (2) provide knowledge about the characteristics and the basic principles of a website.

Then implementation of this course, the student is expected to: (1) have an understanding of various programming techniques and programming languages are available and can choose the appropriate design for a web application; (2) able to demonstrate the ability to design and implement a web maintenance; (3) be able to use the language of web designing HTML and JavaScript and other programming languages; (4) to design and implement a web application server by using one or more appropriate technology; (5) have the knowledge to analyze and critically evaluate Web applications; (6) have an understanding of web protocols is a critical and systematic [8].

Relevance PBL with web programming course

When linked with the project-based learning model for web programming courses are very relevant to the PBL models described in the previous section. This can be described in the following table with the relevance of PBL web programming courses.

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Creating a complex script and links</td>
<td>Problem solving Complex</td>
</tr>
<tr>
<td>Requires strong logical thinking</td>
<td>Interdisciplinary</td>
</tr>
<tr>
<td>Making the web for various fields</td>
<td>The Real Product</td>
</tr>
<tr>
<td>Produce web design</td>
<td>Authentic tasks</td>
</tr>
<tr>
<td>Program design requires creativity</td>
<td>Emphasis on time management</td>
</tr>
<tr>
<td></td>
<td>The role of the lecturer as a resource provider</td>
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</tbody>
</table>

Teaching a web programming course has the potential to make a project-based learning experience more interesting for students. Students who driven web programming course more active on their own initiative to make the web design, teacher or instructor position behind evaluating web projects created by the students.

Some issues related to project-based learning are (1) the students acquire basic knowledge useful for solving the problems encountered in the field; (2) to learn actively and independently; (3) capable of critical thinking, and develop initiatives. Therefore, the application of this model of learning in the field of computers and informatics learning can provide opportunities to improve the quality of learning in the field.

Web projects created by students can be either web planning process, the determination of the programming language, programming algorithm solving. But in order for a web project created to meet the learning criterion then a web
project should create a new understanding of the basics of web programming and web-making skills for students. Approach in a production model that is implemented in web creation web programming course by producing a real project that is a web. By using the Sharan models [7] then there are several stages in the project-based learning web programming. These stages is to determine the topic of the web, web planning, collecting data and syntax, making web design and discuss the results achieved with other colleagues.

Conclusion

Studies on PBL showed an in crease in programming: motivation of learners, problem-solving skills, communication skills and teamwork, knowledge, and capacity to learn independence. Implementation of project-based learning involves the development of the divide of understanding identifying user needs, articulating and classifying core competency are as of programming, and designing web programming experience project-based learning through an interactive process in bringing together the core competencies and map the experience based on the user's needs.

The results of the study of web-based learning project showed learning web programming with Web programming model of the project is in need of real life examples in the form of web products, requiring programming skills, requiring the ability to think logically and problem-solving abilities. Project-based learning is very well developed web programming for field studies because (1) the final product web; (2) learners acquire useful knowledge to solve problems independently; (3) can learn actively and independently; (4) capable of critical thinking, and develop initiatives.

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REFERENCES


Entrepreneurship is one solution to solve the problem of employment and improve society economy. The Colleges who manages teaching vocational education (TVET), has the duty to provide a solution. One of the solution is to integrated entrepreneurship knowledge in teaching. The purpose of this paper is to 1) identify the values of entrepreneurship competencies that can be integrated to leaning; and 2) alternative for integrating entrepreneurship in culinary learning. The entrepreneur competencies value that predicted can be integrated are: Utilize our potential for entrepreneurship, analyze business opportunities, applying management principles, applying the skills of service, apply production skills, culinary product marketing activities. Alternative integration of entrepreneurship through the preparation of syllabi, choosing a strategy that allows students to be actively involved through the experience, and conduct evaluations that give feedback to learners for the learning outcomes that they have achieved.

Keywords: entrepreneurship integration, productive culinary learning

1. Background Issues

In this globalization era, it’s universities role to producing professional experts that ready to work independently and be able to create good job for themselves and their society. Today college graduates still have dependence on the government or private agencies. Generally they still haven’t able to see market opportunity so they unable to create and innovate to empowered their potential and the resource around him effectively and efficiently to meet the needs of live.

One caused less responsive for changes in the surrounding environment is because the curriculum in universities generally have not integrate well entrepreneurship. Integration culture of entrepreneurship into the course is considered important and rational way to preparing professional, responsible, and independent college graduates. Moreover if it’s associated the globalization era, which often occurs concerning social impact, include intense job competition, low wages, event to the layoffs, and difficulty of getting an adequate income.

Teaching is a vehicle to form entrepreneurs. An college graduates entrepreneur are expected to have two characteristics themselves. First, they have knowledge, technology, or art that they use as competence center for entrepreneurship. Second, they must have ideal behavior as an entrepreneur in general, that always confident, oriented in task and result, willing to take risk, leadership, and future oriented. Through teaching these values will be put into the hearts and minds of students, as it’s used as vehicle in education process.

Until now content that learned in the course of catering is more likely on analysis of recipes, try recipes, making various kind of food products, and how to serving the food to looks interesting. As a Result, many graduates have skills to make a product, but it lack the ability to sell.

Based on this, it’s very important to integrate productive catering course with entrepreneurship. As how to analyze the potential to achieve business opportunities, business plan, marketing plan, implementation in business plan, manage production, managing service section, marketing, and managing resources such as equipment, machines, people, time, material, and even finance. The process of integration of entrepreneurship into the curriculum needs to be addressed, in order
to produce graduates who are professional, responsible, and independent.

Entrepreneurship that integrated in learning process is integration of entrepreneurial values into learning, so it will gained awareness of the importance of values, shaping the character of self-employment, habituation entrepreneurial values into the learners behavior through the learning process that takes place inside and outside the classroom as a result.

2. The Values of Entrepreneurship in Culinary Production Education

Among the college word “Entrepreneur” is familiar for scientists who study economics. But not for other scientist. But lately the word entrepreneur doesn’t escape the attention of universities outside the field of economics study.

Entrepreneurship can be defined as a trait of courage and exemplary in taking risk that sourced from their own strength and abilities.

From the definition it can be indicated that entrepreneurship is the work done by those who dare to take risks and dare to stand alone for field employment or livelihood for his own life as well as others that accommodated by him.

The value of entrepreneurship can also seen from the traits and characteristic inherent in an entrepreneur, such as: leaver ship, innovation, decision-making, responsiveness to change, working smart, future vision, and attitudes toward risk. (Muhammad, 1999). Correspondingly Kasali (2002) suggested that the characteristic of an entrepreneur are active to discover new things, always looking for opportunity, have discipline when dealing with opportunity, willing to abandon useless idea, achievement oriented, calculated risk, focus on execution, gives energy on all fronts and think simple.

Entrepreneurship is the spirit, behavior, and the ability to respond positively to the opportunity and gain advantage for yourself or a better service, also create and provide provide more useful products and implement more efficient way of working, thought the courage to take risk, creativity, innovation, and management ability.

The definition above cover the essence of entrepreneurship as positive response to the opportunity to make profits for themself or better service to customers and communities, an ethical and productive way to achieve the objectives as well as the mental attitude to realize the positive response.

Someone can be called has the entrepreneurial competence if he/she able to do three basic competence, that is (1) entrepreneurial (business), (2) able to manage, and (3) has ability accordance with the field (Haryono, 2005).

Productive Catering Education, have characteristic that referring to vocational curriculum lesson for high vocational school or vocational education. Public school only have normative and adaptive learning, while vocational school coupled with productive learning. For the Catering Subject, the example is production of Indonesian food, Continental food production, food presentation, restaurant, catering, or other food service.

The result of Komariah study (2005) have indentified entrepreneurial competencies that can be implemented in the restaurant course are (1) untilizing self-potential for entrepreneurship in the field of restaurant; (2) Applying the principles of management in the restaurant business; (3) Analyze the business opportunities in the field of restaurant; (4) Implement production skills in the restaurant business; (5) Implement service skills in the field of restaurant; (6) Marketing activities.

3. Integration Entrepreneurship in Productive Culinary Education

The integration of entrepreneurship education in the subjects is staring from the planned, implementation, and evaluation of learning in productive culinary study.

1. Integrating Entrepreneurship through Syllabus and Lesson Plan.

Making syllabus in the course is aiming to design class activities, where it design for implementation of targeted competence and necessary material. Sudrajat (2011) explained that the integration of values of entrepreneurship in the syllabus and lesson plans can be carried thought the following steps; (1) Assessing
standard competence and basic competencies to determine whether entrepreneurial values are already included in or not; (2) To entering the entrepreneurial values that have been listed in the syllabus into standard competence and basic competencies to syllabus; (3) developing an active learners learning steps that make them have a opportunity to integrated the value and showing it they behavior; (4) Entering active learning step that already integrated by entrepreneurship value itu Action plan.

Komariah research (2005) had trend a entrepreneurial integrated syllabus in restaurant subjects, that is assigned to design the plan before the restaurant practice stared. That design can guide the student to identify opportunities, demand and supply, apply the principles of management in the restaurant business, apply production skills in the restaurant business, applying service skills, and apply marketing practices. Hereafter restaurant practical implementation will be guided and be examined according with the business plan that made. Through this process students as learners are expected to know, accept the entrepreneurship value as their own and take responsibility for the taken decisions through the process of thinking, being, and doing. And enjoying the result at same time.

2. Integrating Entrepreneurship through Experiential Learning

Rogers (Zainul, 2001) identified learning by two types into cognitive learning and experience learning. The first is related to academic knowledge, while the second is more to the applied knowledge. Type of applied knowledge is a strong foundation for growth and personal change in learners, because the process is involved personaly, self-inisiative, self-evaluation, and have direct impact to the learners. Implication of learning should be done by learner himself, the teacher only as facilitator as his main task is to create an enviornment that conducive to learning.

Sanjaya (2009:126) states that learning strategy is defined as a plan. Method, or series of activities designed to achieves a particular educational goal. The learning strategy defined as detail of selection of sequencing of event and activities in learning (Herminanto Sofyan 2003:105). So, the strategy of learning is process of managing environmental condition that related to learning approaches, as how to communicate the content of the lesson to the student so the learning objective can be achieved. Learning strategy play important role in determining the quality of teaching.

Cennao, Kalk (2005:69) stats that the development of strategies to facilitate learning can refer to the following three considerations: (1) Information needs and characteristic of learner; (2) The intended learning outcomes and the context in which the new knowledge will be applied; (3) The context of the instruction and the environment in which the learning will take place.

Based on the opinion, the development of learning strategies can be implemented to integrated value of entrepreneurship through the appropriate stages of learning methods, such as learning by doing or learning experience.

Alternative teaching strategy for restaurant course that integrated with entrepreneurship is as follow:

<table>
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<tr>
<th>Table 1. Implementation Stages of Restaurant Activities Stages</th>
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<td>2</td>
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</tbody>
</table>
| 3 | Accompanying field trips | Take a field trip | - Identify the types of businesses and restaurants that can serve as a pilot project.  
- Finding the restaurant business opportunities that can be implemented. |
| 4 | Giving business plan assignment | Individually create a business plan | - Exercise makes the design of business models as a pilot project. This exercise, students are trained to analyze business opportunities in the field of restaurant, for example formal restaurant, in a formal restaurant and cake shop. Determine business objectives, organization of work, the draft budget to marketing activities. |
| 5 | Facilitator and give feedback | Business draft presentation | Can communicate about the design |
| 6-15 | Mentoring | Business draft implementation in restaurant management activity | Students work on projects, learn to solve problems, discover, explore, discuss and think critically. Exercise production and service skills |
| 16 | Leading discussion | Report and presenting activity result | Business management responsibilities practice |

According to above presented table, restaurant learning that is one of the the productive culinary learning, applying entrepreneurial learning should be oriented toward student (student centre learning), lecturer server only as facilitators and create a conducive environment.

### 3. Evaluation of Learning

Some form of evaluation that can be use to assess the integration of entrepreneur is observation sheet to measure performance. Assessment of performance is an alternative to reveal individual ability in holistic manner, not only to measures cognitive ability, but including affective and psychomotor abilities. Mansyur (2009) explained that individual performance is the maximum performance that is intended as result of learning process. Each individual can demonstrate their performance in fully capabilities through their involvement in the process or the product.

Komariah (2005) has assessed using observation sheets to assess the performance of student in entrepreneurial integrated restaurant course. As it saw the application in formal restaurant, non-formal restaurant, and cake & bakery. Assessment on management work indicator show an improvement in each cycle. As well as increase in profit earned on each cycle. This
is in line with what is Raelin (2008:253) that the assessment can be seen from the outcome, like from the successful implementation of the program and the positive changes that occur in organization that provide an improvement in managerial that conducted by the participants.

Another way to see the integration of entrepreneurship is the Peer Assessment. The focus point in this assessment is how the participants can feel self-improvement. The result of Komariah (2005) study is with peer assessment it can be determined who possessed a strong motivation for entrepreneurship, who has confidence improvement, student who can apply a good production skills, and who can apply their creativity and may also even note how the performance he had done. Overall it’s a form of entrepreneurial culture code. Thus peer assessment is an efficient evaluation form to see entrepreneurship integration in productive culinary learning.

Another form of assessment is self-assessment, which provides an opportunity for students to take responsibility for their own learning. Student are given the opportunity to assess the work and ability in accordance with the experience that feel. Mansyur (2009:120) states that the student is a best appraiser over their own production, therefore self-assessment can foster self-confidence and responsibility in student. So how successful integration of entrepreneurship through learning can be reflected by the student self-assessment

Conclution

1. Entrepreneurial value that can be integrated in the learning is empowered self potential to entrepreneurship, analyze business opportunities, applying management principles, applying service skills, apply production skills, culinary product marketing activities.

2. Alternative entrepreneurial integration in culinary learning can be done thought:

a) Preparation of syllabus that include targeted competencies, and develop learning step that will be applied b) Entrepreneurship thought experiential learning, learning with appropriate methods, like learning by doing or experience learning. The development of strategy to facilitating learning is basis on (1) Information needs and characteristics of learner, (2) The intended learning outcomes and the context in which the new knowledge will be applied; (3) The context of the instruction and the environment in which the learning will take place. Implication of learning should be done by the learners, while teacher is only a facilitator.

c) Some form of evaluation that can be used to assess the integration of entrepreneurship is performance evaluation that can reveal individuals ability in holistic way, efficient peer assessment, and self-assessment that provide an opportunity for the students to take responsibility for their own learning.

Reference


Abstract

Vocational High School (SMK) has to be able to prepare the graduates to be middle-class employees and to have entrepreneurship spirit. SMK graduates have to be able to compete in the world of work and be entrepreneurs. Entrepreneurship education in SMK is implicitly done through school subjects, extracurricular activities and self-development. SMK graduates should comprehend the skills and values of being an entrepreneur. However, the results of the entrepreneurship education have not been achieved well. This suggests that the entrepreneurship education does not effectively done, and the reasons why this happens are not yet identified. In relation to this, an effective evaluation model implemented in SMK needs to be developed. The model developed includes two things, namely the assessment of the achievement of students' entrepreneurial competencies, and evaluation of entrepreneurship education programs. Assessment of competency achievement should be integrated with entrepreneurial learning. The main assessment technique used is project assessment. In addition to projects, observation techniques to determine the achievement of student attitudes, and techniques of tests are also used in the assessment. Program evaluation is conducted to determine the success of entrepreneurship education programs, and more importantly to improve the program. Through a comprehensive evaluation we will know the weaknesses and constraints, as well as alternative solutions to overcome them. Development of an program evaluation of entrepreneurship education in SMK is conducted, among others, the following phases: preparation, execution, processing, reporting and utilization of evaluation results.

Keywords: Evaluation model, Entrepreneurship education of vocational high school.

Introduction

The quality of human resources is an essential factor in regional and international competition in the global era. In this regard, education at all levels, including at the Vocational School (SMK) has a very important role in meeting the qualified human resources.

SMK is the educational unit at the secondary level, formal education that prepares graduates to enter the workforce. Improving the quality of SMK is an attempt to get closer to the size of the competence of graduates with the competencies required by the size of the workforce. Vocational education provision are expected to provide complete and adequate capabilities so that its graduates can apply their competencies in the workplace.

In accordance Peraturan Menteri Pendidikan dan Kebudayaan No. 54 Tahun 2013, the vocational high school graduates are expected to have competence in aspects of attitudes, knowledge, and skills. Competence in all three aspects is essential for graduates to face the world of work. SMK graduates are expected to be independent in the sense of having a strong mental to do their own business, not just as a job seeker but as creators of jobs.

National Labor Force Survey data 2004 - 2013 (Badan Pusat Statistik, 2014) shows that unemployment is open to graduates of SMK in the last three years has increased, as many as 1,032,317 in August 2011, and 1,041,265 in August 2012, and as many as 1,259,444 in August 2013. When viewed from the composition, labor force which has SMK education level in 2008 was 7.06 percent, amounting to 7.50 percent in 2009, and in 2010 amounted to 8.35 percent (Kementerian Tenaga Kerja dan Transmigrasi, 2012).

There are several factors that cause unemployment of SMK graduates still high, among other non-equilibrium position between the number of job seekers with vacancies available. Appropriate business opportunities from the potential of local wisdom society are
also not taken to become an entrepreneur, rather than being an employee.

One effort to overcome the problem of the high number of unemployed graduates of SMK, and to increase the quantity and quality of new entrepreneurs, the evaluation and education system for entrepreneurship in SMK should be improved.

2. Entrepreneurship Education in SMK

According to F. Drucker (Suryana, 2013:10) the concept of entrepreneurship refers to traits, temperament, and characteristics inherent in a person who has a strong will to realize innovative ideas into real business world and can develop it. Entrepreneurship is the ability to create something new and different. General characteristics of entrepreneurship can be seen from some aspects of personality, namely: self-confident, results-oriented, risk-taking, leadership, and future-oriented.

Based on their research results, Maigida and Saba (2013) make conclusion that “youth unemployment can be tackled. Every young person could be given the chance that previous generations took for granted. Together, we can help the young people get the jobs on which their future-and those yet unborn depends. This can be achieved through informal sector in which all stake holders are involved by way of lending their support to informal sector to ensure that it is not downtrodden. This can be achieved through entrepreneurship training in Technical Vocational Education and Training”

Entrepreneurial activity associated with the acquisition of additional value in the market through a process of combining resources in new ways and different in order to compete. According to Zimmerer (Sukardi, 2014), the added value can be created through the following ways: developing new technology, discovering new knowledge, improving existing products or services, finding different ways of providing more goods and services with fewer resources.

Entrepreneurship Education in Curriculum structure SMK Year 2013 is in Subjects Prakarya and Kewirausahaan (Handycraft and Entrepreneurship). Competency to be achieved in Prakarya and Kewirausahaan Subject include competence in aspects Spiritual Attitude (KI.1), Social Attitudes (KI.2), Knowledge (KI.3), and Skill (KI.4). The whole aspect of competence is expected to be mastered by students.

On the basis of Peraturan Menteri Pendidikan dan Kebudayaan No.70 Tahun 2013 on Policy Framework and Curriculum Structure SMK, the attitude of the subjects Prakarya and Kewirausahaan for Engineering SMK areas of expertise, include: embrace an attitude of cooperation, mutual cooperation, tolerance, discipline, responsible, creative and innovative in understands entrepreneurship and create works of engineering in the local region and the other with regard aesthetics of the final product.

Aspects of knowledge include: Understanding the production process engineering works as simple motion control devices with a source of electric current in the local area through observations from a variety of sources; Analyze the attitudes and behavior of entrepreneurial engineering works as a simple motion control devices with a source of electric current that can support success in running a business.

Aspects of skills include: Designing the production process and make engineering work as a simple means of communication with a source of DC electrical current that developed in the local area and other appropriate techniques and procedures.

Entrepreneurship education in vocational done through the learning process on vocational subjects, local content, extra-curricular activities, and personal development. The implementation of entrepreneurship education has not been considered effective because students have only mastered at the level of concepts and not empirically demonstrate its ability in entrepreneurship.

Entrepreneurship education is planned and implemented in order for students to know, realize or care, and internalize entrepreneurial values and make it in the daily activities (behaviour). Mastery of concepts need to be developed in empirical experience as a new entrepreneurial. Learners should be directed to plan a business and direct practical implementation effort, though on a small scale and limited. Associated with it, it is necessary to develop a model of entrepreneurship education more precisely, among others with project-based approach.

Project-based learning’ refers to students designing, planning, and carrying out an extended project that produces a publicly-exhibited output such as a product, publication, or presentation (Hamlyn, 2012). It is related to enquiry-based learning (also known as inquiry-based learning), and problem-based learning. The distinctive feature of project based learning is the publicly-exhibited output. We have chosen to focus on project-based learning because it incorporates enquiry, and because, in our experience, public exhibition is a tremendously powerful motivator for both students and staff.
Project-based learning is an innovative teaching approach, which emphasizes contextual learning through activities complex. The focus is on learning core concepts of a discipline that studies involving learners in problem solving and investigative activities of the task. In the implementation of learning, project-based learning gives learners the opportunity to work autonomously construct their own knowledge to produce a tangible product in the form of goods or services.

Project Based Learning can direct learners to work more collaboratively than individually. Besides, project Based Learning can also be done through working independently construct their learning (knowledge and skills), and make it happen in real products. Learners are given tasks or complex projects, but realistic and then given enough assistance so that they can complete the task.

Implementation of this project-based learning strategy is to encourage the growth of competencies such as creativity, independence, responsibility, self-confidence, and critical thinking. Project-based learning approach undertaken with the steps: Define the project theme, Setting the context of learning, Planning activities, Processing, Application of the activities to complete the project.

3. Evaluation of Entrepreneurship Education for SMK

In the world of education, recognized term evaluation and assessment. There are some who say that the evaluation and assessment have in common sense, but some other experts assume that the second case is different.

According to Gronlund and Linn (1990), assessment is a systematic process of collecting, analyzing and interpreting information to determine how far students have achieved the learning objectives. Assessment relating to learning in the classroom is designed and implemented by each teacher according to their subject. Almost concurs with that opinion. Assessment is part of the internal evaluation used for assessing student competencies performed during learning take place and at the end of the learning (Badan Penelitian dan Pengembangan, 2006). This means, assessment and learning process are integrated.

In connection with the process of learning, classroom assessment is defined as a continuous assessment that is designed, implemented, and results are used by teachers and students to optimize the effectiveness of classroom learning (Duncan and Chris, 1994). Assessment is primarily intended to empower teachers and students to improve the quality of learning in the classroom. Through ongoing assessment, monitoring of the activities could be done for student learning, obtaining feedback on the progress of students’ learning, how students learn, student perception of learning approaches that teachers do. This feedback can be used to improve learning approach, to help students to learn to master the substance of lessons planned.

According Aiken (1988), evaluation is to judge the merit or value of examinee’s behavior from a composite of test scores, observation, and responses. Evaluation is a process of finding out whether a predetermined goal was achieved or not. Evaluation is derived from the verb "to Evaluate" means that one is to determine whether a program has been completed as specified yield as the program objectives.

The difference between assessment and evaluation lies in the use of information. If the information was used to take out a policy on the micro level, like to say a person is passed or not passed then it is called assessment activities. Conversely, if the information was used to determine good-bad and or determine the state of a group of people or programs then it is called the evaluation activities.

Discussion of models of entrepreneurship education in vocational evaluation includes two things, namely: achievement assessment system competence of learners in education Entrepreneurship, and Entrepreneurship education program evaluation system.

a. Assessment of Student Entrepreneurship Competence Achievement

As discussed earlier, Entrepreneurship education in curriculum structure SMK Year 2013 is in Subjects Prakarya and Kewirausahaan. Competency to be achieved in this subject include competence in aspects Spiritual Attitude, Social Attitudes, Knowledge, and Skills.

Attitude is a tendency to react positively or negatively to some person, object, situation, institution, or event (Aiken, 1988). Attitude also as an expression of the values or way of life of a person. Entrepreneurial attitude can be formed, so that it becomes a desired behavior or action. Competence attitude on craft and Entrepreneurship Subjects include the attitude of collaboration, mutual assistance, tolerance, discipline, responsible, creative and innovative in understanding entrepreneurship and create a masterpiece of engineering.

Knowledge of entrepreneurship include factual knowledge, conceptual, and procedural. Assessment of competency achievement is the
assessment of learners consisting of intellectual potential levels of knowing, understanding, applying, analyzing, evaluating, and creating.

Competence in aspects of skills includes the skills of learners in thinking and acting that are studied in schools and other sources. These skills include: trying, processing, presenting, and reasoning. Skills include using activity, parse, compose, modify, and create.

Assessment of student competence in achieving the educational Entrepreneurship has not been able to uncover accurately on entrepreneurial competencies of students as a whole and integrated so as not to direct the students’ competence to become new entrepreneurs. In this regard, the assessment process and entrepreneurship education should be integrated. In this case, learning and assessment should be integrated. One is the right approach through project-based learning and assessment.

Assessment of competency achievement is integrated with entrepreneurial learning. The main assessment techniques used are project assessment. The project is learning tasks covering the activities of planning, execution, and reporting of written or oral in a particular time. Project assessment is assessment activity of a task that must be completed within a certain time period. The job is in the form of an investigation from the planning, collection, organization, processing and presentation of data. Assessment of the project can be used to find an understanding, the ability to apply, research and inform learners on the subject clearly.

At project appraisal, there are at least three (3) things to consider: (a) the ability of management: the ability students in choosing indicators/topic, seek information and manage time data collection and report writing, (b) the relevance, appropriateness to the subject and indicators/topic, taking into account the stage of knowledge, understanding, and skill in learning, and (c) authenticity: project conducted by learners must be the work of its own/group, taking into account the contribution of teachers in the form of guidance and support to learners projects.

The steps that must be met to plan the project assessment as follows: (a) Determine the appropriate basic competencies to be assessed through the project, (b) Assessment of project planning, execution, and reporting of projects, (c) Develop a process and outcome indicators of achievement of competencies based on competence, (d) Determine the criteria that indicate performance indicators at each stage of the construction project, (e) Plan if the task is a group or individual, (f) Planning techniques in the assessment of the individual for the task at hand as a group, (g) Develop duties in accordance with the assessment rubric (Direktorat Pembinaan SMP, 2014).

Some measures should be done in the performance evaluation of the project are: (a) Deliver rubric assessment before implementation assessment to the learners, (b) To provide an understanding of learners about assessment criteria, (c) Deliver the task presented to the learner, (d) Provide the same understanding to the learners about the tasks to be done, (e) Perform assessment for the planning, execution and reporting of the project, (f) monitoring of project implementation learners and provide feedback at each stage of project implementation, (g) Evaluate the performance of the students based on the rubric assessment, (h) the ability of learners Charting the achievement of minimal competency, (i) Working with and document the results of the assessment, (j) Provide feedback to the report compiled by students.

Assessment techniques used to determine students' attitudes related to entrepreneurship is observation. Observational technique is the process of observing and recording an individual's behavior (Popham, 1981). It is an assessment technique that is done continuously by using the senses, either directly or indirectly by using an instrument that contains a number of indicators of behavior. Direct observations carried out by the teacher directly without the mediation of others. While not a direct observation with the help of others, such as other teachers, parents/carers, learners, and others who know accurately about the entrepreneurial attitude of students. Of instruments used for observation is an observation sheet (rating scale) that accompanied rubric.

Assessment of student knowledge about entrepreneurship can be done through a written test, an oral test, and assignment. The test is a series of questions or statements that must be answered or chosen / addressed, or the tasks to be done by the students with the aim to measure a specific aspect. Assessment of competence achievement of students in entrepreneurship skills can also be done through the practice tests.
4. Program Evaluation of Entrepreneurship Education for SMK

Entrepreneurship education in SMK is a program that should be planned and implemented so as to achieve good results as expected. To find out if the program was well planned and executed as planned and achieving results, then do the evaluation. Evaluation is the systematic assessment of the benefits and use of an object. Implementation of evaluation is to determine the value of a program, so there is an element of judgment about the program. The purpose of evaluation is not only to find out the success of a program, but more important is to improve the program.

Development of an evaluation system of entrepreneurship in vocational education programs need to be done, among others, the following steps:

a. Preparation

1). Internal Evaluation Team

Schools need to establish Internal Evaluation Team, which consists of elements vice principal and teachers of subjects related to entrepreneurship. At least one assessment expert teachers (teachers who have received refresher courses on assessment / evaluation). Vice-principal or expert teacher should be an evaluation coordinator or team leader.

The team's task is to manage the implementation of the evaluation, developing types and techniques of evaluation, scheduling, developing the instrument, conducting the evaluation, analysing evaluation data, informing the evaluation results to relevant parties and some other related matters. In performing its duties, the evaluation team should be assisted by all subject teachers and supported by the principal and adequate facilities.

2). Compiling Program of Evaluation

The evaluation team should draft evaluation, among others, include: the purpose and scope of development that needs to be evaluated, the type of evaluation, implementation schedule, implementation mechanisms, instruments used, the processing results of the evaluation, the utilization of the results of the evaluation, financing, necessary facilities, and the other related matters.

3). Developing Instruments

This type of instrument is drafted adapted to the purpose and aspects that will be revealed. Some of the components that will be evaluated include: fitness for purpose of entrepreneurship education programs, content or materials, support facilities, teaching materials, media, teachers, the process of implementation, management, outcome and impact of the program. Form of instrument could be questionnaires, observation sheets, test, list of documentation, interview guides, and others.

b. Implementation

Implementation of the evaluation is done according to the schedule that has been designed. Team to evaluate the entrepreneurship education program documents, including program design, lesson plan, teaching materials, media, student learning outcomes, and other related documents. The team also evaluate during the process of learning both in the classroom and outside the classroom. Distributing questionnaires to the students and teachers also need to be done to get the various data related to the implementation of entrepreneurship education programs. Implementation of the evaluation must be conducted in a manner so as not to interfere with or create an uncomfortable atmosphere for students and teachers.

c. Processing Evaluation Data

Processing the results of the evaluation, ie scoring performed according to the instructions that have been prepared on each instrument device. Implementation of the processing results of this evaluation should be conducted by a team objectively and openly.

d. Reporting and Utilization of Evaluation Results

Basically, the evaluation report can describe the achievement of the goals of entrepreneurship education programs. This report may take the form of numbers, letters, good or less, description and so on in accordance with the evaluation objectives. Evaluation report should be used by students as feedback on the learning materials and also various drawbacks. For teachers, the evaluation report can also be used as feedback to improve the quality of entrepreneurial learning. For parents/guardians, this report is very useful to direct and guide their children. Similarly, for the benefit of schools and other education managers.

5. Conclusion

Entrepreneurship education of SMK is very important for students to prepare themselves to become new entrepreneurs. As self-employment opportunities in the community is wide open. In order for vocational graduates have the competence and the provision of adequate empirical experience, then entrepreneurship in vocational education system needs to be refined.
Improvements need to be done such as entrepreneurial learning directed project-based approach. Through this approach, in addition to master the competencies of entrepreneurship, students are directed to obtain empirical experience in developing a business. Achievement assessment system of the entrepreneurial competencies of students also need to be done with the project assessment. Thus there is integration and alignment between learning and assessment.

Entrepreneurship in vocational education is a planned and systematic program. Therefore, in order to design fit for purpose, and can be performed well so as to achieve the expected results then need to be evaluated in a comprehensive manner. Through the evaluation will be known successes, constraints, and develop alternative to enhance entrepreneurship education programs of SMK.

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Peraturan Menteri Pendidikan dan Kebudayaan No.70 Tahun 2013 tentang Kerangka Dasar dan Struktur Kurikulum SMK


ENTREPRENEURSHIP TRAINING BASED LOCAL POTENTIAL TO INCREASE STUDENT MOTIVATION ENTREPRENEURIAL VOCATIONAL HIGH SCHOOLS (VHS) IN SOUTH SULAWESI

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Abstract

Local Potential-Based Entrepreneurship Training in vocational high schools (VHS) aims to improve the motivation and spirit of entrepreneurship for vocational students so that graduates are ready to create jobs generated by local potentials manage each area that can have implications on national economic growth. Vocational schools (VHS) is a type of education that prepares students to enter the workforce will be able to be a learning partner government in reducing unemployment and even generate productive human resources when managed productively. The potential of natural resources in southern Sulawesi is very diverse, and has a chance to develop into an independent business. Local potential developed in this research is the field of fisheries, the fish processing into various processed fish, such as shredded fish, fish balls, and fish brains. Processed fish products are packaged with labels SMK BISA. The results of this pilot study product development in the form of entrepreneurship training model is based on local potential, effectively increasing the entrepreneurial motivation for vocational students. Therefore, the potential of local entrepreneurship training based on students’ vocational schools (VHS) may have implications on national economic growth.

Keywords: Training, Local potential, Processed Products, Motivation, Spirit.

Introduction

Current era of globalization, many countries in the world have developed a knowledge-based economy (KBE), which requires the support of qualified human. Because of the vocational education and training is absolutely necessary in order to sustain the development of a knowledge-based economy for the knowledge economy. In this context, education and training institutions should also serve as a center for research and development, which produces excellent research products that support the knowledge-based economy (KBE). The availability of human quality that master of sciences and technology determine the ability of the nation in entering the global competence and a free market economy, which demands high competitiveness. Thus education and vocational training are expected to deliver the nation of Indonesia took the lead in the global competition. Training can improve one's job skills in a relatively short time. By looking at current conditions, employment opportunities are very limited number of unemployment from year to year has increased, due to the orientation of general education to build human job seekers, not job human creators construct. As a result, Indonesia’s young generation does not have the ability to create jobs. Therefore, the role of vocational education and training institutions are expected to provide entrepreneurship skills to student participants, particularly the utilization of the potential of the area. Potential areas in the entire territory of Indonesia is very diverse and abundant, just not optimally managed and professional, so it is ironic indeed that areas rich in natural resources but there are still a lot of unemployment.

Vocational high schools (VHS) is a type of education that prepares students to enter the workforce will be able to be a learning partner government in reducing unemployment and even generate productive human resources when managed productively. Training is a learning process to acquire and improve skills outside the prevailing educational system (formal) or non-school subjects, in a relatively short time and with a method that is more about practice than in theory.
Entrepreneurship training is based on local potential, aiming to increase the motivation of entrepreneurship for students of vocational schools (VHS) in the province of South Sulawesi. Local potential is developed from natural resources (NR) are abundant in South Sulawesi. Natural resource (NR) is the potential contained in the earth, water, and sky that can be utilized for various purposes of life. Local potential developed in the entrepreneurship training is the field of fisheries, the fish processing into various processed fish, such as shredded fish, fish balls, and fish brains. Options to be entrepreneurs, in fact is one of the most promising alternatives for a better life, but not a lot of choices to be entrepreneurs in demand. For that entrepreneurship training for young people must continue to be done to deliver as many potential new entrepreneurs.

A. DISCUSSION

1. Basic Concepts Training

In order to improve the quality of human resources (HR) is competitive to prepare competent person, one common effort is taken to training. Hamalik (2001: 10) states that training is a process that involves a series of actions (effort) that carried out deliberately in the form of assistance to employees by coaching professionals. Meanwhile, R. & Caple J. Buckley (1992:17) stated that training is a planned and systematic effort to modify or develop knowledge, skills, and attitudes of a person through experiential learning, to achieve more effective performance in a variety of activities.

Training program serves to improve the performance of a person or group in the present and in the future. So continuing education training program is to develop the ability of learners to be able to work in a professional and productive. The training implementation program is the of the mandate of Law Number 20 of 2003 article 26, paragraph 5 of the National Education System stating that the courses and trainings organized for people who require a stock of knowledge, skills, life skills, and attitudes for self-development, professional development, work, independent business, and/or continue their education to a higher level. Therefore not only provide a job training to find skills but it is expected to create jobs. Through training will be born entrepreneur who is able to create new employment opportunities, produce goods and/or services that are creative and innovative that has economic value and is able to empower the local potential, so as to improve the quality of life.

2. Entrepreneurship theory

Entrepreneurship by Suryana (2008: 10) is a scientific discipline that studies on values, skills and behaviors in the face of life's challenges with the opportunity to obtain a variety of risks that may be encountered. Entrepreneurship is the ability to be creative, innovative relied upon, tips, and resources to find opportunities for success (Suryana, 2008: 2). Furthermore Zemmerer (2008: 59) says that entrepreneurship is the result of a disciplined and systematic process in applying creativity and innovation to the needs and market opportunities. Including implementing focus a strategic on new ideas and views to create products or services that satisfy customer needs or solve problems.

Entrepreneurship is a process of applying creativity and innovation in solving problems and finding opportunities to improve lives. Meanwhile, Nasution according (2007: 4) that Entrepreneurship is all things related to the attitudes, actions, and the process undertaken by the pioneering entrepreneurs, run and grow their businesses. Of the several views of experts on the above it can be concluded that entrepreneurship is the ability to think creatively and innovative behavior that serve as the foundation, resources, propulsion, goals, tactics, tips, and processes in the face of life's challenges. So entrepreneurship training is a learning process to acquire and improve the skills of creative thinking and innovative behavior is used as the driving force, to create added value in a business or businesses.

The process according to Suryana Entrepreneurship (2008: 3) is preceded by axiom, is the challenge. The challenge arises from the idea, the will, and the urge to take the initiative, the creative thinking and innovative action, so that challenges can be addressed early. All challenges have
certainly risk, the possibility of successful or unsuccessful. Therefore, the entrepreneur is the one who dare to face the risk and love the challenge. Development Pioneering and entrepreneurial process described by Bygrave (1994: 10) and Buchari (2008: 10), as shown in Figure 1.

First, the innovation process (innovation). Some personal factors that encourage innovation to plunge into the world of entrepreneurship are: the nature of curiosity, the desire to bear the risk, education and experience factors;

Second, the event trigger. Some of the factors that encourage personal triggering event (trigger) to plunge into the entrepreneurial world are: (a) a commitment or high interest in entrepreneurship, (b) lack of courage to bear the risk, (c) the existence of dissatisfaction with the current job, (d) absence of termination and no other work, (e) the encouragement of entrepreneurship due to aging. Third, the implementation process (execution). Some personal factors that encourage entrepreneurship implementation are: (a) the presence of a high commitment in entrepreneurship, (b) the vision and mission, the vision far into the future in order to achieve success in entrepreneurship, (c) the presence of an experienced entrepreneur and ready mentally in total, (d) the existence of a right-handed executive managers and assistant principal in entrepreneurship.

Fourth, the growth process of. Growth in the entrepreneurial process driven by organizational factors, among others: (a) the existence of a cohesive team in running the business, so that all of the planning and execution of operations running productively, (b) the presence of a solid organizational structure, (c) the presence of strategies steady as the product of a compact group, (d) the existence of a product to be proud of, such as product quality, product benefits, business location, business management, and so forth.

Looking at the above description, it can be concluded that it is actually the most encouraging person enters a career in entrepreneurship is related to two things: personal attributes (properties) and personal environment (the environment). Therefore, in this entrepreneurship training, both the above form the basis for the training, namely: evoke interest and motivation to manage the potential of local entrepreneurship.

3. Local Potential

Local advantage of the potential of the area should be developed. Potential areas of potential resource are owned by a specific area. The concept inspired the development of the local advantage of a variety of potential, that the potential of
natural resources, human resources (HR), geographical, cultural and historical. In this study, the local potential is defined as the natural resources (NR). Natural resources are the potential contained in the earth, water, and sky that can be utilized for various purposes of life. Example: (1) agriculture, namely: rice, corn, fruits, vegetables etc., (2) field crops: rubber, sugar cane, tobacco, oil palm, cocoa, etc., (3) the field of animal husbandry: poultry, goats, cows and others; (4) fisheries: fish, freshwater fish, seaweed.

Among the many areas of natural resources, the training is focused on the local potential in the field of fisheries, the fish processing into a product that is ready to be marketed. South Sulawesi Province, including the production of fresh caught fish large enough, that Capture Fisheries Production in 2009, with the type of fish: tuna fish and Tuna Fish: 24,736 tons, Shrimp: 2,941 tons, Tuna: 8,670 tons, and other Marine Fisheries: 182,472 tons (Data Source: Statistics of Marine and Fisheries, Ministry of Marine Affairs and Fisheries, 2013). This is a huge potential opportunity for entrepreneurs to open sea fish processing industry into products of high economic value.

Food processing industry from raw materials of marine fish is one of the sectors that are expected to boost economic growth through increased employment opportunities, and increase revenue. Fishery products and processed foods made from raw fish is a commodity which has the domestic and export markets large enough value. The problem is, most of Indonesia's fish exports in the form of raw materials and a few are processed. The enormous potential of the currently utilized only exploitative, fish caught and then immediately sold without further processing so that the sales value is relatively small.

Thus, the fish processing into various types of food products is a huge potential to be developed into a business. Sample processing fish into fish shredded, fish balls, and fish brains. The three types of processed fish products is very loved by the people, not just people of South Sulawesi but also people from various regions in Indonesia. Evidently, the guests often look for souvenirs of the fish processed. Therefore, one of the topics in the entrepreneurship training is how to process fish processed into various types of products, namely: shredded fish, fish balls, brains, and others. Processed fish products are packaged with labels **SMK BISA**.

The results of this pilot study product development in the form of entrepreneurship training model based on local potential can increase entrepreneurship motivation for vocational students. Therefore, the potential of local entrepreneurship training based on students' vocational schools (VHS) has implications for national economic growth.

**B. CONCLUSIONS, SUGGESTIONS AND RECOMMENDATIONS**

Production of fresh fish catches, especially in the southern Sulawesi city of Makassar is quite large, so it is likely to be developed into an independent business. During this time, the catch fresh fish mostly sold directly to consumers, so that the economic value is still relatively low, when compared to the results from fresh fish processing into refined products, such as shredded fish, fish balls, fish brains, and others.

The results of this pilot study product development in the form of entrepreneurship training model based on local potential can increase entrepreneurship motivation for vocational students. Therefore, based on the potential of local entrepreneurship training students of vocational schools (VHS) has implications for national economic growth, so expect fresh fish processed products can be enthused by the whole society in Indonesia, not only the people of South Sulawesi, but also outside of Sulawesi south as souvenirs typical Makassar.

Based on the conclusion that the local potential based entrepreneurship training can increase the interest and motivation of vocational students to entrepreneurship, so that would suggest to the principal, the Ministry of Education and Culture to encourage existing vocational school in the area to provide entrepreneurship training that each region based on local potential each. Recommendations for the world of work in
order to be able to partner with VHS to further expand its business.

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**REFERENCES**


This study aims to (1) obtain a model of the organization of the Student Welding Skill Competition, (2) determine the organization of the Student Welding Skill Competition model implementation, (3) determine the management of the Student Welding Skill Competition, and (4) determine the results of the Student Welding Skill Competition which can accommodate the interests of learning welding practices while meeting the competence aspects in the form of competition.

This study is a survey to describe a systematic, factual, and accurate information on the facts, properties, and relationships in Student Welding Skill Competition phenomena. The steps are: (1) establish guidelines, modules, technical instructions and SOPs; (2) set a piece of observation, (3) collect data, (4) analyzing the data, (5) discussion of the results of data analysis, and (6) concluded that the results analysis in the form of data description and recommendation. Quantitative data analysis techniques, to calculate the frequency, average, and percentage. In addition another trend seen from the median, mode and standard deviation that occurs, then concluded qualitatively.

Conclusion: (1) the implementation model of Student Welding Skill Competition learning module contains teaching materials, SOP, evaluation procedures, training and competency testing, (2) the implementation of the model shows that there is an increased learning outcomes with a significant difference between before and after the learning activities, (3) management aspects of Student Welding Skill Competition is good towards very good, but there are findings: inadequate rewards for participants and teachers, lack of coordination among the stakeholders, the place of training in school workshops with inadequate facilities, (4) Student Welding Skill Competition results are: weaknesses in the knowledge and understanding of the participants to determine the requirements of welding, the error in the set up SMAW machine, set the welding current, the awareness of the importance of occupational health and safety equipment, as well as the presence of welding defects in welds. It is not able to accommodate the interests of welding practices while meeting the learning aspect of competence in the form of competition / certification.

Keywords: Model Development, Student Welding Skill Competition

1. Introduction

According to Government Regulation No. 29 of 1990 Article 1 paragraph 2 of secondary vocational education that prepare students to enter the workforce, developing a professional attitude; and prioritize the development of learners' ability to carry out certain types of work. Basic points of preparation of secondary vocational education graduates are professional attitude demands on a particular job. Outstanding characteristic of these demands is the preparation of students entering employment as required mastery of the workforce form of knowledge, skills, attitudes and values needed workforce (Djojonegoro, 1998:37; Suyanto, 2008: 13; Joko Sutrisno, 2007: 33).

In the world of work, behavior, work attitude and work character is an important requirement for workers. This is to be prepared by the school as a simulated workplace: learning how to train and work; trained to obey the rules that apply in the workplace; training to develop character; initiative to build relationships and socialize and train their peers and teachers (Crites, 1969:184). All of it is a work cultural values (Slamet PH, 2010; Widarto, 2011) include: work ethic, curiosity, trustworthy, discipline, honesty, commitment, responsibility, respect, tolerance, hard work, good relationships, integrity, persistent, cooperation, adaptation, courtesy, communication and leadership. Work culture that is part of the development of this character that should be implemented in the learning program at the school, which includes a variety of program development, be it curriculum, infrastructure, teachers and others. One of vocational development programs implemented through Students Skills
Competition (SWSC) in stages from school, District/Municipal, Provincial and National level.

Students Welding Skills Competition (SWSC) at Special Region of Yogyakarta (DIY) Province is a realization of one of the efforts in the development of human resources by the government. Students Welding Skills Competition (SWSC) is an effort to encourage Vocational School (SMK) to improve the quality of teaching and learning which refers to the Indonesian National Competence (SKKNI) in welding engineering. This is in line with the development of welding technology that economical products oriented, efficient, secure and safe. The extent of the use of welding technology because the process is faster, stronger and tight (no leaks). Quality of welding/connection is determined by the welder skill expertise, indicated by welding certificate that includes the presence of welding process, joint design and inspection. Additionally Students Welding Skills Competition (SWSC) aims to monitor the quality and capability maps of SMK, especially schools with Welding Engineering Programs. However, the implementation of Students Welding Skills Competition (SWSC) can not be used to see who has the capability of Welding Competence Programs of vocational schools. This is due to only a few who have a vocational Welding Engineering Programs who participated in the implementation Students Welding Skills Competition (SWSC). Additionally Students Welding Skills Competition (SWSC) made an annual event organized to prepare the participant in national competition.

Students Welding Skills Competition (SWSC) results showed that in the last five years there are a striking gap between the SMK, which is reflected in the competition scores, as illustrated in table 1.

<table>
<thead>
<tr>
<th>No</th>
<th>Vocational Schools Name</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
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<tr>
<td>1</td>
<td>SMK Muhammadiyah 2 Wates</td>
<td>68,23</td>
<td>60</td>
<td>68,4</td>
<td>28</td>
<td>34,92</td>
</tr>
<tr>
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<td>SMK Muhammadiyah 3 Yogyakarta</td>
<td>36,55</td>
<td>70,3</td>
<td>55,8</td>
<td>76</td>
<td>68,46</td>
</tr>
<tr>
<td>3</td>
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<td>58,8</td>
<td>82,2</td>
<td>56,5</td>
<td>40,46</td>
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<tr>
<td>4</td>
<td>SMK Muhammadiyah Prambanan</td>
<td>-</td>
<td>51,3</td>
<td>32</td>
<td>26,3</td>
<td>40,46</td>
</tr>
<tr>
<td>5</td>
<td>SMKN 1 Pundong</td>
<td>-</td>
<td>68</td>
<td>78</td>
<td>52,3</td>
<td>74,46</td>
</tr>
<tr>
<td>6</td>
<td>SMKN 1 Sedayu</td>
<td>80,58</td>
<td>86,3</td>
<td>96,7</td>
<td>91,3</td>
<td>90,46</td>
</tr>
<tr>
<td>7</td>
<td>SMKN 1 Seyegan</td>
<td>31</td>
<td>47,5</td>
<td>48,4</td>
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<tr>
<td>8</td>
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<td>67,5</td>
<td>88,2</td>
<td>84,8</td>
<td>44</td>
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<tr>
<td>9</td>
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<td>84,8</td>
<td>82,3</td>
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</tr>
<tr>
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<td>80,46</td>
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<tr>
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<td>50</td>
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<td>-</td>
<td>-</td>
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<td>-</td>
</tr>
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<td>SMKPDR 1 Yogyakarta</td>
<td>-</td>
<td>-</td>
<td>59</td>
<td>52</td>
<td>-</td>
</tr>
<tr>
<td>15</td>
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<td>-</td>
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<td>-</td>
<td>-</td>
</tr>
<tr>
<td>16</td>
<td>Average</td>
<td>56,46</td>
<td>64,6</td>
<td>70,8</td>
<td>57,8</td>
<td>55,27</td>
</tr>
</tbody>
</table>

From the above data showed that between the lowest and highest scores range is very large, this is not an indication of the prevalence of students' abilities in SWSC school representative. Though participants SWSC is the best student in school, what about the other students? When further examined the ability of all students in certain schools also similar indications. This is certainly a problem that must be solved in order to implement welding practices that adhere to standards of competence and proven through transparent and accountable competition.

Welding is a material connection with the principle of magnetic bond between atoms of the two materials to be joined. Advantages of weld joint is lightweight construction, can hold high strength, easy implementation, and quite economical. But the most important weakness is the change of the microstructure of the material being welded, resulting in changes in physical and mechanical properties of the material being welded. Two metal which can be fused directly connected, but sometimes other additives are needed in order to deposit the weld metal is well formed, the material is called added ingredients (filler metal). Filler metal is usually in the form of bars, so-called ordinary welding rod (welding electrode). In the welding process, the welding
rod is immersed in a liquid metal that is deposited in a basin called the welding pool and together form a weld metal deposit, this way is called SMAW (Shielded Metal Arch welding), see figure 1.

In Shielded Metal Arc Welding (SMAW) that are the main transformer SMAW machine is designed on the basis of constant current (CC), with this system produces transformer volt-ampere output curve as Figure 2 below.

If the curves in Figure 2 were analyzed, the transformer produces a maximum voltage when zero amperes of electric current and voltage will be reduced when the electric current increases. Variations in the relationship between voltage to the current result of the heat generated by an electric arc is also changing. The heat changes depending on the distance between the workpiece with the electrode. According to Kennedy, " Without changing the machine settings, the operator can vary the welding heat by lengthening or shortening the arc" (2004 : 235 ). The success of metal with SMAW welding depends on the welding parameters, procedures, and welder. Welding parameters include voltage, current, and the arc length regulation is highly dependent on the welder. SMAW welding techniques with consists of three steps, according to Kennedy steps are: preparation, striking, and weaving (2004 : 242-245). Preparation is the cleaning of the workpiece in the form of grease and oxide layer. Striking had understanding the initial ignition electrode carried by the method of scratch (scratching method) for AC welding machine and method of pounding (tapping method) for DC welding machine. Weaving or sweep selectable welding electrode useful for forming a deposit weld metal that has a shape that is required.

According to the Standard Operational Procedure (SOP) issued by the Hobart school of welding technology, there are five steps that must be performed by students are: 1 ) Get ready ; 2 ) Set the machine ; 3 ) Position the material ; 4 ) Strike the arc ; and 5 ) Bead weld practice (2005 : 8-11) . The quality of welds produced by Bead weld practice depends on the mastery Strike arc (startup). Initial ignition electrode becomes a very important factor in determining the quality of welded joints, it is because the characteristics of SMAW machine principled on the CC system that forces them to keep the length of the electric arc in the right position is very difficult because they are among the beginners in learning welding.

In the field of education, learning skills are more focused on the psychomotor domain has several models, one of which is Simpson's models. Simpson models developed by applying the seven steps of learning skills, namely : 1) Perception (interpreting); 2) Set (preparing); 3) Guided response (learning); 4) Mechanism (habituating); 5) Complex overt response; 6) Adaptation (modifying); and 7) Origination (creating). (Harrow : 27). In response Guided or learning step, the first step is a movement of learners imitation then they undergo a trial and error and when they feel confident to make a move then they have to get to the next stage.

Fundamental barriers experienced to produce a quality weld joints is the difficulty of keeping the flame arc length of the electrode in the correct position as yet to understand the characteristics of the arc flame. To understand the characteristics of the flame arc appropriate learning methods are needed that can provide their own experience through the practice of arrangement so that the flame arc length found the right position and produce a quality weld joints. Not all welders proficient in all positions, under the hand position (down hand) position is the easiest to do, but when the weld metal pipe on his side would be very difficult to do. Welders are able to perform welding is first class welders are equipped with international standard certificate.

In the world of industry specific coded welding position during welding in order to avoid mistakes do not define the welders and welding procedures. There are two coding systems are widely known, the system established by the American Welding Society (AWS) and the system
of the International Standard Organisation (ISO). Code set by AWS, linked to the type of position welding techniques welding connection, if the groove connection the code position with the letter G, for the down-hand position 1G, 2G horizontal, vertical 3G, 4G over-head, a pipe with a horizontal axis 5G, and 6G pipe tilted 45°. If the weld is not groove/blunt (fillet) then the code is F, for the down-hand position 1F, 2F horizontal, vertical 3F, and 4F over-head.

There are several basic forms of welded joints is usually done in a metal connection, the shape is a butt joint, fillet joint, lap joint, joint edge, and out-side corner joint. Various forms the basis of this connection can be seen in Figure 5.

Joining metal with welding process must consider several variables that appropriate quality standards required connections. These variables are the materials, processes, methods, safety and health, equipment, human resources, environment, and quality inspection of welded joints.

The system code set ISO welding position different from AWS. Code according to ISO welding position based on the position of the electrodes when welding is done, to welding plate coded PA, PB, PC, PD, and PE, while the ascending pipe welding and pipe down PF, PG, see Figures 3 and 4 below.

Based on IIW standard, consisting of professional welding Welding Engineer (WE), Welding Technologist (WT), Welding Practitioner (WP), and Welder (W). Welding Engineer in charge of determining welding procedures and testing procedures. Welding Technologist in charge of translating these procedures to the welding profession that has the level below. To train the welder takes a Practitioner Welding and welding are doing Welder.

Furthermore discussion of KKNI can be described as follows. Conceptually each level of qualification in KKNI organized into four main parameters, namely (1) job skills, (2) the scope of science, (3) methods and levels of ability in applying science/knowledge, and (4) managerial capabilities. These four parameters are arranged in the shape descriptor KKNI, where 9 levels KKNI explain the rights, obligations and the ability of a person to perform a job or applying knowledge and expertise (MONE, 2010: 18).
Description parameters that forming each descriptor are as follows:  
(1) job skills or competencies is the ability in the cognitive, affective, and psychomotor fully reflected in behavior or in carrying out the activities, so that in determining a person’s level of competence can be traced through the element of the ability of the three domains; (2) Coverage of science / knowledge is a formulation level breadth, depth and complexity / sophistication of knowledge that should be possessed, so the higher the person’s qualifications in KKNI formulated with wider, deeper and more sophisticated knowledge / science he had; (3) the method and level of ability is the ability to take advantage of knowledge is knowledge, expertise and controlled method of doing a particular task or job, including the ability to think (intellectual skills); (4) a person’s managerial ability and attitude required to perform a task or job, and the level of responsibility in the work field.

Internalization and accumulation of the four parameters are achieved through a structured educational process or through work experience is called learning outcomes. Hierarchy in KKNI have characteristics that indicate that in each descriptor for the same level of qualification may contain or consist of elemental composition of knowledge (science), knowledge, skills (know-how) and skills which varies from one another. This means that every educational attainment of learning a skill can have content (skills) are more prominent than scientific (science), but given the recognition hierarchy equivalent qualification. The higher the level of qualification of the more scientific character (science), the lower the more emphasis on the mastery of skills.

Students Skills Competition is one of the tangible manifestation of the efforts in the development of human resources by the government through the Director General Directorate of Vocational Secondary Education. It is based on future challenges in the era of globalization that gives a double effect; The first opportunity broadest cooperation between regions and between the state, the second open competition is getting tougher and sharper in all areas of work. To deal with the above challenges, the government should strengthen the competitiveness and competitive advantage in all sectors by relying on the quality and capability of human resources with a mastery of technology and management. Therefore, the government is always trying to prepare a workforce competent in their respective fields, one of which is the Student Skills Competition (Kemdikbud, 2012: 1). Student Skills Competition purpose is: (1) encourage SMK to improve the quality of teaching and learning which refers to the Indonesian National Competence (SKKNI); (2) monitor the quality of the maps and vocational capabilities throughout Indonesia, especially schools with Welding Engineering Programs; (3) promote the competence of vocational students for Welding Engineering Skills Competency to businesses and industries as potential users of labor; and (4) provide the opportunity and motivation for students to compete in a positive way, to foster pride in the competence of practiced expertise, also of pride for the school and region / province. Entries are taken based on field welding vocational high school curriculum, Welding Engineering Skills Competency. Assessment for an entry field welding performance using methods that include: working attitude (observation - demonstration) (20%) of observation and assessment products (80 %).

Referring to the above description then conducted a study on the implementation of SWSC with the aim to (1) obtain a model of the organization of SWSC; (2) determine the organization model implementation; (3) determine the management of SWSC; and (4) determine the results of the implementation of SWSC all of which are expected to accommodate the interests of welding practices while meeting the learning aspect of competence in the form of competition.

While the benefits to can be learned include (1) the public, especially SMK will have insight, understanding, attitudes and skills of students and teachers should be prepared to face the SWSC; (2) University as a scientific institution will receive feedback to develop the science, especially the science of welding; and (3) education department will be helped in the development of human resource capacity.

2. Research Methods

This study is a survey research to describe a systematic, factual, and accurate information on the facts, properties, and relationships between SWSC welding competence phenomena. The steps are: (1) establish guidelines, modules, technical instructions and SOPs; (2) set a observation sheet; (3) collect data; (4) analyze the data; (5) discussion of the results of the analysis of data; and (6) concludes the analysis results in the form of data description and recommendation. The subject and the study population is SMK vocational industrial technologies program which organizes a welding skills. Research time for 4 months starting from June till September 2013. Data were analyzed
with quantitative techniques, to calculate the frequency, average, and percentage. In addition another trend seen from the median, mode and standard deviation that occurs, then concluded qualitatively.

3. Results and Discussion

The results of the study consists of four things, SWSC implementation models and tools, implementation of the model and its dynamics, management and evaluation of the implementation of SWSC. The model successfully developed illustrated in the figure 7 below.

The device has been developed by researchers such as: teaching materials training modules, test welding theory, observation sheets of competency examination, assessment worksheets (refer to SWSC guidelines).

Implementation SWSC development models by implementing the following steps: (1) establish a model school group, consisting of 30 students and teachers were briefed on the program and its preparation activities to be carried out; (2) orientation and assessment capabilities with the initial test (pre-test); (3) learning theory and practice, guided by: welding expertise lecturer of FT UNY, supervising teacher and student from Mechanical Engineering Education Departement FT UNY. Lesson is done with a competency-based approach. Teaching materials form a complete module: welding theory, welding jobsheet practice, procedures and tips SWSC cover, held 8 weeks; (4) the initial competency test to filter out students who are ready to follow the SWSC; and (5) the last stage is the deployment into the SWSC arena.

Figure 7. Development of Training Model of SWSC welding competence
The quantitative results of the implementation illustrated in Table 2, such as assessment test results to the theory, process and performance, the final test for the theory, process and performance, as well as an increase in the different test results before and after the treatment.

Table 2. Recapitulation of development scores beginning and final

<table>
<thead>
<tr>
<th>No subjek</th>
<th>Beginning Score</th>
<th>Final Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory</td>
<td>Process</td>
</tr>
<tr>
<td>Average</td>
<td>20%</td>
<td>10%</td>
</tr>
<tr>
<td>Minimum</td>
<td>40.00</td>
<td>40.00</td>
</tr>
<tr>
<td>Maksimum</td>
<td>65.00</td>
<td>80.00</td>
</tr>
</tbody>
</table>

The table above can be described by the following histogram

![Training score Distribution at beginning and final](image)

From the table and the histogram is known that the mean total score of initial training activities is 36.02. Lowest total score of 20.50 and a high of 59.50. Mean total score after training 44.61, the lowest score and the highest score 79.50 24.50. This result is not very satisfactory. Participants of the best representatives of the school to SWSC Daerah Istimewa Yogyakarta (DIY) level only reached a score of 79.50. It is still very worrying, ideally nearly perfect score is 100, because they have to compete with other school representatives champions. Thus the more intensive training is still needed, the student already has the capability of capital theory and process, but it should be added that adequate skills training.

Furthermore, the management aspect revealed how schools handle SWSC activities ranging from planning, organizing, implementing and controlling the POAC approach. Ideally, the plan should be 100 % very well, because of the careful planning and adequate preparation of students participating in SWSC is the key to success. Deficiencies in competition preparation less than 1 month. Job obtained information that must be done in less than 1 week so it is less time to prepare. Things that need attention are inadequate appreciation for participants and teachers, lack of coordination among the stakeholders, where only a mere training in school workshops while inadequate facilities.

Table 3. The percentage of SWSC Management Functions

<table>
<thead>
<tr>
<th></th>
<th>Planning</th>
<th>Organizing</th>
<th>Implementing</th>
<th>Controlling</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack</td>
<td>10</td>
<td>6</td>
<td>8</td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td>Moderate</td>
<td>15</td>
<td>21</td>
<td>16</td>
<td>14</td>
<td>17</td>
</tr>
<tr>
<td>Good</td>
<td>38</td>
<td>32</td>
<td>40</td>
<td>30</td>
<td>34</td>
</tr>
<tr>
<td>Very Good</td>
<td>36</td>
<td>41</td>
<td>36</td>
<td>44</td>
<td>40</td>
</tr>
</tbody>
</table>
Overall management aspects of SWSC stated 9% less, 17% adequate, 34% good and 40% very good, with a mean of 3.05 on a scale of 0-4, or good to very well.

Furthermore, the results of SWSC in 2013: process score 92.94, outcome score 45.93 and total score 49.55. Refers to the mean score SWSC in 2013 shows that the participants have followed procedures during the welding process quite well. But if you look at the average score is low results. This proves that the weld technique requires special skills, although procedurally correct, but if the skills of the participants was not good then the results are not optimal. In addition, it also shows that only a few participants who have the skills and follow the procedures correctly so get the maximum score.

In more detail, the following exposure data based on observation of welding processes, and outcome score. Welding process assessment indicators include: using welding auxiliary equipment, using welding safety and health equipment, SMAW machines operate correctly, as well as perform routine welding using the SMAW process. The results of the welding process in SWSC illustrated in histogram Figure 11 below.

The results of the welding process assessment in SWSC in general has seen a majority of the participants fulfilled the criteria. Some participants do not fulfill welding procedure in a process that includes the following indicators: 1) operate the set-up SMAW machine correctly (6013 AC, DC ±, 7016, root DC ±, 7018 filler, cover, DC +), the set-up machine affects the results of the welding process. 2) perform routine welding using the SMAW process, errors in the work piece fit-up properly (0-3 mm root gap affects the root pass welds; election in accordance with the type of electrode and workpiece thickness (root pass 6013, 7016, filler & Cover Pass 6013, 7018), determines the success of the breakout. 3) there is SWSC participants who have not aware the importance of the use of health and safety equipment during the welding process: apron, safety gloves, and
safety shoes. All of them can be illustrated in figure 12 below.

![Figure 12. Participant error in welding processes](image)

The above diagram illustrates the errors that occur include: 1) workpieces free of slag, spatter, and arc stary. Slag, spatter and arc welding stray is a visual defect that can be directly observed. Slag and spatter caused by the current is too large, the wrong type of current, and wrong polarity. Selection and calculation of current will reduce the occurrence of slag and spatter. Stary Arc is a defect caused by scratches electrode on the workpiece. Scratches electrode on the workpiece will damage the workpiece. 2) Variation of bead width does not exceed 2 mm. It is commonly found wide variations exceeding 2 mm bead, this occurs when the cover pass welding unstable. This can be avoided by strengthening the hand holding the pedestal electrode when welding. 3) the workpiece is free from incomplete penetration defects or root fusion porosity, this occurs in unperfect or not translucent root pass welding. The reason for the electrode position during the first welding is too high, and the current used is too low. In addition, distance-hand side seam (root gap) is too tight. 4) the workpiece free from stop-start defects on the surface of the cover and the root pass. Stop-start height difference is due at the time of temperature decrease after welding electrodes run out. Therefore melting new electrode welding is not perfect so the result is higher at the beginning, so that preheating is required when connecting as electrodes run out. 5) the workpiece is free from under fill defects. Errors that occur on the surface (cover pass) is not full or below the surface of the workpiece. This occurs because the movement is too fast or when the filler pass welding is still lacking. 6) the workpiece is free from excessive face reinforcement defects. Welding defect is caused by the movement of the electrode is too slow, resulting in accumulation molten weld is too high. How to prevent it by maintaining the stability of the electrode movement.

4. Conclusions

Several conclusions can be drawn include: (1) implementation of the SWSC model module contains learning materials, SOP, evaluation procedures, training and competency testing; (2) there is improvement learning outcomes with a significant difference between before and after the learning activities, both in learning theory, processes and practices; (3) SWSC management aspects 9% of respondents said less, 17% adequate, 34% good and 40% very well, with a mean of 3.05 on a scale of 0-4, or good to very good. But there is a note: inadequate appreciation for participants and teachers, lack of coordination among the stakeholders, where only a mere training in school workshop with inadequate facilities, not yet the growth of achievement motivation and the limited information; (4) The results of the implementation of SWSC for the last 3 years has deteriorated, where there are deficiencies and weaknesses of the participants in the knowledge and understanding to determine the welding conditions, the error in the set up SMAW machine, set the welding current, the awareness of the importance of health and safety equipment, as well as the presence of welding defects in welds. These results not yet able to accommodate the interests of welding practices while meeting the learning aspect of competence in the form of competition / certification.

The advice regarding school development in participating in SWSC include: (1) need improvement models apart from modules that have been made, such as a minimum standard equipment, standard time training, management
support; (2) implementation of the model needs to enhanced with the intensification of the learning, training and equip additional instructional time in order to obtain optimal results; (3) management aspects that need to be developed is a communication and coordination among stakeholders so that students can more adequately prepared in participating in welding SWSC; and (4) needs to scrutiny so that weaknesses can be minimized in the future. The implications of the implementation of SWSC are required to improve the role of the stakeholders to the maximum supported by accountable management.

REFERENCES


NATURAL COLOUR BATIK HANDICRAFT IN SRAGEN, CENTRAL JAVA
(A STUDY TO IMPROVE HANDICRAFTER’S WELFARE)

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Abstract

The aim of this research is to increase of the welfare of most people in the research area of the object, ie in Masaran Subdistrict, Sragen, Central Java, by encouraging the batik industry in that area. So far, most people living in Masaran, Sragen, work in the batik industry as labor. This research were conducted in two Small-Scale Medium Businesses (SMBs) in that Subdistrict, ie Batik Morinda and Sadewa. Those batik those companies have advantages in the production process. Both of them use natural coloring material (not the chemical stuff). Therefore their products are more natural, environmental-friendly and have high interest in the international market.

The research problems are: a) The source of raw materials are difficult to be Obtained (only available in some areas are far from Sragen roomates). b) Limited production capacity due to limited production tools. c) The ability of available human resources is the minimum. d) Traditional business management. e) Limited and less inovative batik designs.

In overall, the pattern used in the implementation method of this activity includes: discussion, workshop/studio work, factory operating, training and mentoring (groups/individuals). The steps in the implementation of science and technology are: team discussion with the SMEs regarding the development of batik designs roomates have high interest in the market and unavailable in the SME, designing machines (feeder) roomates are needed for production, managerial trainings (accounting, marketing, human resources) and techinal trainings in order to increase of the ability/skill of the workers. Besides, the Efforts to develop the usage of natural coloring materials are more encouraged by assisting the SMEs in providing access to the source of raw materials and lab testings. Then, those activities are Followed by mentoring so that all activities can be conducted effectively activities.

Keywords: batik handicraft, natural color, batik designs

A. INTRODUCTION

Batik is one of Indonesian culture is recognized in the eyes of the world, and on October 2, 2009 Batik Indonesia is officially recognized by the UNESCO representative included in the list of Intangible Cultural heritage as humans (Representative List of the Intangible Cultural Heritage of Humanity) in Session -4 Intergovernmental Committee (Fourth Session of the Intergovernmental Committee) on Intangible Cultural Heritage in Abu Dhabi. The ministry declared the entry of Indonesian Batik in the UNESCO Representative List of Intangible Cultural Heritage of Humanity is an international recognition of the Indonesian cultural one eye, which is expected to motivate and uplift the dignity of batik craftsmen and support efforts to improve the welfare of the people.

Every region in Indonesia both Java and outside Java has natural and cultural richness that can be expressed as a motif. Natural wealth in the form of flora, fauna and landscapes. Sragen is one batik-producing areas in Central Java, today has expanded its technology and design. Amid the rise of modern batik industries that use a lot of synthetic dyes, Sragen still retain the use of natural dyes derived from nature, plants and animals.

Batik craft in Sragen is a heritage that has lasted over 100 years. At first the craft of batik is done by batik workers men and women who work at the company in Surakarta batik. Furthermore, batik workers began work at home batikan as folk craft which then developed into home industry (home industry). Batik industry business development Sragen officially began in 1985,
is one of the leading sectors of the textile industry is expected to contribute to economic growth after industrial Agricultural and Forestry (HPK) and furniture.

**Interpersonal patterns of SMEs**
Each SME has some differences, which lies in the type of product, type of marketing agencies, and consumer segments. In terms of products, SME-1 dominant batik manufacture of a variety of materials with natural dyes with leaf and floral motifs, while the SME-2 producing batik and batik print with chemical dyes and natural dyes. SME market segment batik-1 for the lower class, middle-and upper-class. One of the SME-1 products are products that are used by the family batik President Susilo Bambang Yudhoyono. SME-2 producing batik for the lower class, middle, and upper.

In general, the pattern of relationships among SMEs working very well, as seen for example between SMEs often borrow from each other various materials and equipment. For example, when the SME-1 deficiency fabric SME-2 will supply and vice versa, or other materials (wax, evening). Similarly, in terms of equipment and design (screen) among SMEs will complement each other, especially the screen, because to make the kind of long motif usually takes between 5-10 screen.

**Technical Problems**
Based on preliminary surveys, there are some problems facing SMEs today that need solving are: Internal problems include raw material acquisition, financing, design innovation, and financial management, which includes also the financial administration / accounting. Most SMEs have not been taking notes well, and not attempt to differentiate between personal property assets.

a. **Business Management**
Forms of organization SME everything is shaped individual effort, while most of the workforce is female. In operation SMEs do not split the treasure so that less effort can determine the actual amount of income, although progress can be seen from the business and assets as well as a means of increasing the number of production processes and the behavior of the large number of marketed. So that SMEs need to get an effective coaching Financial Management in order to accurately determine the extent of the effort was successfully implemented.

b. **Wage System**
Wage systems in SMEs varies, mostly based on the number of products produced / wholesale.

**Barriers:** no general and uniform rate among SMEs.

To solve these problems in the first year, the research team provided training Special Sederhana bookkeeping models that can be applied to SMEs SMEs and the SME already Beginner Walk.

**Obstacles encountered:**
1. Because of his efforts have long felt it less difficult to start from the beginning where do bookkeeping or inventory of their assets in a way.
2. Most do not understand how essential records and financial statements when his business began to grow rapidly.
3. Ebb and flow of their businesses on the one hand and the many individual needs with the condition that there was no property or confuse the separation between business and personal needs feel pretty no problem with such conditions as individual companies.

c. **SME capital**
Sources and allocation of funds derived from SME businesses and some of the equity capital of the loan. Allocation of funds to meet the needs of SMEs are equipment, supplies, raw materials, auxiliary materials, labor, and promotion costs.

Delayed obtained information about the SME loan opportunities and do not know how to submit a proposal to get the loan. If managers are less well will make SMEs are less
conducive conditions. Overview of SME capital: comparison of own and foreign capital is still relatively balanced. Still need a helping government assistance in product development and financial assistance.

d. **Raw Materials**

   And an aide price range.

   Raw materials whose supply is erratic even have to come from outside the city. Raw materials imported batik natural color of Solo and Yogyakarta.

**Barriers:**

SMEs need to get Raw Materials Outer City and inefficient.

**Problems of SMEs, Solutions and Target Outcomes**

Land policy issues

On the whole technical or administrative problems identified by the proposing team in every aspect of SME businesses and SMEs Batik Batik Morinda Sahadev greatly affect the perceived smoothness of a business, and needs to be resolved for three (3) years are:

- Raw materials are relatively distant origin.
- Kemampuan production is limited because lack of means of production.
- Ability / skill craftsmen minimal human resources.
- Management businesses are still traditional.
- Marketing is limited (in terms of network and the number of competitors).
- Equipment is traditional or very simple.
- Orking m requires businesses through loans with soft interest.

There are problems related to the equipment, which at the moment is still quite traditional, given the limited availability of capital so as to reach equipment such as electric stoves, computers for pattern, pattern table, penglorot tub, bathtub coloring, clothesline - permanent, and another canting - others still need the help of stakeholders, particularly Government Sragen.

Problems **skill** and ability of the craftsmen still limited, it is necessary to increase skills and knowledge. Overview of the craftsman or mission is to improve the quality of Sragen batik batik so as not to lose the outside Sragen. It is still always haunt the craftsmen, especially with the implementation of the ACFTA free trade batik Sragen readiness to compete with foreign products remains a problem for craftsmen. However, with good intentions and sincere craftsmen strive to move forward and compete with the products from anywhere. Batik products are most favored by consumers today is the Batik Sragen.

In terms of management, the Company did not have any Batik so it requires coaching abilities. In the case of the majority of consumer product marketing Batik is the consumer or the local market. The other half is a regional consumer, such as Surabaya, Kalimantan and Bali. At the local level to serve the consumer and office employees who will have a lavatory. This marketing technique is necessary given that there will be an increase in network expansion and market reach.

Human Resources owned by Morinda Batik is very potential. Employees and artisans made up of workers who are young who had the opportunity to go forward and easily scouted. Nevertheless, it is still very lacking ability to require guidance from professional parties or an expert in the field.

While the outcome of the main program for the team is proposing outputs berkaitan feeder with improved design tools, and the development of design patterns based on local culture (typical motif Sragen).
### Table 1. Issues SMEs Batik Morinda

<table>
<thead>
<tr>
<th>Aspects of the business</th>
<th>Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw Materials</td>
<td></td>
</tr>
<tr>
<td>Production</td>
<td>Equipment is still very simple (traditional), so it needs the technology innovation</td>
</tr>
<tr>
<td>Process</td>
<td>The process is still limited to the making of batik</td>
</tr>
<tr>
<td>Product</td>
<td>Product diversification is limited, so the design needs improvement</td>
</tr>
<tr>
<td>Management</td>
<td>Management is still family so not well ordered.</td>
</tr>
<tr>
<td></td>
<td>a. Human resources management, there has been no regeneration in the manufacture of batik motifs and patterns. Because new mothers handled by Morinda and are elderly.</td>
</tr>
<tr>
<td></td>
<td>b. Lack of production management competence / expertise specifically in the production process of making patterns, drawing, batik until finishing &amp; dyeing process</td>
</tr>
<tr>
<td></td>
<td>c. Financial Management, the lack of bookkeeping, though modest, in the business so it will thrive well</td>
</tr>
<tr>
<td></td>
<td>d. Marketing management, there is no good marketing strategy so that the marketing of relatively constant month to month</td>
</tr>
<tr>
<td>Equipment management</td>
<td>computer information technology and communication media</td>
</tr>
<tr>
<td>Marketing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The area around and outside Java (Bali, Borneo).</td>
</tr>
<tr>
<td></td>
<td>Marketing still be simple so that needs to be done to develop the market promotion.</td>
</tr>
<tr>
<td></td>
<td>P roses in marketing directed at marketing with multimedia</td>
</tr>
</tbody>
</table>

### Table 2. Problems SMEs Batik Sadewa

<table>
<thead>
<tr>
<th>Aspects of the business</th>
<th>Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw Materials</td>
<td>Remote access raw materials (for Solo)</td>
</tr>
<tr>
<td>Production</td>
<td>Equipment is still very simple (traditional), so it needs technological innovation:</td>
</tr>
<tr>
<td>Process</td>
<td>The process is still limited to the making of batik</td>
</tr>
<tr>
<td>Product</td>
<td>Product diversification is limited, so the design needs improvement</td>
</tr>
<tr>
<td>Management</td>
<td>Traditional management, management needs to be improved in a professional manner. Management is still family so not well ordered.</td>
</tr>
<tr>
<td></td>
<td>a. Human resources management, there has been no regeneration in pattern making all activities ranging from the manufacture of batik motif or pattern, production, marketing to finance only held by one person.</td>
</tr>
<tr>
<td></td>
<td>b. Lack of production management competence / expertise specifically in the production process of making patterns, drawing, batik until finishing &amp; dyeing process</td>
</tr>
<tr>
<td></td>
<td>c. Financial Management, the lack of bookkeeping, though modest, in the business so it will thrive well</td>
</tr>
<tr>
<td></td>
<td>d. Marketing management, there is no good marketing strategy so that the marketing of relatively constant month to month</td>
</tr>
<tr>
<td>Equipment management</td>
<td>computer information technology and communication media</td>
</tr>
<tr>
<td>Marketing</td>
<td>Marketing is still simple that needs to be done to develop the market promotion.</td>
</tr>
<tr>
<td></td>
<td>P roses in marketing directed at marketing with multimedia</td>
</tr>
<tr>
<td>HR</td>
<td>Skill is still limited, need to increase the competence (knowledge and skills)</td>
</tr>
</tbody>
</table>
Aspects of the business | Problems
--- | ---
Facilities | Facilities are limited, in order to support the necessary increase in productivity. There needs to be setup in the production process so as to make production more simple and run smoothly. The main facility is required
  a. Pan for nglorog,
  b. Sewage treatment plant
  c. Spatial planning so that production could flow more smoothly
  d. Show room for production.
  e. Computer
Financial | Limited capital, need assistance in the form of soft loans.
No bookkeeping

C. Methods of Implementation

Broadly speaking, the pattern used in the implementation of activities IbPU include: discussion, work workshop /studio, plant operations, training and mentoring (group and individual). The steps in the implementation of science and technology are presented in Table 3.

<table>
<thead>
<tr>
<th>Implementation science and technology</th>
<th>Stages of implementation</th>
</tr>
</thead>
</table>
| Innovation dye machine (feeder), includes the addition of rotary pipe outside the tube as the color, the addition of two rollers, the addition of the motor | • Team discussions with SMEs about the advantages and disadvantages of existing feeder
• The team designed a feeder image, then discussed again
• Revised drawings feeder design
• Making the feeder in the garage UNS
• Excess redesigning feeder: fabric perfectly open automatically, as the fabric does not rub against the silent, steady pace, fast, and lightweight, flat colors, fast drying |
| Development of printed batik design | • Discussions with the team about the SME market interest motif (consumer) and not yet available in SMEs
• Draft design drawings motif (A4 paper)
• The discussion draft drawing batik design with SMEs
• Improvements draft design into design work ready (1:1 on tracing paper)
• The design work ready diapdruk on screen
• Screen results apdruk tested and refined |
| | • Team discussions with SMEs on the concept that the market demands motif (consumer) and not yet available in SMEs, with labar cultural destinations (eg wayang beber patterned design for the Indian market, Thailand, the motive for the Japanese cherry blossoms)
• The draft master batik design drawings (A4 paper)
• The discussion draft drawing batik design with SMEs
• Improvements draft design into design work ready (1:1 on tracing paper) |
<table>
<thead>
<tr>
<th>Implementation science and technology</th>
<th>Stages of implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Design master design compiled with other masters and with other colors, produced many new designs ready for work</td>
</tr>
</tbody>
</table>
| Innovation dough composition of colors | • Contok collection of color intensity, and then offered to SMEs, and SME team determines these colors (list colors Table 7 and Table 8)  
• The team made the dough dikendaki bleak color batik SMEs based on the theory of color batik (napthol, natural dyes). Adjuvants to induce and reinforce batik natural color is lime, citrus, vinegar, saltpetre, alum, rock sugar, palm sugar, prusi, molasses, lime water, tape (cassava / sticky rice), banana and guava klutuk |
| Implementations staining techniques | • Staining with the dye techniques with less machine feeder  
• One machine feeder for one color, so the color matches the color that you want, no contamination with other colors.  
• Staining with a dab technique, with the brush tool in small areas. |
| Innovations print table rails models dead (static). | • Team discussions with SMEs on the print table design, size, and material.  
• Cetak table 2 x 10 m (4 pieces of cloth), or print a table size that is longer will be more effective production process. |
| Plant layout design | • Team discussions with SMEs about the condition of the existing production flow (over / under)  
• Teams and SMEs plan to discuss the plant layout, plant layout elected realized. |
| Management Development | • Team discussions with SMEs about the condition of the existing production management (over / under)  
• The team conducted an analysis of SME management needs, including the needs of ATK  

**Training**

For the development of managerial systems and to improve the skills of employees / batik artisans have done a wide variety of training, including:

1. Managerial training, which includes Human Resource Management, Marketing Management, Production Management, and Financial Management is simple, especially on the recording.

2. Training on the development of batik design. In the training steps are performed:

   • Tim discussions with SMEs to determine the design concepts are much in demand by the market / consumer, of
course taking into account that for the implementation of natural colors will slightly increase the cost of production.

- Team makes draft design motifs proposed on A4 paper
- Figure draft design motifs are then discussed with the owners of SMEs, then if necessary, make revisions.
- Draft revised design was then made into a design ready to work with 1:1 scale on tracing paper, which later became the master design.

SMEs then develop this master design by making modifications and improvements that can enrich existing motif.

3. Training on the use of Natural Color Techniques, Namely the use of environmentally friendly natural dyes (instead of chemical dye), the material is derived from leaves, fruits, roots, and so on.

<table>
<thead>
<tr>
<th>No.</th>
<th>Materials dyes</th>
<th>The resulting color</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Indigo leaves (indegofera)</td>
<td>Blue</td>
</tr>
<tr>
<td>2.</td>
<td>Higher bark Soga</td>
<td>Red</td>
</tr>
<tr>
<td>3.</td>
<td>Soga bark tegeran</td>
<td>Yellow</td>
</tr>
<tr>
<td>4.</td>
<td>Soga bark jambal</td>
<td>Red-brown</td>
</tr>
<tr>
<td>5.</td>
<td>Java soga bark (cup), tekik</td>
<td>Red</td>
</tr>
<tr>
<td>6.</td>
<td>The roots of noni (Morinda cyrifelia)</td>
<td>Red-brown</td>
</tr>
<tr>
<td>7.</td>
<td>Intersection buffoonery</td>
<td>White milk</td>
</tr>
<tr>
<td>8.</td>
<td>Turmeric</td>
<td>Orange</td>
</tr>
<tr>
<td>9.</td>
<td>Tea</td>
<td>Brown + black</td>
</tr>
<tr>
<td>10.</td>
<td>Gambir / nut</td>
<td>Red-brown-black</td>
</tr>
<tr>
<td>11.</td>
<td>Bark and leaves of mango / mempelam</td>
<td>Brown</td>
</tr>
<tr>
<td>12.</td>
<td>Leaves whisker shy daughter</td>
<td>Brown</td>
</tr>
<tr>
<td>13.</td>
<td>Banana flower</td>
<td>Red-black</td>
</tr>
<tr>
<td>14.</td>
<td>Peanut leaf</td>
<td>Brown</td>
</tr>
</tbody>
</table>

D. Conclusions and Suggestions

Conclusion

1. Implementation Program
   a. Preparation
   The preparation stage includes the step of preliminary visits to SMEs with requirements analysis and preparation of training materials, facilities required, as well as a competent instructor, has been done on time according to the proposed schedule is July 2013 and the achievement of the objectives meet the criteria as planned.
   b. Implementation.
   Broadly speaking, the pattern used in the implementation of this IbPU include: discussion, work workshop / studio, plant operations, training and mentoring (group and individual). The steps performed are:
   1. Discussion Team with SMEs about the condition of the machine dyes (feeder) existing as well as potential improvement / development or the need for the addition of a new engine.
   2. Development of design / motif new, more attractive and marketable. Technical 3.Inovasi staining (with natural dyes) are more attractive to consumers (especially overseas consumers), and the printing table innovation dead rail models (static) to develop the production process.
   4. Development and Management Training, which includes Human Resource Management, Marketing Management, Production Management and Financial Management (Recording). Then all these activities followed by assistance in the implementation process.
2. Institutional Benefits
   Efforts application of science and technology (science and technology) developed have contributed to the increase in the participation of the University of March in order to improve the quality of life of rural communities, in particular the presence of SMEs around the partners (Kec. Masaran Sragen district) in the fields of education, economics, social and culture.

3. Social Benefits
   Implementation of activities IbPU held in the batik industry is giving a contribution to the development and improvement of human resources for the citizens in District Masaran Sragen, so as to improve their motivation and skills to become self-employed or independent business managers become more professional workers.

The application of technology and innovation in the design of batik dyeing techniques with natural dyes has provided added value by increasing managerial skills and abilities better.

Suggestion
To further enhance the effectiveness of the implementation / implementation of science and technology program for Products Featured in future, it is advisable to:
1. Using the approach of the partners with a better method, as well as sufficient socialization that more SME partners have no motivation to evolve and improve its performance.
2. Consistently various fields of design innovation and implementation of training methods should be developed according to the needs of participants and the grasp of the trainees.

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VOCATIONAL EDUCATION PERSPECTIVE ON CURRICULUM 2013 AND ITS ROLE IN INDONESIA ECONOMIC DEVELOPMENT

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Abstract

Curriculum 2013 in vocational education, especially on vocational high school (SMK) not only aims to produce graduates who are ready to work, but also produces Indonesian people who are productive, creative, innovative, through strengthening affective attitudes, skills, and knowledge which are integrated. One of the challenges for the SMK future is how to increase the contribution of vocational education for Indonesia development, particularly in economic development. Thompson (1973) stated that “vocational education is economic education as it geared to the needs of the job market and thus contributed to the national economic growth”. Basically, vocational education is education to create or actuate economic activity, because vocational education is designed to fulfill needs of the labor market, and it is clear this will provide a positive contribution to the world of productive work that produces goods and commodities that have economic value. Because of that, the implementation of curriculum 2013 is expected to answer that challenge. This paper presented about the development of vocational schools in Indonesia, the implementation of the curriculum 2013 on vocational education, particularly SMK, and efforts that can maximize the contribution of SMK in Indonesia economic development.

Keywords: Curriculum 2013, SMK, economic

1. Introduction

Economic growth is essential for a country. Economic growth is believed to reflect an increase in the society's welfare. To increase economic growth, a strategy which is considered effective is to do industrialization. Skilled workers who are not only able to operate the technology but also able to maintain it is needed in the process of industrialization. Therefore, in order to support economic growth, vocational education becomes important.

Historically, vocational education developed in some countries. The development of vocational education started in Ancient Egypt around 2000 BC. The organized apprenticeship program involved learning basic skills of writing and reading literature. This was the beginning of integration of classroom learning for basic skills and direct learning in the workplace. This method had spread to other parts of the world until about the 19th century (Ana: 2009).

In China, the development of vocational education was begun at Confucianism Period, late 19th century until early 20th century. The purpose of education at that time was to create an ideal social order in which people could live in harmony, respect and sincerity (Confucianism). Vocational Education was taught by old people of the lower class. The philosophy of Vocational Education was introduced by Mo Tzu (476-390 BC). He argued that vocational education should not only focus on skills but also on science, morals, and how to create meaning (Schmidtke, C., & Chen, P.: 2012).

In Indonesia, the early
development of vocational education was started in the Dutch colonialism era. Forced cultivation System (Cultuurstelsel) in 1830 and liberal system in 1870 implemented by the Government of the Netherlands in its colony, the Dutch East Indies, was a political dredging with tremendous advantage. That era was the beginning of the Political Ethics proclaimed by the Queen of the Netherlands in the Dutch parliament in 1901. Since the declaration of Political Ethics, Netherland's government tried to develop the economy in order to have its own budget and in the end, the elements need addressing and building was education. Vocational education was one the education addressed in which graduates with engineering skill are obtained. At the outset, the first vocational education was Carpentry School, a school that was a mean to advance Indonesia's carpentry (Supriya: 2002).

Today, vocational education is entering a new phase, which is adjusting the curriculum set by the government, in this case is the Curriculum 2013. Curriculum 2013 is the result of an evaluation toward KTSP and become reinforcement in improving the competence of the balance between attitude, skills, and knowledge. Competence will not only strengthen the cognitive but also contains attitude, knowledge, and skills that are the basis of core competence. In Curriculum 2013, the learning process takes place by using five thematic learning models which are integration, discovery learning, problem based learning, project based learning and scientific learning. The learning process is based on competencies supported by four pillars of learning activities, namely: productive, creative, innovative, and affective emphasizing on soft skills (Dit.PSMK: 2013).

The presence of curriculum 2013 brings some changing element. Based on the Materials of Public Test November 2012, changing element on the vocational school are among others: the number of normative and adaptive class hours are reduced to provide more hours on productive subjects. In the process of learning, competence skills will be aligned with the development trend of DU / DI (Business and Industry) including the addition of skills based on the spectrum of global needs and taking into account of the hard skills and soft skills. That changes are intended to make the maximum contribution so that vocational graduates are in accordance with the purpose of Curriculum 2013.

On the role of vocational education to economic growth, we must first understand the philosophical goals of vocational education. There are three alternate philosophies for TVET. These three philosophical positions are applicable to TVET. Specific choices about the nature and scope of TVET depend on the specific combination of philosophies selected to define a particular program.

First, essentialism. Purpose of TVET is to meet needs of labor market. Characterized by sequential organized curriculum, instructors need extensive business / industry-related experience. System separated from academic education. Second, pragmatism. The purpose of TVET is to fulfill the individual needs for personal fulfillment and life preparation. Characterized by an emphasis on problem-solving and higher-order thinking, learning is constructed from prior knowledge. Third, Pragmatism (reconstruction strand). Purpose of TVET is to transform work into democratic, learning organization. Proactive rather than perpetuating existing workplace practices. Adopts a stance against injustice and inequity in work issues. (Rojewski, 2009). From the three vocational philosophies, we can determine which philosophy has more role in economic growth, especially in Indonesia.

Then the question is how is the implementation of Curriculum 2013 at the SMK?, How is the contribution to
economic development? What efforts can be done to maximize the contribution of SMK in Indonesia's economic development?. This paper will present the perspectives of vocational education in the curriculum of 2013 and its contribution to the economic development of Indonesia.

2. Discussion

Vocational education has a very important role in the effort of creating skilled workers and with specific skill. Jandhyala BG Tilak (2002) states that "Vocational education has an advantage, imbibing the specific relevant job skills, that can make the worker more readily suitable for a given job and would make him / her more productive Thus". Vocational education has some advantages because it can produce skilled and relevant, employable and productive human resources. If the process of vocational education, especially vocational curriculum of 2013 goes well and in accordance with plan and objectives set, the unemployment rate is expected decreasing and the Indonesian economy globally increase. To understand and explore vocational education, either good development, curriculum implementation and strategic efforts that might be an important input to improve the quality of the Indonesian economy through vocational education, below is elaboration and critical thinking regarded as one of the discourse to develop ideas about vocational education.

2.1 SMK Developments in Indonesia

The development of vocational education in Indonesia is divided into two periods: Pre-Independence and Post-Independence. In the Pre-Independence period, the vocational education in Indonesia was started from the idea of Queen of the Netherlands' Political Ethics (EtischePolitiek) which is a form of political accountability, the Government of the Netherlands to the Dutch East Indies (Indonesia) toward the enactment of the Cultivation System (Cultuurstelsel) in 1830 and Liberal System in 1870 implemented by the Dutch government.

The first vocational education was Carpentry School, which was a school used to advance carpentry in Indonesia. The next vocational school was vocational school of agriculture, which was a school that concentrated on practical agricultural education. Technical vocational school was then built where a lot of expertise developed as skill building, mining expertise, driver education, and others. Here's a brief history of the history of vocational education and the process of an education which was originally established by the Dutch government and the European nationality only for China, but eventually developed for Indigenous people (Supriya: 2002).

As described Supriya (2002) in his book History of Technical and Vocational Education in Indonesia, in the Post-Independence period, vocational education was divided into three stages: First, the years 1945 to 1968 which was the period after Indonesian independence was proclaimed before the Pelita (Pembangunan Lima Tahun) I. In this period, an approach to the importance of education (social demand approach) was begun. Vocational education was considered able to produce graduates who can immediately work yet the condition of vocational school facilities was not good. Vocational education known that period was STM and SMEA used an approach based on the subject matter (curriculum 1964 SMK).

Second, the implementation of Pelita year 1969/1970 until the end of Pelita VI in 1997/1998. At that time manpower demand approach was conducted limitedly, the process of searching for the right shape for the education of industry technicians. At that time, the economic growth in Indonesia was in a good level with the growth rate of 7% per year that it required a lot of manpower to fill the
vacancy in the world of work. However, vocational education was only able to fill 50% of the total needs. The involvement of the industry in vocational education was not formally institutionalized. Vocational education at that time consisted of industry vocational education (STMP, SMEA Pembina, 4 years of SMTK), and the interpreter techniques (STM-BLPT, SMEA, SMKK). Approach Community needs was also used (for schools that had not been rehabilitated): SMEA, SMKK, SMPS, SMM, SMIK, and SMSR. New policy was also introduced for the development of education, called "Link and Match" which in its implementation used Double Education System in SMK.

Third, the reformation period in 1998 which continued with the implementation of regional autonomy since 2001 until now. During this period, the growth momentum of quantitative vocational education increased and the relationship with the industry was better. The Government was very aware of the importance of developing the technology and vocational education in Indonesia. We all know that Indonesia has a huge potential to grow and develop into a prosperous nation. In addition to its rich natural resources, Indonesia has abundant quantities of labor. To make this potential to be renewal resource, good and relevant education is needed. Similarly, the Vocational Training is required to improve the competence of Indonesian youth who will enter the workforce, retrain and improve the competence of those who are already working, in line with technological developments and changes in the labor market.

2.2 Implementation of Curriculum 2013 at the SMK

The concept of vocational education is secondary education that prepares students mainly for working in a particular field. Therefore, the vocational education in SMK should not only prepare students as fulfillment (to fit) and preparation (to prepare) market requirements but also serve as a vocational education that develops education (to develop) the skills, abilities, understanding, attitudes, work ethic, and is required by workers to enter and make progress of useful and productive work (Rojewski, 2009). This is what is raised by the Curriculum 2013, which is to create productive, creative, innovative, through strengthening affective attitudes, skills, and integrated knowledge for Indonesians.

Based on EPIC system (Electronic Monitoring the Implementation of the Curriculum 2013) 1142 schools were registered as implementation target of curriculum 2013, while until August 2013, SMK has entered the limited-phased implementation to Class X in 1021 SMK throughout Indonesia. The initial step that has been done in the preparation of the implementation of Curriculum 2013 for Vocational Education, training and education are given to teachers and schools as well as other elements directly involved in the educational process. To speed up the improvement of the understanding and mastery of skills to implement the curriculum, mentoring programmes are given to teachers and principals. Mentoring program is conducted as a reinforcement to understand the concept of Curriculum 2013 and the various changes in the implementation in the field, as well as to help to overcome the obstacles that arise during the implementation in the school curriculum. This mentoring program is also an effort towards the implementation of Curriculum 2013. Complete assessment of the implementation of the national curriculum will be conducted in June 2016.

There are several factors supporting the implementation of Curriculum 2013 in the vocational school, some of them are: First, the suitability of teachers competence with the curriculum taught and textbooks used. Second, the availability of books
as teaching materials and learning resources that integrate the four formers of curriculum standards. Third, strengthening school management and culture. Fourth, strengthening the government's role in the guidance and supervision. And the last, a good cooperation between SMK with DU / DI to create link and match.

However, in practice there are some problems in the implementation of Curriculum 2013. For example in the learning process, (1) a total of 48 hours per week plus Mulok deemed burdensome by both teachers and students, (2) scientific approach cannot be implemented in all subjects, (3) regulations of industry practices implementing is still doubt, (4) the National Exam is not entirely clear, and Furthermore, Alumnus of SMK is still not ready to work in industry and the implementation of apprenticeship (prakerin) for 6 months has not received a positive response from the industry (FGD implementation of Curriculum 2013 FPTK UPI).

Therefore, the implementation of Curriculum 2013 in the SMK is still must be addressed, ranging from preparedness and competence of teachers, school management and culture, and government policy in improving and developing the deficiencies that have occurred in the process of implementation of Curriculum 2013.

2.3 Contributions of SMK in Indonesia Economic Development

According to the Law 17/2007 on the Long-Term National Development Plan (RPJPN), the government through the Master Plan aimed at the Acceleration and Expansion of Indonesia's Economic Development (MP3EI) which integrates three main elements: (1) developing the economic potential of the region in the six corridors Indonesia, namely; Sumatra Economic Corridor, Java Economic Corridor, Borneo Economic Corridor, Sulawesi Economic Corridor, Bali-Nusa Tenggara Economic Corridor, and Papua-Maluku Islands Economic Corridor. (2) strengthening the national connectivity locally integrated and globally connected, and (3) strengthening the capacity of human resources (HR) and science and technology national to support the development of major programs in each economic corridor. The program must have the support of various parties for the smooth running and success of its. And SMK is a practical education that can contribute directly as the booster of the program. One of the ministry that have responsible of SMK quality is the ministry of national education, particularly General Directorate Of Secondary Education (DitjenDikmen) which takes a part and contributes in labor force so that the acceleration of economic development can work well.

Fig.1 Long-Term National Development Plan 2005 – 2025 (Law 17/2007)
From the picture 2005-2025 RPJPN development above, we can see that we are in a position RPJPN 2nd period, namely the consolidation of the reform program NKRI, improving the quality of human resources, building the capacity of science and technology, and strengthening economic competitiveness. The existence of the design that quality of human resources should be improved is a strategic step that had to be done by the government so that human resources who qualified that contribute to strengthening the competitiveness of the economy. Vocational education is one which is formal education which practical so that graduates from vocational education be the workforce that can directly fill the needs of specialists in accordance with their respective scientific disciplines. Supports of RPJPN program with the improvement of the quality of vocational education will indirectly strengthen the economic development of Indonesia.

Contribution of vocational education in Indonesia economic development namely is preparing the labor force according to the demands of the industry. Law 17/2007 on the long-term national development plan (RPJPN) 2005-2025 is a strategic plan for managing and directing an increase in the level of the Indonesian economy into a purposeful and regular. Directions of RPJPN 2005 with the National Development Vision for 2005-2025 are: “INDONESIA YANG MANDIRI, MAJU, ADILDANMAKMUR”, with the following explanation: (1) Independent: independent nation is a nation that is able to realize parallel life and equal with other nations that have been developed by relying on their own abilities and strengths. (2) Forward: A nation said to be advanced if the human resources have a personality of its nation, noble, and high quality of education. (3) Fair: Fair Nation means no discrimination in any form, whether between individuals, gender, and region. (4) Prosperous: Then prosperous nation is a nation that has met all the needs of life, so as to give meaning and significance to other nations in the world. RPJPN implementation is expected to run smoothly with the support of various stakeholders so that the Indonesian economy improved and able to compete in the era of free market economy.

From the description, we can conclude that vocational education has a very important role to support the successful development of RPJPN, so that the Indonesia economy development can be more quickly and precisely.

Technological changes promote demand for education, and education promotes technological change. Technological change leads to economic competitiveness and economic growth. Therefore, education is associated with these factors (Marginson, 1993 in Pavlova, 2009). The results of research on the role of education in economic development also showed that investment in education contributes to economic development, as has been inferred by Boediono and McMahon (2001). Joesoef, I. R., at all (2007) in his journal entitled "The Role of SMK to Support Regional Economic Growth: A Macroeconomic Analysis" states that SMK has a positive role in regional economic growth. This role can be traced from each successive three things, namely: (1) the preferences of society toward SMK, (2) capacity SMK for secondary school graduates (SMP), and (3) the ability of SMK to produce graduates who qualified. In line with the results of previous studies, the Directorate of Vocational High School (2008) conducted a study which concluded that there is a positive relationship between the ratio of vocational students and Gross Domestic Product (GDP). In addition, the research results also found that there is a positive relationship between the ratios of vocational students and the rate of economic growth. Based on the above explanation, it is clear that vocational education...
education has an important role in economic development in Indonesia.

According to Alhumami (2004), education contributes to economic growth in two ways. First, education creates new knowledge that had an impact on the production process. This approach is commonly called Schumpeterian growth that relies on the role of humans (human capital) played by professionals, experts, technicians and workers as drivers of economic growth. Second, education can change the way of thinking, acting, and behavior of working through the process of diffusion and transmission of knowledge, technology and information, so that it can contribute to the provision of workforce who smart, skillful, and mastering technology so as to increase productivity.

According to Slamet, PH (2012) attempts to maximize the contribution of vocational education for economic development can be done in four ways, namely: (1) offering vocational education based on the characteristics of Indonesia, (2) strengthening the link and match with the world of work, (3) integrating soft skills into learning, and (4) implementing entrepreneurship education.

First, offering vocational education based on the characteristics of Indonesia. The sciences are taught to students of vocational education should be suitable sciences to facilitate the development of students to become fully human, and sciences in accordance with the characteristics of Indonesia.

Second, strengthening the soft skills of learners. Mathematically, soft skills is intrapersonal quality and interpersonal skills. Intrapersonal quality is inner quality (spiritual quality) of human which sourced from deep within human heart whose dimensions include, among others, humility, self-respect, integrity, responsibility, commitment, self-motivation, curiosity, and so on. While interpersonal skills are skills related to human relations which dimensions include responsible for all his actions, respect to the others, peace, love of neighbor, good communication, leadership, collaboration, good character, sociability, solidarity, tolerance, and so on. From the many skills above, there are four skills most needed to prepare students in the 21st century (Concept 4C). Communication, sharing thoughts, questions, ideas, and solutions. Collaboration, working together to reach a goal—putting talent, expertise, and smart to work. Critical Thinking, looking at problems in a new way, linking learning across subjects & disciplines, and Creativity, trying new approaches to get things done equals innovation & invention. The term of soft skills is closely associated with other terms, such as character, emotional intelligence, values of life (living values), morality, personality, and employability skills for those already working. The issue of character has been applied in the curriculum 2013, so expect the goal to prepare Indonesian human: Productive, Creative, Innovative, through strengthening Affective Attitude, Skills, and integrated knowledge can be achieved.

Third, Build the relevance (link & match) with other systems as stated in Fig 2, especially alignment with the economic system in general or in particular the work world.
vocational education should be directed by the "demand driven" rather than "supply driven" which conducted through actual learning than textual, much more concrete than the abstract, which more refers to the reality than the artificial, and more real than the virtual. All of these require vocational education that proactively get closer to the world of work.

Fourth, teach entrepreneurship to students of vocational education through knowledge, awareness, and practices which real and actual about entrepreneurship. Lack of technical and vocational education and training, including entrepreneurship and training for creativity, hampers employability (UNESCO-IBE, 2004 in Hollander, 2009). Therefore, the practice and teaching of entrepreneurship in vocational education is needed. Issues in Indonesian entrepreneurs were maintained in Curriculum 2013, especially in SMK. This is proven that the Entrepreneurship Subject expertise is include in each program.

3. Conclusion

The purpose of Curriculum 2013 is to support the success of vocational education programs globally through strategic effort to prepare human resources in order to have the ability to live as individuals and citizens who religious, productive, creative, innovative, skilled, and affective and able to contribute to the life of society, nation, state, and world civilization. By increasing the quality of education, so did the quality of Indonesian people, so that the goals to promote economic growth can be achieved. Efforts to maximize the contribution of vocational education for economic development can be done in 4 ways: offering vocational education based on the characteristics of Indonesia, strengthening the link and match with the world of work, integrating soft skills into learning and implementing entrepreneurship education.

REFERENCES


Abstract

SarunggoyorSragen is an excellent product that is grown will be given the availability of potential and existing resources and has a clear market opportunity. In developing superior products mentioned, SME centers incorporated in the local Cooperative containers. In connection with this, the development of superior products sarung Goyor based One Village One Product (OVOP) support, both from the Government of Central Java Province, as well as the Central Government and the Higher Education scheme Hi Link.

Research for the improvement of the technology applied. Technology selection methods used in the implementation of activities, namely: observation intended to observe goyorsarung woven products, manufacturing process innovation goyor woven sarung, equipment manufacture of loom machines new models, KalijambeSragen.

Assistance on an individual basis is intended to determine the potential of individual craftsmen to be developed optimally. Training is needed in order to export and import of cooperatives and community groups can export its own without the help of wholesalers.

Keywords: woven sarunggoyor, KalijambeSragen, strengthening exports, OVOP.

INTRODUCTION

Sragen has the potential for some excellent products that are being developed. One of the featured products is SarungGoyor, located in Sambirembe, Kalijambe. The commodity is developed because it has several advantages, including Sarong Goyor has appeal and historical value. It is a hand made product, using a loom machines (Lurik), which produced for generations, so it is a potential heritage that should be preserved. SarungGoyor have export market share, it is much popular in Middle Eastern countries such as the Republic of Somalia, because the quality of the material is typical, can make a sense of "cool" or cold

To improve the efficiency, effectiveness, and competitiveness for craftsmen of Sarunggoyor, has formed KoperasiIndustriandanKerajinan (Kopinkra) AGAWE MAKMUR, as the place to joint economic activities, particularly with the purchase, processing and sale together.

SMEs need to develop craftsmen of Sarong Goyorgroup, as prospective member of AGAWE MAKMUR, to fulfill the market's demand is still highly potential export.

The purpose of the Regional Superior Product Development by Cooperatives are:

a. SMEs cultivate SarungGoyor craftsmen with loom machines (not woven machine/ATBM) for a member /prospective member of AGAWE MAKMUR in Kalijambe.

b. Increasing production capacity, so as to meet both local and export orders.

c. Increase the value added and selling with a higher prices, affect the increase of income for craftsmen of Sarong Goyor in KalijambeSragen.

d. Growth of new entrepreneurs.

e. Create jobs, reduce unemployment and alleviate poverty.

Sambirembe has 250 SMEs loom machines (Lurik), Sarong Goyor, with an average production of 1,500 pieces, worth Rp. 300,000,000. Follow up visiting Bp.
Halim Mintardjo, Textile Import Export Chamber of Commerce of Southern African Region on dated July 21, 2010, with the General Director of Trade Ministry of Commerce of the Republic of Indonesia, an then on August 6, 2010 by the Somali Ambassador with The State Minister of Trade of the Republic of Indonesia and their export’s plans Sarong Goyor, to various Middle East countries, especially Somalia it is necessary to develop this proposals of HI-LINK.

The Governor of Central Java said in Instruction number 518/23546 in 2012 on the Development of Rural Regions Production, by OVOP Approach Based Cooperative. Regional Development Featured Products Sragen approach the OVOP by cooperative Commodities:
   a. Sarong Goyor
   b. Organic rice
Constraints faced over the years is:
   a. Lack of experts in the field of product design and staining techniques
   b. Lack of competent personnel in the management of Cooperatives
   c. Lack of diversification product
   d. Lack of packaging products quality
   e. Lack of access to markets and networks businesses.

GOAL
Common Goal
This program’s goal is enhance capacity building in the application of university’s technology that required by the industry and the public on an ongoing basis and instutusional, in order to strengthen the competitiveness of industry partners and the public welfare. Craftsmen can improve their knowledge skills and attitudes in the field of Sarong Goyor with batik designs according to their interests so that they would get the ability to work independently or trying to conform with the potential resources and employment opportunities in the industry the company can ultimately improve their quality of life.
Special Goal
The specific’s goal of this program is the institutional strengthening (capacity building). DP2M-Higher Education develop a model of cooperation programs between University-Industry-Government is implementing the required technology industry and society, and is derived from the research. Benefits for Higher Education Institution:
   a. Existence encourages of Universitas Sebelas Maret Surakarta (UNS) and UNY predict and provide alternative solutions to local and global issues in order to support social and economic activities that are highly competitive science and technology based.
   b. Creating potential synergies between communities, government and university, UNS Surakarta and UNY, as basic integration and alignment (link and match) and provide input for adjustment of curriculum materials.

The road map research are:
   a. Bintek Cooperatives.
   b. Cooperative’s Management and Development Assistance Proposal, as well as marketing information via the Internet by BDS Blooms Commerce.
   c. Socialization Scheme for SME’s credit.
   d. Coordination and synchronization program by Activity Group Discussion (FGD), based OVOP Development Cooperative.
   e. Improved Product Quality and human resource’s skills in Kopinkra Planting Activity Sector Sarong Goyorby OVOP in Sragen system.
   f. Comparative study in Pemalang and Tegal.
   g. Technical Application SME’s Development through Value Chain Approach.
   h. M & E implementation of OVOP.

ASSESSMENT SYSTEM
Performance Indicators
- The first year (2104): (a) increasing the office facilities for Kopinkra Agawe Makmur as OVOP cooperatives embody Sarong Goyor, (b) increasing transportation and production facilities for Sarong Goyor, (c) increasing the quality of human resources by import-export training for craftsmen’s of Sarong
Goyor, (d) Sarong Goyor woven's module, accounting module, marketing management module (e) a national or an international seminar.

- **The second year (2015):** (a) increasing the number of KopinkraAgaweMakmur,27 people to 72 people, (b) increasing production capacity of 1,125 pieces goyorsarung/month to 2,280 pieces/month, (c) Increasing KopinkraAgaweMakmur’s turnover of Rp. 385 790 000, - to Rp. 771 580 000, -, (d) accredited national journal.

- **The third year (2016):** (a) increasing the assets from Rp.160.812.000 KopinkraAgaweMakmur,- to be Rp.409.926.000, -, (b) the realization of a new plant (enterprises) with local government land, (c) export without another broker, (d) publication in reputable international journals, (e) there is a batik design patented innovations

**Qualitative Indicators**

- **First Year (2014):** (a) Develop and establish potential areas through people's productive economic sectors, (b) Conducting the process of transformation of economic development of the people in a professional sector. Improving the quality of human resources is critical following her being a dynamic and constructive, (c) Developing a culture of learning, working and trying to sound “berkewirausahaan for citizens, (d) to develop educational programs and life skills in efforts to develop the small business sector, micro-enterprises and the informal sector, (e) Providing training to new technology for weaving.

- **Year II (2015):** (a) to provide business mentoring and business development consulting services, (b) to develop alliances with governmental and non-governmental organizations in the fields of entrepreneurship and business development both within and outside the country, (c) to develop acceleration other new entrepreneurs in the community, (d) to develop programs of study in the field of entrepreneurship studies and small businesses.

- **Year III (2016):** (a) establishing and developing a business meeting programs, exhibitions and facilitate intellectual property rights to the craftsmen Small Business, (b) holding a productive unit and facilitates financing for microenterprise sector, (c) to develop other new entrepreneurs acceleration among the public, (d) developing Competence and professionalism in providing services institution entrepreneurship and small business development, (e) to develop and implement the findings of science and technology through productive efforts to support self-financing, (f) International Journal. After HI-LINK program is completed, it will be published in the International Journal of indexed proquest/scopus.

**METHOD OF EXECUTION**

The method that will be done is the training: systems woven technology of Sarong Goyor material, the development of mental attitudes to entrepreneurship, financial management for participants, preparation of the business plan for the participants, the management of business, success story by presenting business-related practitioners. The design implementation, evaluating and implementing the following activities:

1. **Draft Implementation Activities**
   - **Preparation.** Activities undertaken include: (a) prepare the materials and instruments for selection and recruitment for trainees, (b) coordination with relevant stakeholders, such as government agencies or private organizations and rural planning/craftsmen of Sarong Goyor, (c) coordination the teaching team includes professors from UNS who
related technical practitioners, (d) preparation of materials/modules/training materials.

- **Provision of training.** The training is given in the form, in-house training and out house training, include: (a) training of entrepreneurship: Lecturer awarded by UNS in the form of in-house training and out house training, (b) the technical training, product manufacture sarong's woven with new design batik, which was given by Mrs. Sarah Rum H, (c) financial management training in the form of practical training, business plan preparation, business management in-house training, by the Faculty of Economics, UNS, (d) success story speakers practitioners in fields related business, (e) production of technical assistance, business management, financial management, as well as undertake the establishment of a network marketing business to the next production.

- **Evaluation activities.** After attending training activities, participants will be evaluated. At this stage, participants must: (a) the individual is required to make products of training, (b) shows the results of the practice of preparation of financial statements, business management, (c) submit a business plan/business plan that will be made in writing and delivered orally, (d) presenting entrepreneurs related to the scope of business partners locally, regionally, and export. Oriented production to see the result of participants in order to form a network of businesses that will be done.

**2. Implementing Activity**

- Lecturers related material from the Faculty of Economics and from the University, UNS, Mrs. Sarah technical practitioners, and practitioners from related industries of Pemalang and Tegal.

3. **Implementation of program activities in detail in three (3) year**

- **Year I (2014) include:** (a) Training Need Analysis for weaving Sarong Goyor ATBM craftsmen. (b) develop a model and training modules Batik Design Innovation In Lurik Weaving. (c) implementation of loom machines with new technology and mordant bath. (d). import export training.

- **Year II (2015) include:** (a) validation of training modules and limited field trials,(b) implementation of appropriate models of entrepreneurship training modules that have been validated,(c) evaluation and improvement of the module.

- **Year III (2016) include:** (a) validation and confined field trials after using the new machine, (b) implementation of a New Machine models have been validated, (c) evaluation and improvement of a New Machine Implementation.

**IMPLEMENTATION**

1. **Completion of the technology applied in the first year (2014)**

Through science and technology selection methods used in the implementation of activities, such as:

a. Observations intended to observe product sarung goyor woven sarongs and batik design and manufacture of process equipment in KalijambeSragen.

b. Discussions with craftsmen determining the right concept in the determination of the design so that it knows that many designs that consumers demand, also determines the new colors that will be created.

2. **Applying Technology to a second year (2015).**

The use of touch technology, as well as the craftsmen in the process goyor woven sarongs extortion and drying the fabric after washing and then dried for design. In connection with the development of these technologies, the world of education is supposed to develop appropriate methods
of planning one of them with a rolling machine press fabrics. So in addition to encouraging us to apply the technology/tools, machines can also create a concept that can help save human labor.

3. Application of new technologies such as Elevator Shelf Machine in third year (2016).

In the era of globalization, people are required in order to develop their creativity, because in times like these free competition has spread throughout the world. With this positive competition will be created a product that can treat and alleviate human hardship, particularly in the field of technology.

One of them is the lift machine on the showroom shelf or display case. This tool has a simple construction, but has great functionality, which has been equipped with propulsion machinery and power transfer systems. In this plan also accompanied calculations can refer to the power of these tools.

The purpose of this tool is the plan: (a) determine the appropriate construction material strength and load received,(b) maximizing the capacity of the room because it utilizes the space above the range of normal grasping the storefront or showroom space,(c) streamline the material so that the data is in the showroom or storefront space, according systematics interior showroom.

Benefits of planning tools: (a) we feel safe and comfortable when making materials at a certain height,(b) make it easier to streamline store pickup or above range of the human hand, (c) shorten and lighten the work.

RESULTS AND DISCUSSION

1. Contributions PT-Industry-Government

HI-LINK program that operates smoothly and institutionalized (standalone prospects and ongoing) by the Learning Enterprises Group and continuous course of BDS. So that would be obtained by craftsmen Enterprise Capabilities include: ability to manage and develop the business plan , ability to conduct business through the development of creative and innovative thinking skills, ability to conduct business professionally and independently.

Intensive involvement with the partnership to be involved in the planning, implementation and supervision of HI-LINK: (a) Government Institutions Rural/District Head for recruitment craftsmen,(b ) Department of Education and Culture PLS Sragen and Central Java Province for advocacy and consultation,(c) Department of industrial cooperatives and SMEs to capital, (d) Department of Tourism Sragen, (e) UNS research team, (f) KopinkraAgaweMakmurSragen.

Benefits for Development: (1) Poverty Reduction. Improve business performance and socio-economic life of the community through increased potential for community of craftsmen in the long term will accelerate the recovery of the Indonesian economy,(2) Provision of Employment, expand employment opportunities for the wider community through the growth of new entrepreneurs in the field of craft woven sarong goyor.

2. Application of Industrial Technology in 2014 (First Year)

a. Introduction loom machines (Lurik)

The purpose of the introduction of loom machines is to know the machine tool parts and know the function and number of aids used to facilitate the processes involved in making cloth. For recognition phase looms discussed are limited to loom machines (Lurik) because gedagan loom is rarely used because it is not effective for users, given the size and
made serbalos, while non loom machines are more likely to lead to the textile industry which requires working speed and able to produce fabrics that are much faster. Framework introduction loom machines are considered adequate and loom machines can be made by using a metal or wood.

c. **Research for the improvement of the technology applied**

Science and technology selection methods used in the implementation of activities, namely: Observations intended to observe product innovation Lurik weaving loom Sarong Goyor and equipment in the manufacturing process as well as Kalijambe. Team of researchers with the craftsman determine the right concept in the determination of the design so that it knows that many designs that consumers demand, also determines the new colors that will be created. Observations in order to find weaknesses and strengths: Lurik application with new technology, the manufacture of mordant bath, rolling press machine, making machine rack lift and see the advantages and disadvantages are also revamping financial management, work stations, operations business and individual assistance, intended to determine the potential individual craftsmen to be developed optimally.

3. **Targets**

- **Criteria Target Students:** (a) has interest in learning/trying, (b) the productive age population (18-35 years) women and men, (c) minimum high school education, (d) domiciled location in the village of Kalijambe.

- **Students Recruitment Method:** socializing, registration, selection, training

- **Learning Strategies**, learning process implemented in the following manner:
  a. Group.

  For purposes of efficiency and effectiveness of learning strategies do with the model group approach through the establishment of four (4) groups of 5 people each, total enrollment of 20.

b. **Andralogi approach.**

  Personal approach according to the needs and abilities of learners with a personal approach that minimizes lead instructional approach.

c. **The implementation**

  Place in the implementation of Community Services in Kalijambe and the Faculty of Economics and business UNS.

**CONCLUSION**

Results of the first year (2014) include: (a) Conducting Training Need Analysis for weaving sarung goyor ATBM (loom woven) craftsmen,(b) Developing a model and training modules of Batik Design Innovation In satung goyor Weaving, (c) Implementation of loom machines with new technology and mordant bath (to be colored yarn dyeing), (d) Import export training.

  Qualitative indicators of the First Year (2014) which has been reached is: (a) Developing and establish potential areas through productive economic sector people, (b) Process of transformation of economic development of the people in a professional sector, (c) Improving the quality of human resources is critical following her being a dynamic and constructive, (d) Developing a culture of learning, working and trying to sound entreprenuership for citizens, (e) Developing educational programs and life skills in efforts to develop the small business sector, micro enterprises and sectors informal, (f) Training with new technology for weaving.

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EFFECTIVENESS OF WEB-BASED LEARNING MODEL AT VOCATIONAL EDUCATION

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Abstract

This study develops a WEB-based learning model for vocational schools, particularly in subjects KKPI (PPKPI-WB). This study is the research and development of education (Educational Research & Development). Result paired two-sample t test (paired samples t-test) showed the Sig = 0.149 > α = 0.05 level, so it can be interpreted that there is a linear and positive nature between pretest and posttest variables. This suggests that if there is the student who at the time of the pretest value is good, then after a given treatment is then given a posttest, the value would be the better. Based on the analysis of data obtained value of t-test = 19.068 with sig. (2-tailed) = 0.000 < α = 0.05 level, then there is enough reason to H0 is accepted, then H1 is accepted. So there is a statistically significant difference between pretest and posttest. Then when seen in the average value (the mean), it can be said that an increase in learning outcomes from pretest to posttest. Based on the analysis of data obtained t value = 11.847 with sig. (2-tailed) = 0.000 < α = 0.05 level, then H1 is accepted. So there is a difference between the results of the final test experimental group with the control group. From the research that has been done can be concluded that the learning PPKPI - BW can be done effectively. This is evident from the data the average value of learning outcomes after using PPKPI - BW increased learning outcomes from pretest to posttest. Furthermore, use of instructional models PPKPI - BW is very good to be applied.

Keywords: keywords, effectiveness, web-based

1. Introduction

Vocational School (SMK) aims to produce skilled workers, which is expected to be ready to use as set forth in one of the aims of education at the vocational high school vocational education as part of secondary education and the national education system aims to (1) prepare learners to continue to higher education or expanding primary education, (2) increase the ability of the learner as a member of society in performing a reciprocal relationship with the social environment, culture and the environment, (3) enhance the ability of learners to be able to develop themselves in line with the development of science, technology and art, and (4) prepare learners to enter the work of Field and develop a professional attitude [1].

The ability of teachers demanded optimally manage learning activities, as proposed by Kusmayadi [2] that: "Efforts to achieve effective learning is strongly influenced by the ability of teachers to mastery, mastery of a variety of methods, selecting and determining instructional media, determining evaluation tools, do instructional design, teaching and teaching evaluation management ".

Based on author interviews with several teachers who follow the Professional Teacher Education (PPG) in the Department of Electronics Engineering, Faculty of Engineering Education UNM originating from various regions, including some teachers smkn Makassar, KKPI that subjects tend to use media printed materials, namely printed books by using the method conventional means of teaching and learning activities are concentrated on one side is the teacher. In case the teacher is not the only cypress learning resources, but is one of the existing learning resources.

Mastery learning strategy enables KKPI well students are able to think critically and creatively, and are not burdened by homework assignments. Learning KKPI must follow the rules or how, systematic hierarchical, consistent, and using deductive reasoning. Learning models should be
developed and used in accordance with its rules and characteristics.

In the current era of globalization, learning on how students, emphasizing the active process, students construct their own or build their own knowledge, positioning students as learning resources, provide opportunities for students utilize learning resources. In the education system, students are required to study independently, self-study is not an attempt to alienate learners from friends learning and the teacher/instructor. The most important thing in the process is self-learning and upgrading of skills of learners in the teaching and learning process without the help of others, so that in the end the students are not dependent on the teacher/educator, mentor, friend, or anyone else in the study. In the independent study students will seek to understand the content of the lessons themselves are read or hear of view seen through the media. If you get into trouble, then the students will ask or discuss it with friends, teachers/instructors, or others. Independent learners who will be able to search for learning resources that it needs. The task of the teacher / instructor in a self-learning process is to be a facilitator, be the one who is ready to provide assistance to students when needed. especially aid in determining learning objectives, selecting learning materials and media, as well as in solving difficult problems that cannot be solved solely by learners themselves.

One application is the process of self-learning web-based learning or Web-Based Education (WBE). WBE offers speed and no limitation on the place and time to access the information. Learning activities can be easily done by students anytime and anywhere perceived safe by the learners. Limits of space, distance and time is no longer a complicated problem to solve.

Integration of information technology into education in the form of one of these web-based learning or Web-Based Education (WBE). Various advantages WBE application in addition to some notes weaknesses when compared to conventional learning. Application of WBE obtained some important notes, among other things that the readiness of students to use the computer and its applications need attention. In the application of the WBE that has been done, students benefit, among others, that the present WBE simulation can assist in understanding the phenomenon being studied, as well as through computer WBE students can learn and recognize its utilization in learning

2. WebBased Learning
Web-based learning is popularly known as Web-Based Training (WBT) or sometimes called Web-Based Education (WBE) can be defined as the application of web technology in the world of learning for an educational process [3]. In simple terms it can be said that all learning using Internet technology and perceived learning occurs during the process by which followed the activities that can be referred to as a web-based learning. Then offered by this technology is not limited to the speed and the place and time to access the information. Learning activities can be done easily by learners anytime and anywhere perceived safe by the learners. Limits of space, distance and time is no longer a complicated problem to solve.

3. How to Learn Through WEB
How do I learn via the web ? There are major requirements that need to be met, namely lack of access to resources via the Internet. Furthermore, lack of information about where the location of resources we want to get to be. There are several sources of data that can be accessed freely and free of charge, without accessing complicated administrative process. There are several resources that can only be accessed by those who are already authorized owner resources.

Internet technology makes it easy for anyone to get any information from anywhere and at any time easily and quickly. Information is available in various data centers in various computer in the world. During these computers are connected to the net, we can access from anywhere. It is one of the advantages of learning through the internet.

Realize a web-based learning is not just put on the web to learn the material and then accessed via computer. Web is used not only as an alternative medium for storing paper documentation or information. Web
is used to get a superior side that had been revealed. The advantage that no other media or paper media.

In addition to the Internet infrastructure, web-based learning requires an instructional that was designed specifically for this purpose. An instructional models is a vital component that determines the effectiveness of the learning process. Regardless of instructional modules designed, interactivity among learners, teachers, advocates and the learning material should get special attention. This is not an easy job.

Web page views is a form of computer-written computer languages exist html (hypertext mark-up language) , where the display has an interactive nature and can contain any number of photos/graphics images, music, text and even motion pictures as well as the ability to hyperlink to other file.

Web-based learning is a system or process for carrying out learning activities remotely over the Internet and web applications. Although, in principle, can be run in a web learning local area (LAN) , but is a manifestation of efforts to develop e-learning with a web base.

Web-based learning is a learning activity that utilizes media websites (websites) that can be accessed through the Internet [3]. Web-based learning, known also by the term "web - based learning" is one kind of application of electronic learning (e-learning).

In one publication on the website abaat-elearning.com, Association of American Society for Training and Development Activity (The American Society for Training and Development/ASTD, 2009) suggests the definition of e-learning as follows: "E-learning is a broad set of roomates applications and processes include web-based learning, computer-based learning, virtual classrooms and digital. Much of this is delivered via the Internet, intranet, audio and videotape, satellite broadcast, interactive TV, and CD-ROMs. The definition of e-learning varies depending on the organization and how it is used but basically it is involves electronic means of communication, education, and training."

Web Centric Course is the use of the internet which combines distance learning and face-to-face (conventional). Most of the material delivered over the internet. Web Enhanced Course is the use of the Internet to support the quality of learning is done in the classroom. Internet functions is to provide enrichment and communication between students and teachers, fellow students, members of the group, or students with another resource.

4 . Elements of Learning Outcomes

Learning outcomes in this study refers to the view [4] which says that the learning outcomes are a key aspect of any learning conditions. Further it is said that there are three elements of learning outcomes are: 1) The level of effectiveness, is related to the extent to which the learning process gives results indicated by how well the achievement of learning objectives. It is seen from the level of mastery associated material. Desired learning outcomes are not related to the elaboration of the learning goal itself but related to how well that goal can be achieved. That is whether the learning model is applied on target or effectively facilitate students master the subject matter KKPI ; 2) The level of efficiency, this is the result of the division with a time of learning effectiveness and students' costs incurred in achieving the learning objectives. That is whether students can take advantage of this learning aid with minimal cost and maximum results; 3) The level of the attractiveness or charm, it can be seen from how the students enjoy the learning process, students' tendency to want and continue the learning process and so on that reflect students' motivation to use the existing learning support that is Web-based learning model. Observations on the Department of Electronics Engineering Education and the literature review has been carried out, showing that it is necessary in the Web-based learning model KKPI subjects, because of existing learning model for this has not been an efficient and effective way to improve the ability of students achieve the learning objectives KKPI.

Based on the results of the learning expectations set out by the Reigelutie high level of effectiveness, efficient, and showing the need for the development of Web-based
learning model in subjects KKPI, student-centered, anytime, anywhere, studying alone, students can undertake remedial, students can acquire material essence KKPI.

4. Needs assessment Students on WEB - Based Learning

Students as subjects in this preliminary study consisted of 31 students who have the academic ability of a relatively homogeneous based on the results of the test are given as the initial test. Based on a questionnaire given to the students to determine the needs of the students obtained the following answer.

From the answers given respondent, on item 1 with the question that " if teachers give special time to discuss each learning competency?" Most of the students answered "yes" on the grounds that in accordance with the provisions of the curriculum (27 people or 87.10 %) and the remaining 4 people (12.90 %) answered "no" "friends one hour to answer on the grounds that learning is not achieved . To the question that "Is time provided adequate teachers to consult ? " There are about 25 students (80.56 %) who answered "Yes " to a variety of reasons but the reason often given is that teachers never refused when trying to consult and there 6 students (19.35 %) who answered "no" . Approximately 25 students (80.56 %) who answered "Yes" and 6 students (19.35 %) who answered "no" to the question "Is the teacher always gave feedback after each provide independent assignment ? ". On the question "Is the teacher always gives feedback each completed work on the problems ? " There are 22 students (70.97 %) who answered "Yes " and there were 9 students (29.03 %) who answered "No" . Furthermore, on the question "Is the teacher provides materials in the form of modules, power point, or papers that can be downloaded , which can be studied alone ? " There are 17 students (54.84 %) who answered "Yes " and 14 students (45.16 %) who answered " No" . From this data it was seen that there are still teachers are by and large not upload teaching materials that can be learned by the students . There were 10 students (32.26 %) who answered "Yes" and 21 students (67.74 %) who answered "no "to the question " Are references provided during this suffice?" . From this data it was seen that the references provided in schools is still very low for learning activities. Then the question "Are the resources provided during this suffice? "Answered "Yes" by students as many as 15 people (48.39 %) and answered "no" by the students as many as 16 people (51.61 %) on the grounds that the library schools still lack a complete book on vocational subjects. To the question "Are references provided during this date? "There are 16 students (51.61 %) who answered "yes" and 15 students (48.39 %) who answered "no" . There were 25 students (80.65 %) who answered "Yes" and 6 students (19.35 %) who answered "no" to the question "Is online chat and forums to help you interact with your friends ?". This data can be seen that the student requires the communication forums to interact with friends in learning, then to the question "If WEB KKPI learning available at school, do you agree if the teacher gives the task independently through the WEB ?" almost all students (30 people or 96.77 %) who answered "Yes" if the site is available in school and learning KKPI agree if teachers give assignments through WEB and only 1 student (3.23 %) who answered "no" . As for the question "Are you willing to open WEB KKPI learning and independent tasks and questions through the Internet outside of school?" There are 5 students (16.13 %) who answered "no" and the remainder (25 people or 83 , 87 %) who answered "Yes" . Related to the previous question may be seen in the results of the assessment that if the instructional WEB KKPI applied then the students would be willing to open WEB KKPI learning and independent tasks and questions through the Internet outside of school. Further to the question " Is learning through WEB KKPI KKPI learning more interesting?" Generally students answered "Yes" (30 people or 96.77 %) and only 1 student (3.23 %) who answered "no" . It can be seen that if the study is carried out through the WEB KKPI it would be more interesting for students. On the question "Is the independent tasks and problems can be resolved through WEB KKPI learning?" There are as many as 27 students (87.10 %) who answered "yes" and the rest (4 people or 12.90 %) answered "no". Based on
student assessment can be seen that the WEB-based learning KKPI will be able to complete the task independently and student questions. Furthermore, on the question "Are you going to take advantage of the learning WEB KKPI as a means of communication?" There were 25 students (80.65%) who answered "Yes" that would use it well, and as many as 6 students (19.35%) who answered "no".

From the answers given student can be seen that in general the students feel that the teacher has provided time, responding to what they do, provide enough material for them. Most students feel that the references provided yet sufficient, and they assume that learning resources are also provided insufficient. Most of the students were aided by online chat and forums to interact with his friends, and the majority of students agreed that teachers give assignments independently through the WEB KKPI learning and they feel that learning through the WEB KKPI more interesting.

1) Aspects of Teaching Materials Characteristics
Assessment aspects Teaching Materials characteristics for one-on-one test was performed by 32 students. Components in the characteristic aspect of teaching materials that students easily and quickly access the WEB study obtained a mean score of 4.56 KKPI criteria Very Good, aspects of students easily find material in the WEB-line learning KKPI mean score of 4.69 was obtained with the criteria Very Good, technical aspects students felt just a bit, for example: slow login time, system hangs, the Internet disconnected obtained a mean score of 4.84 with the criterion Very Good, aspects of the learning objectives that help students presented a mean score of 4.75 with the criterion Very Good. The mean scores of aspects characteristic Teaching Materials obtained overall mean score of 4.74 with the criterion very well.

2) Aspects of Student Characteristics
Components of the characteristic aspects of students obtained a mean score of 4.61 with the overall aspects of Very Good overall criteria. In the aspect of student characteristics consists of several aspects of the guidance teacher helps students obtained a mean score of 4.38 dengnan both criteria, musty Teachers make time to chat with students obtained a mean score of 4.72 with the criterion Very Good, aspects of teacher corrects and give feedback as soon as possible obtained a mean score of 4.63 with the criterion Very Good. Further aspects of the discussion forum facilities can be utilized by the students obtained a mean score of 4.63 with the criterion Very Good. Aspects chat facilities can be utilized between students obtained a mean score of 4.72 with the criterion Very Good.

3) Aspects of organizing
In the aspect of organizing MPBW-KKPI overall mean score of 4.73 was obtained with the criteria Very Good, Aspect material presented in the online module structured and can be accessed easily obtained a mean score of 4.75 with the criterion Very Good, aspects of materials containing information about topics presented assessment results obtained with a mean score of 4.88 with the criterion Very Good. Further aspects of the module presents a number of examples of problem-solving appraisal obtained a mean score of 4.56 with the criterion Very Good.

4) Delivery Strategy Aspects
In the aspect of the delivery of the strategy obtained a mean score of 4.63 with overall Very Good criteria, indicators reflected in the material scope of the menu / link criterion 4.56 Very Good, clear indicators order and easy to follow instructional obtained a mean score of 4.88 with the criterion Very Good, Teachers indicators for informal discussion motivates students obtained a mean score of 4.56 with the criterion Very Good, indicators of teacher initiated learning and close the obtained mean score of 4.50 with the criterion Very Good.

5) Aspects of the management strategy
Aspects of management strategies mean score of 4.57 was obtained with the criterion Very Good, Learning sustainability indicators obtained with the 4.56 mean criterion Very Good. Indicators Students can work on exercises and assignments independently obtained a score of 4.63 with
the criterion Very Good, Student Activities can be monitored every criterion 4.53 with Very Good

6) Aspects of effectiveness

Aspects of the effectiveness of the overall mean score of 4.67 was obtained with the criteria of Very Good. The effectiveness aspect consists of several indicators include indicators Ease of interacting with the media obtained a mean score of 4.59 with the criterion Very Good. The clarity indicator of media usage instructions obtained a mean score of 4.59 with the criterion Very Good. WEB based learning indicator is easy to understand and motivate students more than late learners obtained through face to face with a criterion mean score of 4.81 Very Good.

7) Aspects of efficiency

Aspects of efficiency obtained with the 4.64 average overall score criterion Very Good. Aspect consists of several indicators of efficiency among other programs use efficiency indicators obtained mean score of 4.48 with criterion Very Good, Speed indicator material mean score of 4.86 was obtained with the Excellent criteria, indicators Students can learn faster through the WEB based learning compared to learning obtained through face-to-face with a criterion mean score of 4.58 Very Good.

8) Aspects of the attractiveness

Aspects of the overall attractiveness of the mean score obtained by the students vocational assessment as many as 32 people at 4.67 with the criterion Very Good. In the aspect of attractiveness of the assessment consists of several indicators including indicators of material presented is quite interesting and interrelated obtained a mean score of 4.56 with the criterion Very Good. Text Indicator module is easy to read and understand the average score of 4.69 was obtained with the criterion Very Good, next to the indicator Students are more comfortable learning online rather than face-to-face following study obtained a mean score of 4.63 with the criterion Very Good. Indicators more students to communicate with teachers using e-mail, chat, than before the use of WEB-based learning assessment scores obtained average 4.66 with criterion Very Good. Indicators of WEB-based learning provides opportunities more frequent contact between the teacher and the students obtained a mean score of 4.72 with the criterion Very Good. And the most recent is the indicator of Teachers and technicians interested in learning more frequently following the WEB based on other learning derived from the average score of 4.75 with the criterion Very Good. And the most recent is the indicator of WEB-based learning provides opportunities more frequent contact between the teacher and the students obtained through face-to-face learning mean score of 4.75 was obtained with the criterion Very Good.

4. Description of Requirement Students will be Web-based Lesson

The results showed that students in the habit of using information technology or IT is very high. This has an impact on learning in SMK KKPI to be able to fill the needs of the students towards IT in this regard over the web. So it is appropriate that the implementation of the learning process begin to pay attention to the use of the web as a medium of learning. Based on this research, it is known that the learning needs of students included in the availability of web-based sufficient time to study and consultation, provide material performance form modules, power point, or papers that can be downloaded, which studied alone, is packed with interesting material, sufficient, advanced, interacting with friends, independent tasks through the WEB, independent tasks and questions through the Internet outside of school, can take advantage of the WEB KKPI learning as a means of communication. It is also in line with the results of the study Neng Sri Conservation (2003) suggests that the problems are handled via e-mail services are grouped into learning problems, academic, career, personal and social. Weblog as a product of the development of the internet technology can be very useful assessed media such as e-learning. Utilizing the Internet as a product of today's technology is not a requirement but a requirement anymore
4. Effectiveness Analysis of Web-Based Learning Model

To examine the effectiveness of a WEB-based learning model the learning outcomes KKPI, then conducted an experimental study to observe the students' test results before and after treatment. Pretest an initial test given prior to treatment in the experimental group. Based on observations of preliminary tests conducted at SMK Negeri 5 Makassar with respondents 32 students earned value - average of 61.7188 with a standard deviation of 4.58. Distribution of pretest values of experimental classes are presented in the following table:

<table>
<thead>
<tr>
<th>No</th>
<th>Keterangan</th>
<th>Hasil</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rata – rata</td>
<td>61.72</td>
</tr>
<tr>
<td>2</td>
<td>Median</td>
<td>63.00</td>
</tr>
<tr>
<td>3</td>
<td>Modus</td>
<td>67.00</td>
</tr>
<tr>
<td>4</td>
<td>Standar Deviasi</td>
<td>4.58</td>
</tr>
<tr>
<td>5</td>
<td>Variansi</td>
<td>20.98</td>
</tr>
<tr>
<td>6</td>
<td>Jangkaan (range)</td>
<td>14.00</td>
</tr>
<tr>
<td>7</td>
<td>Minimum</td>
<td>53.00</td>
</tr>
<tr>
<td>8</td>
<td>Maksimum</td>
<td>67.00</td>
</tr>
<tr>
<td>9</td>
<td>Jumlah data</td>
<td>1975.00</td>
</tr>
</tbody>
</table>

The results of the test after treatment (posttest) gives value - average of 85.40 with a median and standard deviation of each - 83.00 and 6.66 respectively. For more posttest results are presented in Table 2 below:

<table>
<thead>
<tr>
<th>No</th>
<th>Note</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rata – rata</td>
<td>85.41</td>
</tr>
<tr>
<td>2</td>
<td>Median</td>
<td>83.00</td>
</tr>
<tr>
<td>3</td>
<td>Modus</td>
<td>83.00</td>
</tr>
<tr>
<td>4</td>
<td>Standar Deviasi</td>
<td>6.66</td>
</tr>
<tr>
<td>5</td>
<td>Variansi</td>
<td>44.31</td>
</tr>
<tr>
<td>6</td>
<td>Jangkaan (range)</td>
<td>23.00</td>
</tr>
<tr>
<td>7</td>
<td>Minimum</td>
<td>77.00</td>
</tr>
<tr>
<td>8</td>
<td>Maksimum</td>
<td>100.00</td>
</tr>
<tr>
<td>9</td>
<td>Jumlah data</td>
<td>2733.00</td>
</tr>
</tbody>
</table>

The results of the test after treatment (posttest) gives value - average of 85.40 with a median and standard deviation of each - 83.00 and 6.66 respectively. For more posttest results are presented in Table 2 below:

After conducting a description of the data, then analyzed using two-sample t-test paired to determine whether there is an increase in student test results SMK Negeri 5 Makassar after using WEB-based learning model for KKPI subjects.

Uji Normalitas

<table>
<thead>
<tr>
<th>Normal Parameters</th>
<th>Pretest (Tahap I)</th>
<th>Posttest (Tahap II)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>Mean</td>
<td>61.7188</td>
<td>85.4063</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>4.58071</td>
<td>6.65684</td>
</tr>
<tr>
<td>Most Extreme Differences</td>
<td>Absolute</td>
<td>.188</td>
</tr>
<tr>
<td></td>
<td>Positive</td>
<td>.124</td>
</tr>
<tr>
<td></td>
<td>Negative</td>
<td>-.188</td>
</tr>
<tr>
<td></td>
<td>Kolmogorov-Smirnov Z</td>
<td>1.064</td>
</tr>
<tr>
<td></td>
<td>Asymp. Sig. (2-tailed)</td>
<td>.208</td>
</tr>
</tbody>
</table>

From the results of the Kolmogorov-Smirnov test mentioned above, the information obtained was that great a significance value for the Kolmogorov-Smirnov test students' test results before treatment (pretest) and after treatment (posttest). Basis for decision making is asymp. significance if the value is greater than 0.05, then the data is categorized meet the assumption of normality. From the Kolmogorov-Smirnov test results appear in the table above asymp. significance value of
0.208 for the pretest and the value asymp sig. 0.141 for posttest. This means that the value of such a value that indicates that students in the pretest and posttest have observational data are normally distributed, because the value is greater than 0.05 Asymp.Signifikansi.

**Two sample paired t test**

Paired two-sample t test (paired samples t-test) which is also called the within-subjects t-test is usually performed on experimental studies in which the sample is given a certain treatment conditions were then compared with the sample before the treatment. Thus the sample group will serve as a control variable to another variable that gets a certain treatment.

<table>
<thead>
<tr>
<th>Table 4. The results of paired two-sample t test</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Paired Samples Statistics</strong></td>
</tr>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td>Pretest</td>
</tr>
<tr>
<td>Posttest</td>
</tr>
</tbody>
</table>

Paired Samples Statistics table presents the pretest and posttest values with parameters: mean, sample size, standard deviation, and the average standard error. Paired Samples Correlations table shows the Sig = 0.149 >α = 0.05 level, so it can be interpreted that there is a linear and positive nature between pretest and posttest variables. This suggests that if there is the student who at the time of the pretest value is good, then after a given treatment is then given a posttest, the value would be the better.

Hypothesis:

H0: there is no difference between pretest and posttest.

H1: there is a difference between pretest and posttest.

Based on the analysis of data obtained value of t-test = 19.068 with sig. (2 - tailed) = 0.000 < α = 0.05 level, then there is enough reason to H0 is accepted, then H1 is accepted. So there is a statistically significant difference between pretest and posttest. Then when seen in the average value (the mean), it can be said that an increase in learning outcomes from pretest to posttest.

**2. Testing Product Model**

To determine the impact of the model on improving student learning outcomes in subjects KKPI using a web-based learning model, then conducted experiments with a pretest-posttest equivalent group. At this stage the selected one class at SMK Negeri 2 Makassar as the experimental group and one class at SMK Negeri 3 Makassar as a control group by giving each - the beginning of each test (pretest) and final test (posttest). Based on observations of the initial test and final test conducted at SMK 2 and SMK Negeri 3 Makassar Makassar by respondents as many as 32 students earned value - average pretest each - amounting to 46.25 and 36 146 with a standard deviation of 20.40 and 12:09. The results of each test - each group are presented in the following table:

<table>
<thead>
<tr>
<th>Table 5. Description of Test Data end (posttest) experimental class</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Keterangan</strong></td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Rata rata</td>
</tr>
<tr>
<td>Median</td>
</tr>
<tr>
<td>Modus</td>
</tr>
<tr>
<td>StandarDeviiasi</td>
</tr>
<tr>
<td>Variansi</td>
</tr>
<tr>
<td>Jangkauan (range)</td>
</tr>
<tr>
<td>Minimum</td>
</tr>
<tr>
<td>Maksimum</td>
</tr>
<tr>
<td>Jumlah data</td>
</tr>
</tbody>
</table>

**Normality test**

From the results of the Kolmogorov-Smirnov test at 4:10 and 4:11 in the table
above, the information obtained was that great a significance value for the Kolmogorov-Smirnov test students' test results before treatment (pretest) and after treatment (posttest) in the control group and the experimental group. Basis for decision making is asymp. significance if the value is greater than 0.05, then the data is categorized meet the assumption of normality. From the Kolmogorov-Smirnov test results appear in the table at 4.10 significance value asymp amounting to 0.852 to pretest and value asymp .0,782 to post-test. This means that the value of such a value that indicates that the students on the pretest and posttest for the control group had a normal distribution of data observations, because the value Asymp. Significance greater than 0.05. Similarly in Table 4:11 acquired sig. 0.462 for the pretest and sig. .200 to post-test can be concluded that the value of the students in the experimental group also meet the assumption of normality.

**Two independent samples t-test**

Two independent samples t-test (Independent sample t-test) is also called the between- subjects t-test performed if you want to determine whether the value - average target variable in a different group with a value - average target variable in the different groups. This test is only valid if the two groups being compared have a member who really-really different. Levene’s Test for Equality of variances (F test) to test the basic assumptions of the t-test that the variances of both groups was similar (homogeneous).

Statistical hypothesis:

H0 : Both groups have the same variance
H1 : Both groups had unequal variances

If the calculated F ≤ F table , then H0 is accepted
If F count > F table , then H0 is rejected
If sig ≥ , then H0 is accepted
If sig < , then H0 is rejected

Based on the analysis of data obtained sig. = 0.005 < = 0.05 level , then H0 is rejected . So both groups have a variant that is not homogeneous . The next test put a value on the bottom line (equal variances not assumed ).

hypothesis

H0 : there is no difference in the results of the initial test group with the control experiment
H1 : There are differences in the results of the initial test group with the control experiment

By testing criteria:
If t ≤ t table and - t ≥ t table , then Ho is accepted
If t count > t table or - t < - t table , then Ho is rejected

Based on the analysis of data obtained t value = 2.410 with sig .( 2 - tailed ) = 0.02 < = 0.05 level , then H1 is accepted . So there is a difference between the results of the initial test experimental group with the control group .

Levene’s Test for Equality of variances ( F test) to test the basic assumptions of the t - test that the variances of both groups was similar (homogeneous ).

Statistical hypothesis:

H0 : Both groups have the same variance
H1 : Both groups had unequal variances

If the calculated F ≤ F table , then H0 is accepted
If F count > F table , then H0 is rejected
If sig ≥ , then H0 is accepted
If sig < , then H0 is rejected

Based on the analysis of data obtained sig. = 0.018 < = 0.05 level , then H0 is rejected . So both groups have a variant that is not homogeneous . The next test put a value on the bottom line (equal variances not assumed ).

hypothesis

H0 : there is no difference in the final test results of experiments with the control group
H1 : There are differences in the results of the final test group with the control
Based on the analysis of data obtained t value = 11.847 with sig. (2-tailed) = 0.000 < = 0.05 level, then H1 is accepted. So there is a difference between the results of the final test experimental group with the control group.

CONCLUSIONS

Based on the results of research and discussion on the development of web-based learning model in the SMK, it can be stated conclusions that: 1) the effective use of web-based learning in SMK Makassar, obtained a mean score of 4.56 overall assessment results show very good results. And efficiently meet the criteria indicated by the assessment and learning process with a shorter time, greatly helped students, and students' independence in performing activities of practice can be achieved through the use of web-based learning; 2) the impact of the implementation of the WEB-based learning model on learning outcomes in vocational subjects KKPI Makassar District based on the results of the analysis of data obtained t value = 11.847 with sig. (2-tailed) = 0.000 < = 0.05 level, then H1 is accepted. So there is a difference between the results of the final test experimental group with the control group. Thus, students who learn to use the web-based learning is better than using the conventional method.

REFERENCES


THE POLICY OF PROFESSIONAL EDUCATION
FOR VOCATIONAL TEACHER IN EAST-INDONESIA

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The policy of The Ministry of National Education and Culture, Indonesia is to provide professional teachers in higher education level and vocational school in order to face AFTA era in 2015.

The law No. 12 Year 2012 about Higher education, juridically, accomodate higher education institution of vocational "Community Collage". The requirement projection of the educators for Community Collage in six economic corridors till the year of 2015 is 6.053. The east area is estimated at about 2.456 teaching staffs.

Teacher Profession Education (PPG) has lasted since 2008 with in-service model. The decree of Minister of National Education No. 126/P/2010 on the establishment of Teacher Education Institute as the organizer of PPG for In-Service Teacher appointed 55 Teacher Education Institutes with the quota of 13.020 students for 3 years. However, the program had not responded optimally by the teachers. The another model of PPG for Pre-Service Teacher determined by Directorate of Higher Education which was assigned 15 Teacher Education Institutes (TEI) to conduct PPG for elementary level with dormitory system. Also, Integrated-Professional Education of Teacher to prepare vocational high school teachers in the remote and Underdeveloped regions (SM3T Program).

To improve the teacher quality of vocational high school as a mandate of Law No. 14 Year 2005, and Government Rule No. 74 Year 2008, Directorate of Higher Education decided Padang State University, Jakarta State University Yogyakarta State University, and Malang State University to hold Collaborative-PPG Program for Agriculture field. In 2012, twelve Teacher Education Institutes conducted Collaborative-PPG program with various skills.

Keyword: policy, vocational, education

A. INTRODUCTION

The vision of national building, as written on the Law No.17 Year 2007, is "Realizing Indonesian people that are self reliance, progressive, fair and prosperous" known as the national long term planning 2025. In line with the vision, the focus is to increase the value added and to expand the chain of production processes well as managing the asset and expanding the access of (potential) Natural Resources, geographic region, and Human Resources, through the creation of an integrated as well as synergistic economic activities within and among regional centers of economic growth. Then, what is the relevant field of expertise to develop the education in East Indonesian?

In order to support the sustainable economic growth as well as to provide equitable high income to all levels of society in eastern Indonesia, in this case, the education sector become the core element. Education should be able to design the programs which is purposive, flexible in order to accommodate the needs of knowledge and skills for this community. The policy of the ministry of education and culture is to improve the education quality of the high school level as well as the higher education. In the year of 2012, the priority is the provision program for professional educators. The Law No.74 Year 2008 on Teacher states that the government gives mandate to Teacher Education Institute (TEI) to hold Teacher Profession Education (PPG) and the Law No. 12 Year 2012 about Higher education, juridically, government gives legal permission to establish Community Collage.
B. DISCUSSION

1. POLICY DEVELOPMENT AND ECONOMIC BUILDING

The Coordinating Ministry for Economic Affairs has formulated the strategies and development policies through The Masterplan for Acceleration and Expansion of Indonesia's Economic Development (abbreviated MP3EI). Long-term policy of Indonesia is based on the development of economic corridors in accordance with the potential and the benefit of each region of Indonesia. The eastern Indonesia economic corridor includes 1) Bali –East Nusa Tenggara, 2) Borneo, 3) Sulawesi, and 4) Papua.

The Economic Corridor theme of Bali –East Nusa Tenggara is "the Gateway for Tourism Industry and National". The development strategy in Bali corridor is focused on tourism sector while East Nusa Tenggara is on agriculture processing, livestock, and plantation. The theme for Kalimantan is “Center for production and processing of national mining and energy reserves”. The corridor of Sulawesi focus on “Center for production and processing of national agricultural, plantation, fishery, oil & gas, and mining”. Then, the corridor of Papua - Maluku is "Center for development of food, fisheries, energy, and national mining".

2. Gross Enrollment Ratio (GER)

The National Socioeconomic Survey (SUSENAS) of 2012 shows that the higher education level, the smaller participant enrollment. The highest Gross Enrollment Ratio (GER) of Indonesia is only 18.7 percent. It means the higher-education should make a great effort to create academic atmosphere which is truly needed by society. The Minister Education and Culture of Indonesia, Muhammad Nuh, explains that the GER should increase until 35 percent in 2015. At his moment, the development of GER attain 29 percent. Meanwhile in 2014, it is expected that GER can improve until 30 percent. This number is increasing at about 12 percent in the last four years. Previously, GER in 2009 was only 18 percent (retrieved from Republika on Thursday, December 19, 2013). Director General of Higher Education Ministry of National, Djoko Santoso, in the inauguration of the Mandarin Language Center on campus Tamalanrea UNHAS, Makassar (February 23, 2014) states that the number of Indonesian students is 4.6 million while the children who are in age for collage level are about 25 million. He adds that GER for the developed countries has reached at 40 percent.

Based on School Enrollment (APS) of SM / SMA / SMK 2013 in Eastern Indonesia, the highest 3 was Bali with 70.8%, province of Maluku is 68.40%, and North Maluku with 68.26%. GER for higher education for those three provinces was Maluku province of 29.00%, province of South is22.76 Sulawesi and North Maluku province of 21.70%. It means the eastern Indonesia have still to arrange the educational programs to encourage the local economic, as the expectation of the Minister Education and Culture of Indonesia, i.e. 35% in 2015. Therefore, the central government and local governments should make synergetic efforts to encourage various human resource development programs which is oriented to the potential of each region through vocational education.

3. Community Collage

Community colleges is a place to gain valuable knowledge (knowledge, skills and vocational) which is needed by the society and industrial sectors. The more specific definition is provided by Jacobs and Grubb (2003), they state that community college is an institution to establish basic skills, vocational and produce workers with particular skills. Based on the Benchmarking on the structure of Community collage in Malaysia (Ministry of Higher Education of Malaysia), it showed that the Community collage is under JabatanPengkajianPoliteknikandKolejKomuniti since 2001. The main purpose of Community Collage is to provide the required job skills training, and to expand educational opportunities for further post-secondary school, before entering the corporate or continuing their studies in higher education. Community collage provide a guarantee towards competition level in the terms of another education form which is appropriate with its commitment
to maintaining access and quality (Mullin, 2010).

Law no. 12 of 2012 on Higher Education, Article 59, paragraph 7 describes that community college is in the form of collage that run vocational education program on the level of Diploma One (D1) and Diploma Two (D2) with the specification field of particular science and technology according to local benefits and special needs. Indonesia has the potential of socio-economic and abundant natural resources but those haven't used optimally. This is because the lack of resources, either the human resources of technology. In the blueprint of community collage (2013), it gives emphasis on the role of community collage of vocational oriented to maximize the ability to process the potential of the existing resources in each region.

The establishment of community collage is based on the characteristics of each community and the potential of each region in accordance with economic corridor of each district or province. The establishment and management of community collage can be held, either from government initiative or the industries which is operated in the region. Law no. 12 of 2012, Article 81, paragraph 1 states that the government along with the local government developing gradually at least 1 (one) community college which having appropriate field with the excellent potential in the district/ city and / or in the border areas.

The prediction of community collage in the entire Indonesia until 2012 is about 269 units.

It is predicted that there will be 100 community colleges in Eastern Indonesia till 2015 while the national target is 269 units from 6 economic corridors. If each community college opens 3 study programs with 3 groups of learning, each unit will have 25-30 students. It means community college can recruit about 103,860 students. This condition will increase the GER in eastern Indonesia approximately 40.9% from the number of students in 6 economic corridors of community collage which is predicted at about 242,100 students. Then, to establish 100 community colleges and to be able to produce graduates of Diploma One and Diploma Two, how many teaching staffs or educators should be prepared in eastern Indonesia?

The curriculum of community college is developed synergically between academic society and profession organization. The graduates of applied community college will be the agent of economic growth center for each economic corridor. This unit is as the provider of highly skilled manpower and highly skilled semi-professionals based on the potential of the region. Therefore, the existence of this unit in the entire cities/regencies should be the main consideration. The curriculum arrangement refers to or harmonizes with
the curriculum of higher education of vocation. The curriculum defines that each level harmonizing with annual based and having certain competence target. It refers to the profile of program graduates in corporate world or the industry based on the excellence of each region. The basic framework of the curriculum for each community college programs is developed by the universities, the related industries and the stakeholders which refer to Presidential Decree No. 8 of 2012 on National Qualification Framework (NQF). The main structure of community college curriculum consists of three (3) competences, namely: (i) general competence, (ii) the competence of expertise, and (iii) special competence. (See Table 4.1) For general competency-based course, students are expected to have good communication skills in Indonesian and foreign language of at least one foreign language. The ability to use information and technology become the core competence to explore and expand the knowledge. Therefore, the students are expected to be able to access plentiful information and knowledge related with their field as well as be able to implement it. This practice is referred to all learning requirements which are conducted through media of internet.

4. THE TEACHER PROVIDER FOR COMMUNITY COLLAGE

The community college educators consist of lecturers and instructors (Blueprint of Community College, 2013). The instructors for workshop and laboratory practicum, industrial practice have important role to produce skilled graduates which are ready to work for industry or developing entrepreneurship. Hence, the instructors should have adequate experience which is proved by competence certificate or their skills have been recognized by the associations, the public services and the industrial users. It is predicted that, in 2015, community college needs about 7,263 educators for D1 and 16,947 for D2. Meanwhile, the need of educators for community college in eastern Indonesia is 1,674 for D1 and D2 program as many as 3,806. The preparation of instructor candidates for community college educators with a variety of study program throughout Indonesia certainly requires the synergy between TEI and Polytechnic.

The Decree of Directorate General of Higher Education, Ministry of Education and Culture No. 65/DIKTI/Kep/2012 on the establishment of the holder of Pilot Program for the Education of Teacher Candidates for Community College (Program Pendidikan Calon Pendidik Akademi, abbreviated P2CPAK), the director appointed 12 state polytechnics which are collaborated with 12 Teacher Education Institutes. The collaboration model to prepare P2CPAK in eastern Indonesia is as follow: Yogyakarta State Komunitas University Universitas Negeri Yogyakarta collaborated with Politeknik Pertanian Negeri Kupang, Universitas Pendidikan Ganesha with Politeknik Negeri Bali, Universitas Negeri Menado and Politeknik Pertanian Pangkajene Kepulauan, while Universitas Negeri Makasar berkolaborasi working with Politeknik Negeri Ujung Pandang.

5. VOCATIONAL HIGH SCHOOL (VHS)

Based on the primary data of Vocational High School (VHS) version 6.0, NTT province consists of 18 districts/ cities and there are 42 state VHS and 13 private VHS in the field of livestock agribusiness and agricultural. From 55 state VHS and the private ones in the field of livestock agribusiness and agricultural have 212 groups of learning with the number of students is 3,879. The number of productive teacher is 115 and 7 honorary teachers. Meanwhile, until 2011, the government (Ministry of Education and Cultureq Directorate General of Higher Education) have not prepared TEI for livestock agribusiness and agricultural.

6. THE PROVISION OF PROFESIONAL TACHER FOR VHS

The mandate of Law No. 14 Year 2005 article 8, 9, and 10 explains that the teachers must have educator certificate as well as physically and mentally healthy to achieve national education goals. The academic qualification is at least obtained through higher education of bachelor degree or diploma 4 program. Meanwhile, the teacher competencies, i.e. teacher pedagogical competence, personal competence, social competence, and
professional competence can be acquired through Teacher Profession Education (PPG).

The purpose of PPG is to produce the teacher candidates which have the ability to realize the national education goals. That goal infers that to develop the students’ potential to become pious, autonomous, and creative individual in developing knowledge as well as being responsible and democratic citizen. In addition, PPG has a special purpose, as explained on Government rules (permendikbud No. 87 tahun 2013), to periodically and sustainable develop professionalism to produce teachers who have multiple competencies, namely: 1) designing, implementing and assessing learning, 2) follow-up action by providing guidance and training to students, 3) conducting continued research and professionalism.

PPG is categorized into in-service and pre-service teacher. PPG for in-service teacher is an educational program which has purpose to prepare the teachers to master complete competences in accordance with the standard of national education to have educator certificate (Government Rule No. 9 Year 2010, article 1). Meanwhile, the graduates of Bachelor of Education or Bachelor/ Diploma 4 of non-educational degree program who want to be a teacher should join PPG of pre-service teacher. This program aims at preparing the graduates of Bachelor of Education or Bachelor/ Diploma 4 of non-educational degree program who have aptitude and willingness to teach to have a complete teacher competence based on national education standard (Government Rule No. 87 Year 2013).

In 2013, Directorate General of Higher Education has developed various models of PPG for Pre-service teacher, such as PPG for Bachelor Graduates Teaching in Remote and Underdeveloped Regions(SM-3T) program, PPG-Integrated with Dorm System and Additional Authority, Collaborative and Integrated PPG, as well as Integrated PPG. The purpose of Collaborative PPG program is to prepare the teacher of vocational high school to planning, conducting, and assessing productive subjects.

The spectrum of expertises for vocational education has developed rapidly. In the year of 2008, the Decree of Directorate General for Management of Primary and Secondary Education No.251/C/KEP/MN/2008 show that there are 121 spectrums of expertises. Nowadays, TEI is just able to educate teacher candidates for 54 skill-competencies. Meanwhile, the vocational high school which has 20 study programs with 67 skill-competencies do not have qualified teacher from TEI graduates. Based on the characteristics of academic expertise and strong partnerships, Directorate of Higher Education develops a model of Integrated and Collaborative PPG.

7. PILOT PROGRAM OF INTEGRATED AND COLLABORATIVE PPG (COLLABORATIVE PPGT)

At the beginning, the model of Pilot Program of Collaborative PPGT in 2012, Faculty of Engineering, Yogyakarta State University (FT UNY) was appointed by Director of Education and Educational Staff Development, The Directorate-General of Higher Education, to hold Collaborative PPGT Program in the field of agricultural with Polytechnic State Kupang (Politani).

The reason behind the appointment of Faculty of Engineering, Yogyakarta State University and Agricultural Polytechnic State Kupang because of (1) the teacher storage in Kupang (East Nusa Tenggara) as the remote and underdeveloped region, (2) unbalance distribution, (3) underqualified teachers, (4) low-competencies teacher, (5) mismatching between teacher qualification and their subject field.

The recruitment process and students selection of Collaborative PPGT is through three stages, namely: selection of administration, academic selection, and interview test (personality, interest, and motivation). In the administratitive selection, there were 84 participants passed the stage and the written test for academic selection remains 40 candidates. After the final selection (interview), 30 candidates were declared “fulfilling the requirements”.

The curriculum framework of Pilot Program of Collaborative PPGT is developed
based on the demand of corporate world as professional teacher with teaching authority for productive subject on vocational high school. The curriculum refers to teacher education integrated with VHS. In the first year or two semesters, a student pursues a diploma 4 and matriculation programs. In Diploma 4 program, students take academic courses in the field of agricultural extension which is equal to 49 credits. In addition, the students go through pedagogy course of 12 credits. The planning and implementation of Diploma 4 program become the duty of Polytechnic State Kupang. The curriculum can be described as follow:

<table>
<thead>
<tr>
<th>PPG</th>
<th>4</th>
<th>PPL 2 at VHS 3T (6 sks)</th>
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<tr>
<td></td>
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<td>PPL 1 ta VHS DIY &amp; JATENG (6 sks)</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>WORKSHOP SSP ( 20 sks)</td>
</tr>
<tr>
<td>D4</td>
<td>2</td>
<td>Pedagogical Course (5 sks)</td>
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<tr>
<td></td>
<td>1</td>
<td>Pedagogical Course (7 sks)</td>
</tr>
</tbody>
</table>

Figure 2. The curriculum structure of Pilot Program of CollaborativePPGT

The policy of Pilot Program of Collaborative PPGT which has been implemented in four collaborations of TEI and Polytechnics since 2011 is the integrated concept to improve the academic qualification and the competence of teacher candidate. This program is expected to be able to provide ideal and professional teachers for vocational high school, especially for the field of expertise that have not been accommodated by TEI.

C. CLOSING REMARKS

The predicate of professional teacher on vocational education for the community college and vocational high school is a prestige position and it can be a pride for the youngster of eastern Indonesia. The policy of development and preparation among the teacher candidates of vocational has lasted since 2009 through PPG of In-Service Teacher program. In 2012, the program of teacher candidate for community college needs to be developed by involving the stakeholder systematically. The Implementation of both programs through the concept of "Pilot Program" should be examined. After that, deciding the model of vocational PPG and community collegewhich is in line with the economic corridors in eastern Indonesia.

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FINDING THE MISSING LINK IN THE DESIGN OF POLYTECHNICS COMPETENCE-BASED CURRICULUM

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Abstract

Competence-based curriculum has been initiated since early 1995 and developed in Polytechnics throughout Indonesia since 2006. The improvements of this curriculum to raise the quality of learning outcomes have been periodically conducted every 3 years, but until now in the implementation stage it is almost as the same as before. This study aim to reveals the source of the problem which caused obstructed in the improvement of learning outcomes quality. This study used mainly the qualitative approach supported by quantitative data, especially to encompass the opinion of learning outcomes quality. This study revealed: there was missing link in the design chance of polytechnics competence-based curriculum. There was no evaluation component in the design stage and no aligning process in the implementation stage. These caused the improvement of learning outcomes quality was very slow and almost no change.

Key words: missing link, competence-based curriculum, evaluation, aligning process, learning outcomes quality

1. Introduction

The first polytechnic was established as a pilot project in 1976. It was followed by establishing six polytechnics in the period 1979-1984 in Indonesia. Now Indonesia has 175 Polytechnics. The spring up of polytechnics has not yet increased the Human Development Index (HDI) significantly. HDI describe how good a country is. The low HDI described that the contribution of education, included polytechnics, to human development and economy growth were very low.

Polytechnics generally have a very high vision. Each polytechnic wants to become a superior institution and leading in vocational education. Therefore Polytechnics revised their curriculum periodically to realize their dreams. Competence-based curriculum (CBC) has been developed since early 2000, replace subject-based curriculum. CBC has been used to all polytechnics since ca 2006.

Polytechnics have attempted to improve the quality of their output by improving their curriculum every 3 years, but until now many industries are still in doubt the quality of polytechnics graduates. This is because of the worsen situation between polytechnic and industries [1]. An evaluation research found a missing-link which has been impacted to educational process and its result.

2. Curriculum Design and Implementation

2.1 Curriculum Design

Curriculum is a key element in education process. The vocational and technical curriculum focuses not only on the educational process but also on the tangible result of that process. Strategic planning in education is needed to get optimal achievement of visions or goals. A program or curriculum should be developed through a process or series of steps [2]:

a. examining the external environment and its impact on the organization now and in the future,
b. conducting a self-examination,
c. formulating vision and mission statements to guide the organization in the future,
d. developing specific plans that will assist the organization to fulfill its vision and mission,
e. applying the strategies included in the plans, and
f. evaluating the organization through formative and summative approach

Curriculum is an engine of educational accomplishment which should be planned strategically. This strategic begins with an ideal vision from which an organization mission is derived. Strategic planning identifies results based upon an ideal vision. These results must be defined into measurable descriptions of knowledge, skills, attitude and abilities which are suitable for students in the future life. It has to link at three levels achievements: societal (outcomes), organizational (output or completers/leavers), and individual or small group (products). Input and process are one of determinant factors which impact on outcomes of education. Figure 1 shows the relationship between inputs and outcomes [3].

Mission statements have to be converted to mission objectives that are measureable on an interval or ratio scale. A mission objective is focused on ends (results), and not on means (process). An objective should be stated without confusion:

a. who or what will demonstrate the performance or accomplishment,

b. what performance it to be demonstrated,

c. Under what conditions the performance will be observed,

d. What the criteria will be used to determine success

Figure 1. An Educational Results Chain

Curriculum design should be able to connect the elements of each level. The arrows in Figure 1 connect the five organizational elements: mega/ outcomes; macro/outputs; and micro/ products, processes, and inputs. If there any missing alignment or lack of “fit” between any of the elements, the system is at risk.

Curriculum design and its implementation are influenced by environment. Educational policies (external and or internal), are environments that directly influence the curriculum design at mega, macro, and micro levels. One of the external policies (mega level) that strongly influence curriculum design is an Indonesian Qualification Framework (IQF). IQF contain a description of qualification standards. There are nine levels of IQF standard that relates to graduate level of education [8]. In addition, there are at least eight education components which are required to fulfill national education standards (SNP). These components are: content, process, human resources, graduate competencies, facilities, educational management, financial, and assessment of learning outcomes [4]. Curriculum as a macro level policy (organizational) must be designed strategically to provide qualified education result.

At micro level, professionalism of teachers, facilities, and methodology are the main factors that influence of educational results [7, 9]. Methodology relates to instructional design. It is used to manage and implement learning activities. Dick W [5] used a system approach to design instructional. This system consist of some components which interrelated to each other. A feedback as one important component of system will control the quality of instructional. It is obtained from the evaluation. Figure-2 shows a strong relationship between components. If there is any changing in one component, it will affect the others. Therefore all components must be designed simultaneously. A curriculum developer must understand fully the context within which a curriculum must operate.
The most critical problem in the process design of instructional is goals identification. There are many approaches to identify these goals. Frequently it can be determined by subject-matter expert, content outline, or performance approach. The last approach is suitable for competence-based curriculum. The goals can be identified by defining the knowledge, skills, attitudes, and abilities that must be mastered after students completed a training program.

2.2. Competence-based curriculum (CBC)

Competency and curriculum have many definitions. Sanghi has differentiated between competence and competency. Competence means a skill and the standard of performance reached, while competency refers to the behavior by which it is achieved [6]. Competence describes what people can do while competency focuses on how they do it. Competencies are the characteristics of somebody that lead to the demonstration of skills and abilities. Therefore, competency or competencies must be demonstrable, observable and measurable. Curriculum is the planning of learning experiences and assessment of students learning. Curriculum may be defined as the sum of the learning activities and experiences that a student has direction of the school [1]. Generally, curriculum should be designed by the answers to four questions [7]:

a. What learning outcomes do students should be achieved (intellectual, social, practical & personal)?

b. How well the course can help students to achieve these learning outcomes?

c. How will we know if students on this course have achieved these learning outcomes?

d. How will we know if and how our teaching have contributed to our students’ learning outcomes.

Competency as a construct of learning outcome is a key word in the competence-based curriculum. Course and curriculum should be focused on student needs (student center learning philosophy) and be designed based-upon learning outcomes (intellectual, social, practical & personal). These learning outcomes can be measured by some of indicators which describe knowledge, skills, attitudes and abilities that have been mastered by students after completing a course.

2.3 Development and Implementation of CBC

Higher education graduates are expected to be competent at least in the five areas: professional expertise, functional flexibility, innovation and knowledge management, mobilization of human resources, and international orientation. Higher education graduate in most countries indicated that study program formed a good basis for starting work and a slightly lower percentage indicated that it was still useful five years later in their performance of their work tasks. By contrast, only around 20% indicated that higher education graduates have a good basis for developing entrepreneurial skills [10].

Polytechnic, in Government Regulation Number 17 of 2010 on the Implementation and Management of Education Chapter 1 verse 18, is a higher education institution that conducts vocational education in few specific fields. Vocational education in the historical record has always been associated with the supply of skilled workers, industries and economy of a country. Curriculum has always been designed to meet with these demands [1, 11, 12, 13]. Nevertheless, the development of
Polytechnic curriculum has been strongly influenced by the government's policies in education that didn't always meet with the demand. The education policies for vocational education should be related and synchronized to the policies for economy, industries, and human resource development. The relationship between education policies and other policies is still difficult to be aligned. The content of curriculum which was expressed by subjects has not been understood by industries. Therefore content or subject-based curriculum was changed into competence-based curriculum since 2000 until early 2009 in term to get closer or to improve communication between polytechnic and industries. CBC must be expressed by graduates' learning outcomes or what graduates can do (competences) or how they can do the tasks (competencies).

The CBC should changed all aspects of teaching, learning, assessment and evaluation approaches. A learning outcomes approach to curriculum design must be aligned with the teaching activities and assessment employed to measure that learning. Polytechnic curriculum must be focused not only on the knowledge development, but also on skills, attitude and abilities (competencies) which meet with the demand. How far do the teachers have understanding CBC?

Interviews with some teachers revealed their opinion of CBC. Most of them mention that CBC is more systematic than subject-based curriculum. They also believed that the educational process could be delivered better than before. It is because of the CBC should be derived from some of learning objectives and learning outcomes. But most of teachers (50%) argued that CBC is still difficult to understand. Therefore at the implementation level, it has not changed yet the content, methodology, and evaluation approach significantly. The survey shows that there is almost no change in teaching and learning method, and also assessment and evaluation approaches. Mostly the teachers have a good tool and approach to assess knowledge and cognitive skills relate to their subject, but they don’t have any good tool to assess students’ skills and attitude. Skills and attitude are as a part of students' learning outcomes.

Learning outcomes-based curriculum is relatively new and difficult to be expressed. It must be aligned to the teaching activities, assessment and evaluation approaches [7]. Polytechnic curriculum has been designed and developed through the series of stages as shown in Figure-3. It shows that government regulations and the result of tracer study are the main materials to do SWOT analysis. Curriculum was designed with the assumption that input students mostly (70%-80%) come from general high school (not vocational high school). There wasn’t any special treatment or matriculation for both kind of input. Polytechnic curriculum at each study program generally has 110-120 credit semester unit (csu) for D3 program, and 140-160 csu for Bachelor program. The load (number of csu) has been determined by government. These curriculums are structured as follows: generic subjects 25%, entrepreneurship subject 3%, and technical subjects 72%. The learning activities consist of theory (65%) and practical in laboratories (35%). This composition has been developed more by tradition in vocational education rather than the need to fulfill learning outcomes.

There are at least four indicated critical points in the curriculum development (Figure-3). Determining the learning outcomes is the first critical point. Teachers and curriculum designer team have difficulties to express learning outcomes. They also frequently ignored
their visions (institution and study program visions) and the background of input students (raw material) during design of learning outcomes. The team has seen regulations (government and internal regulation) as the greatest consideration in the curriculum development or design. It shows that government regulations have impacted strongly in the curriculum design and curriculum development.

The second critical point is the step of selecting teaching materials. The lack of achievement indicators causes each faculty or teacher has different perception about materials needed to teach. The proposed materials become very extensive. There is no idea to restrict these materials. The team of curriculum development does not know that it can be done by designing evaluation or assessment approach [3, 16]. Assessment and evaluation is important step in the curriculum and instructional design. But in Figure-3 does not show this step. The design of assessment and evaluation is an important thing to answer the question: how will we know if students on this course have achieved these learning outcomes. In another word, design of assessment and evaluation will impact on many things at the implementation of CBC. Survey revealed that tools of assessment or evaluation just valid for measure knowledge achievement. There was not any tool to measure skills and attitudes. At least there was not any indicator that can be used as a reference to measure skills, attitudes and abilities precisely.

The third critical point is categorizing and selecting subject based on selected materials in the previous step and determining the credit-semester unit of each subject. The lack of achievement indicators and evaluation design causes no reference or reason to restrict the materials. The further impact is that the extensive materials become difficult to be categorized and organized. This raises many subjects in the curriculum. Team of curriculum development has no empirical data which can be used to restrict these materials and or to determine the time needed to achieve a learning outcome. The time is very difficult to be determined because of the absence of any achievement indicators that will be used as reference to determine the time needed to achieve defined learning outcomes. It also causes difficulty to determine level of student qualification and level of IQF standard should be achieved.

The fourth critical point is at the step of planning teaching and learning. The impact of the absence of assessment and evaluation design also raises the difficulty to control quality of instructional and teaching and learning. Teachers have never known how well the course was conducted and or how well they can help students to achieve the learning outcomes. There was no reference to measure student competences (what student can do) and student competencies (how student can do a job) which can be used for determining a student qualification and also to improving instructions.

Now CBC will be changed into Indonesian Qualification Framework (IQF)-based curriculum. Socialization of this new type of curriculum has been conducted in early this year. IQF has been developed based upon learning outcomes. These learning outcomes have been arranged based upon a taxonomy which fit to students’ qualification level that has to be achieved. IQF consist of nine levels of qualifications (Figure-4) [8].

![Figure-4. Learning Outcomes Equality in the Indonesian Qualification Framework (IQF)](image)

The graduates of Polytechnics Bachelor program must be fit to 6th level and D3 program must be fit to 5th level of IQF. IQF-based curriculum essentially is a learning outcomes-based curriculum. The construct of a learning outcome is a competence that should be shown with some of indicators of achievement. These indicators must describe knowledge, skills, attitudes and
abilities of student after completed a course [7].

The explanation of the second critical point shows the importance of understanding about function and its impact on the loss of evaluation design stage in the curriculum design or curriculum development. All teachers must have understanding about it and have an ability to design and develop evaluation tools. These tools need to be aligned with their teaching objectives and activities. They also need to understand about new paradigm of teaching and learning which is oriented to the student needs.

The survey on six study programs at Electro Department in Bandung State Polytechnic (Polban) which is involving more than 40% of teachers revealed that teachers have different understanding about student needs and learning outcomes in term student center learning (SCL). The SCL is understood narrowly. Most of them interpret SCL as a learning approach in which the students are in active position, while the teachers are in tutor position (80%). In fact, SCL has wide meaning, for example, SCL can be interpreted as a learning approach to help students get the targeted competencies and support their career in the future (30%).

Learning outcomes have been understood by teachers in the same meaning as learning objectives. Kaufman differentiated these two terms. Learning objectives refer to what the student are expected to learn, while learning outcomes are more behavioral, describing what students are actually able to do in observable terms having successfully completed the course [7]. Gnahs [17] defined learning outcomes in term of knowledge, skill(s) and competence(s). Knowledge is described as theory or factual. It is the lowest level of student achievement [6]. Skills are described cognitive (including use of logical, intuitive and creative thinking), and practical (including manual dexterity, and use of methods and materials, tools and instruments). Skills are the abilities to use knowledge in the limited scope. Competences are described as amount of skills and knowledge that can be measured with the help on indicators of skills and knowledge. A learning outcome must be derived into indicator achievements which are demonstrable, observable and measurable.

Most of the teachers have been able to define indicators which describe the student understanding of knowledge, but they have not been able to determine indicators which describe skills, attitudes and ability that must be mastered by students after completed their course.

At micro level (individual or class), the absence of achievement indicators drag the impact on almost of all teaching and learning aspects including instructional design and development, the methods of teaching, assessment and evaluation. At the organizational level, it is difficult to evaluate the effectiveness and efficiency of teaching and learning, and also educational program. This is because of no precise feedback or information which can be used to improve instructional and quality of programs. The missing of evaluation design in the curriculum chain impacts on all aspects of teaching and learning, valuing and evaluating a program delivery, measuring a customer satisfaction (students, teachers, and all element who involving in program delivery), etc. The effectiveness and efficiency of teaching and learning can not be measured without evaluation.

2.4 Evaluation Design

What is the importance of evaluation? There are four reasons for design evaluation in the curriculum chain. The most common reason is that evaluation design can be used to select the appropriate teaching materials and method. The second reason is to create and develop standard criteria of student achievements. The third is to measure the contribution of course and teaching method in the student achievements. The fourth is to improve future programs.

What is the impact of the missing evaluation design from the stage of curriculum development or design? It has been explained above in part 2.3. What will be evaluated? Evaluation at micro or individual level should be focused at least on the learning process, learning outcomes or achievements based on the student performance including mastered knowledge (cognitive skills), hard and soft skills and/or product of student performance, and
attitudes which are all summarized into student abilities.

What is to be measured? Evaluation should be able to measure knowledge, skills and attitude after they intended a course. When evaluation will be conducted? Evaluation can be conducted in the beginning of course, during the process, and at the end of program. Evaluation in the beginning of course is called assessment and analysis which is used to find out whether actions are required to produce meaningful results. Evaluation which is conducted during the process is called formative evaluation. This evaluation will provide a feedback that can be used to improve the next step of teaching and learning method or improve the next program at the wider scope. Assessment an feedback to students are critical and significant part of an academic’s work [15]. Evaluation which is conducted at the end of courses is called summative evaluation.

How to evaluate the learning outcomes? Assessment for learning focuses on the formative which is integrated into the curriculum, and is context embedded and flexible. Assessing for feedback is focused more on practices to improve student learning [14].

What kinds of evaluation tools can be used to measure the learning outcomes? There are many kind of tools which can be used to assess learning outcomes. The main assessment tools encountered in engineering disciplines are [15]:

- a. Written examinations which are appropriate in many areas for assessing knowledge of underpinning science in a traditionally structured degree program.
- b. Laboratory/practical reports as a part of students portfolios
- c. Analytical calculation
- d. Multiple choice questions, especially at lower level)
- e. Project report
- f. Portfolios or personal development plans
- g. Poster presentations
- h. Oral presentations

Assessment can be designed by using these tools in accordance with the level of student achievement. Knowledge can be evaluated using written examination, while skills and attitudes examinations are more appropriate for assess the learning activities in the laboratory. Project report, poster presentation and/or oral presentation can be used to assess more complex skills and attitudes.

How to design evaluation system? The assessment design must be focused on learning outcomes. Evaluation and/or assessment should be designed before designing the content. The principle of assessment design is a consistency between the three related components of curriculum design [15]:

- a. What is expected student to learn,
- b. What teaching method will be use to enable them to achieve these learning outcomes
- c. What assessment tasks and criteria will be used to show that student has achieved the learning outcomes.

If one element of system is changed all the others must necessarily change in order to effect the desire learning.

3. Recommendation

Refer to Stefani model [9] in the planning learning and teaching and the reveals of this research are related to the last condition at implementation level in many study programs in the Polytechnic, there are a number of key steps to effective course and curriculum development and/or curriculum design as shown at Figure-3.

Curriculum should be developed or designed by considering the environmental requirements: government regulations as the main sponsor of polytechnic education and industrial needs. Developing curriculum starts from vision which will be achieved in the certain time in the future. All activities should be aligned and focused to get this vision. The second step is the defining learning outcomes and learning objectives. This step is the defining what student can do and what student need to learn. SWOT analysis need to know what elements should be enhanced, eliminated, and anticipated in order the program running well. Next step is the defining student
requirements that meet with this program. This step should provide the minimum qualification of student. Planning or designing assessment framework is an important step that will impact all of learning and teaching aspects directly. Each teacher has to develop an assessment tools which appropriate with his or her learning objectives. Learning and teaching materials (one of inputs materials), teaching method, learning activities and evaluation approach (process) must be aligned and synchronized with the assessment approach and learning objectives to provide qualified outputs or results.

![Diagram of Key Steps to Effective Curriculum Design](image)

**Figure 5. Key Steps to Effective Curriculum Design**

The content of program is designed to be meet with the assessment has been planned. Teaching method and learning approach need to be planned to get results optimally. The last step is the compiling the list of resources including teacher qualification, facilities, information sources, finance, management and standard needed for marking or leveling the learning outcomes.

4. Conclusion

The assessment and evaluation are part of curriculum that must be designed before determining the content or selecting curriculum materials, teaching method and learning activities. The lack of evaluation and assessment design in the chain of curriculum design will have an impact on a wide range of aspects of teaching and learning that leads to education quality. The assessment must be designed and focused on the learning outcomes. It needs to be aligned with the learning objectives, learning activities and teaching methods during process of learning.

The learning outcomes will be used as a standard measurement of learning achievement. It is defined in three terms, i.e. knowledge, skills, and competences. Knowledge is the lowest level of student achievement. Skills are the abilities to use knowledge in the limited scope. Competences are described as amount of skills and knowledge that can be measured. Therefore it must be measurable, observable, and demonstrable.

Assessment and evaluation will provide valuable information to improve further learning and teaching methods. It needs standard indicators to provide standardized competences which are the primary competences qualifications. These can be functioned as a bridge of communication between polytechnic and industries. The success communication leads to the achievement of both education quality and production on the other side.

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WEB-BASED SCHOOL SELF-EVALUATION
FOR QUALITY IMPROVEMENT IN VOCATIONAL SCHOOL

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Abstract

The rapid development of science and technology resulted in increasing human needs that impact on increasing the level of competition in global workforce. Vocational schools as an educational institutions that were designed to produced graduates who were ready to worked need to maintained the quality of graduates continuously in order to competed in global marketplace. One attempts that must be done is to do a school self-evaluation to determine the condition and performances of schools. The high flurry of vocational school sometimes makes experiencing difficulties in school self-evaluation. It was required a school self-evaluation system that was easily used by vocational schools as a tool to improve the quality of education. Web-based self-evaluation system is one of solution to conduct an evaluation analysis easily and quickly. This article will discuss about the web-based vocational school self-evaluation as a tool to improve the quality of education. Then it also discusses how to designed and implemented web-based school self-evaluation in vocational education especially in Indonesia.

Keyword: web-based school self-evaluation, vocational education, quality improvement.

1. Introduction

Vocational education is an education of an applied personnel training mode and it is also an education of training skilled and applied talents for the social sectors (enterprises), so vocational education, which requires a lot of practice curriculum to train students’ operation capacity (Jhing Zhang, 2010). Vocational School (SMK) is one of the education level in Indonesia which has a strategic role in enhancing national economic growth. SMK is designed to produce graduates who are ready to work well in the world of business, industry and independent entrepreneurship. Quality improvement in vocational education was believed to produce professional candidates who are ready to use in accordance with their respective fields. Various efforts have been taken by the government to improve the quality of vocational education. In its strategic plan, the Government seeks to change the ratio of general high school (SMA) and SMK from 60:40 in 2008 to 30:70 in 2025. Besides the number of vocational schools, government also seeks to improve the quality of vocational schools through various programs, one of which is a international level school.

The main problem in development of vocational school are self-evaluation system to measure profiles, the real condition associated with strengths, weaknesses, opportunities and threats were not optimum, so that vocational experience difficulties in making and developing excellent programs and activities. On the other hand, the government will also have difficulties in mapping the advantages of each existing of vocational school because of the lack of information that can be accessed at any time quickly, precisely and accurately. Vocational development tends to follow the trend of the moment is undergoing rapid development without good school self-evaluation analysis.

In many districts, policy-makers and parents are increasingly preoccupied with the quality of vocational schools and with the knowledge and skills obtained through schooling (Anton De Grauwe, 2002). The inspection system was supposed to exercise control over schools and to offer advice for improvement. Based on experience in many countries, the inspection system has failed
to play either of both roles, leaving many schools unsupervised and unsupported. In response, countries have attempted to reform their inspection and/or have strengthened alternative evaluation tools. School self-evaluation was becoming more popular, especially among policy-makers, although its integration in schools encounters many challenges.

It is therefore necessary to design web-based information system for school self-evaluation that can be accessed for all people with a certain level to be able to integrate all the strengths, weaknesses, challenges and threats so that policy decisions can be made quickly and accurately.

2. School Self-Evaluation (SSE)

Evaluation is at the centre of almost all education quality improvement policies and strategies in most countries today. School Self-Evaluation (SSE) is a way of systematically looking at how teachers teach and how students learn and making decisions about what the school want to improve (Mathews, 2012). Self-evaluation is a process, not an event. It is the first, essential step in a cyclical process of bringing about change and improvement. It is based on professional reflection, challenge and support among practitioners.

School self-evaluation must be seen as a collaborative, reflective process of internal school review (Bernard, 2005). During school self-evaluation the principal, deputy principal and teachers, under the direction of the board of management and the patron, and in consultation with parents and pupils, engage in reflective enquiry on the work of the school.

School self-evaluation is a continuous process that governed by the needs of the institution rather than the requirements of external bodies (Karl Smith, 2012).

Nevertheless, schools are accountable to their stakeholders; they need to be in a position to provide convincing evidence of their success and a clear plan of action to demonstrate how improvements will be made. The case study schools provide examples of how this can be done. They all have a positive and reflective ethos and are determined to improve.

Every organization should implement continuous quality improvement every time. It required a thorough evaluation periodically the existing resources, the process is run, the results obtained and other things related. Thus the significance of an organization can be measured and presumably there are things that are not in line with the vision of the organization can be directly known early on for further improvement (Ali, 2013). Further self-evaluation results known to the public is expected to increase community participation in improving the quality of education. Vocational school self-evaluation is an integral part of the process of development of the educational unit. The level of maturity of the institution can be traced from the results of self-evaluation during a certain period. This document will be very useful for the next leader, especially in improving the quality of education unit.

The process of self-evaluation is planned, executed and controlled properly can find the actual profile of an organization so that it can perform planning and appropriate action to achieve the aspired goals. The development organization that plans to use the self-evaluation that do not use self-evaluation can be shown in Figure 1 (PHK A3 Guide, 2006).
3. Web Based Information Systems

Information system is the study of complementary networks of hardware and software that people and organizations use to collected, filtered, processed, created and distributed data (Jessup et al. 2008). Web-based information system displays many benefits of multimedia technology.

Using today’s fast broadband connections, it is possible to stream sophisticated content to a computer anywhere in the world. This is an advantage for many people as the information can be received and read wherever and whenever it is convenient for them, which can be a crucial factor for a busy executive. A significant amount of interactive multimedia content is now delivered via the internet.

Information system can’t be separated from technology related information into a data processing and information distribution process data into information and the distribution of the data/information within the limits of space and time. Information Systems in order to operate optimally, it is necessary that information technology has a proven good performance. The use of information technology as the basis of development of information systems would ensure the smooth flow of data and information and accurate data processing results. With the development of network systems both local and internet, makes the distribution of information will take place quickly and dynamically (Oetomo, 2002).

4. Web-based SSE System Development

Web-based school self-evaluation for vocational school was developed by research and development (R&D) methods based on software development by Pressman (1982). The stages of the research consisted of: 1) needs analysis of the SSE system for vocational school in Indonesia,  2) design of the system, 3) coding and building the system, 4) Testing and 5). Acceptance and implementing. The procedure of research can be seen in figure 2.
Needs analysis was done by collection of data and information through observation, discussion with parties related to vocational self-evaluation to determine user needs related to self-management of vocational evaluation. The focus needs analysis covering the processes that exist in the implementation of vocational self-evaluation, the user system that includes administrators, school supervisors, vocational school, Department of Education District / City / Province and Directorate of Vocational Training School.

The design of web-based school self-evaluation conducted based on vocational needs analysis that includes system architecture design, database design, process design and display design. Database system was developed by MySQL server that can be used free.
5. Result and Discussion

Web-based school self-evaluation system was implemented by PHP web programming language that can be accessed at http://evaldismk.com. This system used MySQL database server to collected and managed the data from the vocational school.

The server was implemented by Apache server that have high reliability in implementing web based system. The results of the preparation of the program code can be viewed on figured 4.

![Web-based SSE system development Model](image)

The database for the web-based school self-evaluation system was design and implemented by MySQL Server. The reasons for selecting MySQL server database based on consideration:

1) MySQL is an open source software, so are legally.

2) MySQL has proven reliability indicated widely used in the development of web-based information systems, more than 60% of web-based information systems in the wordl using MySQL Server

3) MySQL has a relatively small size so light to run and accessed
Self-evaluation in vocational was done by filling out a web-based school condition data in accordance with existing conditions. Self-evaluation includes 8 national education standards that include: 1) standard of contents, 2) standard of learning process, 3) standard of facilities and infrastructure, 4) standard of students and graduates competency, 5) standard of teachers and education's staffs, 6) standard of management, 7) standard of financing, and 8) standard of assessment.

The evaluation process was done by form that provided in the web-based system to check the conditions faced each vocational school. The form is designed with a selection of existing conditions with weight rating in accordance with existing conditions. To be more convincing in filling the data, upload the necessary physical evidence required for each of the entered data. With this patterns, the process of self-evaluation can be done by the school quickly, precisely and accurately.

Data Charging school self-evaluation carried out by an administrator appointed by the school concerned. In the charging process, the administrator was accompanied by a school inspector in charge to guide and control the data that is loaded by the school. School inspectors will check the data that is loaded in accordance with the physical evidence so that it can be guaranteed that there entered data is the correct data. Data that has been filled by the school and has received approval from the supervisor will be sent to the central system then admin will verify the entry of data. The data has been verified by the admin center will then be processed and displayed a summary of the data in the form of a diagram. Furthermore, the data of this summary will be published in the system that can be accessed by everyone.

Model of school self-evaluation is helpful web-based vocational school in view of the existing conditions. Through self-evaluation, the school may determine strengths, weaknesses, opportunities and threats. With data identified strengths, weaknesses, opportunities and threats, the school can plan programs and activities with good seed. Vocational school self-evaluation can be used as a web-based means of continuous quality improvement. The principles of self-evaluation for the government, vocational high school self-evaluation is very useful for web-based
map the condition of schools in Indonesia. The Government may determine the strength of each school, 8 drawbacks associated with the implementation of national standards of education in Indonesia. With school self-evaluation data, government can make school mapping condition so that it can conduct training with ease. Efforts to improve the quality of vocational education can be done through periodic self-evaluation and controlled.

6. Conclusion

a. Self-evaluation can be done by vocational schools in Indonesia easily and quickly at any time at http://evaldismk.com by filling out a form that were provided.

b. The result of web-based self-evaluation in vocational school will be analyzed by the system and will be display in graphical chart that informed about condition on each standard and can be used as a basis for developing a work plan.

c. Government through the directorate of vocational training to perform the mapping for the development of quality improvement programs in vocational.

References


IMPROVED EMPLOYABILITY SKILLS VOCATIONAL STUDENTS THROUGH THE IMPLEMENTATION OF CURRICULUM 2013

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Abstract

Demands on job skills amended from time to time. The world of work is not only demanding to understand and perform their jobs well practiced in the field, but also must have the competencies and skills that can sustain continued employment with better conditions. One of the characteristics of vocational education is to prepare students to enter the workforce, so that vocational education should be based on the need for a demand-driven workforce. Because of the alignment of vocational education with the demands of the workplace in terms of competence is a necessity. Competence in the world of work is defined as aspect-Musty personal skills in managing behavior and attitude to work as expected by the world of work (employability skills). Employability with regard to activities that prepare a person to work in the long run. One element of the curriculum change curriculum level education unit (KTSP) 2006 and 2013 were on the competence of graduates, which includes competency attitudes, knowledge, and skills to be achieved in a balanced way. Domain stance on curriculum in 2013 became a significant element of change which is in line with the efforts of alignment with the world of work. Thus the implementation of the curriculum in 2013 is expected to have a positive impact in addressing and aligning with the needs of the workforce.

Keywords: employability skills, the world of work, curriculum 2013.

1. Introduction

Ministry of National Education raises strategic issues relating to the world of work and education. These issues include: (1) higher engineering education is not in tune with the world of work, including alternative models of higher education that is able to produce graduates who are professional and entrepreneurial; (2) the lack of synergy between educational institutions in the preparation of graduates to the labor needs; (3) curriculum that is expected to produce graduates who have the qualifications and competence; (4) lack of partnership between the government, education and training institutions in empowering communities to contribute to economic development; (5) lack of research-based center of excellence; (6) lack of alignment with the needs of the research community PT; and (7) is not optimal business involvement in research activities in universities [1].

The above issues are thought to be caused by many things. On the one hand is an indication that the quality or competence of graduates has not met the expectations the world of work, and on the other hand, the results of which bear the certification competency assessment has not been used as a reference by the workforce as a true picture of the competence of graduates. World of work requires competence in the ability / skill employabilitas candidates. Employability skill is the ability to manage attitudes and behavioral skills to work as expected by the world of work.

The issues and demands of the industrial world to be one of the foundation and driving force for education to straighten themselves up, no exception to the vocational school. It is undeniable that vocational
education is a kind of education that has special characteristics, which is oriented toward preparing students to work in a particular field. Therefore, vocational education can not be separated from its attachment to the working world, because the world of work is a chain that should not be broken and a series of vocational training systems ranging from planning, goals, curriculum, teaching and learning, as well as the spread of graduates. To answer these issues then it should do the alignment education. Basically alignment is the adjustment of education as a human resource supplier to the world of work that has dynamic needs and demands. The concept of alignment suggests the need for better coordination between the providers of education graduates with those who need to employ graduates [1].

Alignment of education with the world of work is done by adjusting the pattern of supply/demand of education with the world of work. Demand conditions will vary by sector occupations (industrial goods and services) in some employment sectors. Besides that, it also needs to be based on the condition map based on four dimensions of quality, quantity, location and time. Demand conditions will control the supply side of the education system. Education system that includes training needs designed such that it is able to address the needs of the request based on the same four dimensions. So we need to design a deployment quality education system both in terms of infrastructure, educators and learning systems. These three aspects that need to be redesigned is done at each level of education in any kind of formal education and training and other educational activities. Based on the principles of alignment and the above description, it can be described as an alignment framework in Figure 1 [1].

Figure 1. Framework Alignment

From the picture above, there are four main dimensions to consider in mapping is the quality/competence, quantity, location and time. Accuracy in defining requirements on the demand side in the four dimensional accuracy is crucial in addressing the needs and challenges of the world of work.

Curriculum 2013 as a means of realizing the national goals in Article 3 of Law No. 20 Year 2003 on National Education System confirms that the national goal of education is "Expanding the potential of students to become a man of faith and fear of God Almighty, noble, healthy, knowledgeable, skilled, creative, independent, and become citizens of a democratic and accountable". In detail above national goals can be translated in the form of student achievement of competencies that include attitude (spirit: faith and fear of God Almighty and social: noble, healthy, independent, democratic, responsible), knowledge (knowledgeable), and skills (proficient and creative) [2].
Based on the above, the issue that will be answered by this study is how the implementation of the curriculum in 2013 to improve employability skills of vocational students? While the purpose of this research is to improve the employability skills of vocational students through the implementation of curriculum 2013.

2. Discussion
2.1 Employability Skills

DEST (2002:13) states, "skills are Commonly understood to refer to an ability to perform a specific task" [3]. Skills are usually understood to refer to the ability to carry out specific tasks or specific. Jordan, Carlile, and Stack (2008:203) explains that the skill is the ability to consistently perform a set of activities. The skills involve the appearance of a person in a particular activity or work [4].

Employability is a term that can be defined as the ability to work. Kneale (2009:100) illustrates that an employability "skills, for others it is an activity which prepares individuals for long-term employment". For some interpret with regard to employability skills, and others interpret the activities that prepare a person to work in the long term [5].

While Knight and Yorke (2004:4) defines employability is "a set of achievements, understandings and personal attributes that the make individuals more Likely to gain employment and be succesful in their chosen occupations", a set of achievements, understanding and attributes that make one individual’s easier to get a job and succeed in the job to the selected [6].

Commonwealth of Australia (2006:5), explains that the employability skills is not a new concept, but it is something that describes a non-technical skills and competencies that will always be an important part in the success and effectiveness in the workplace [7]. Employability skills similar to the key competencies that are specific conceptualization that is widely known to the general skills.

The Secretary's Commission on Achieving Necessary Skills (SCANS), conducted a study to identify and describe the skills needed in the workplace (Kneale, 1990). At first SCANS found seven functional skills are essential skills for a worker, resource management, information management, social interaction, behavior and performance systems, human and technology interaction, and affective skills. Based on in-depth review and verification, SCANS skills to make two groups, namely the basic skills and competencies in the workplace, as shown in Table 1 [5].

<table>
<thead>
<tr>
<th>Table 1. SCANS Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Foundation Skills</strong></td>
</tr>
<tr>
<td>1. Basic Skills</td>
</tr>
<tr>
<td>2. Thinking Skills</td>
</tr>
<tr>
<td>3. Personal Qualities</td>
</tr>
<tr>
<td><strong>Workplace Competencies</strong></td>
</tr>
<tr>
<td>4. Resources</td>
</tr>
<tr>
<td>5. Interpersonal</td>
</tr>
<tr>
<td>6. Information</td>
</tr>
<tr>
<td>7. Systems</td>
</tr>
<tr>
<td>8. Technology</td>
</tr>
</tbody>
</table>

The Conference Board of Canada, also have developed employability skills as a tool to assist educators in preparing graduates to enter the workforce. These profiles, updated in May 200, a reflection of the demands of work in the era of globalization, which was then known as the Employability Skills 2000+. Employability Skills 2000+ framework consists of employability skills, attitudes and behavior, as addressed in Table 2 [8].
Table 2. Employabilitas Skills 2000 +, Canada

<table>
<thead>
<tr>
<th>Fundamental Skills</th>
<th>1. Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2. Manage information</td>
</tr>
<tr>
<td></td>
<td>3. Use numbers</td>
</tr>
<tr>
<td></td>
<td>4. Think and solve problems</td>
</tr>
<tr>
<td>Personal Management Skills</td>
<td>5. Demonstrate positive attitudes and behaviours</td>
</tr>
<tr>
<td></td>
<td>6. Be responsible</td>
</tr>
<tr>
<td></td>
<td>7. Be Adaptable</td>
</tr>
<tr>
<td></td>
<td>8. Learn Continuously</td>
</tr>
<tr>
<td></td>
<td>9. Work Safety</td>
</tr>
<tr>
<td>Teamwork Skills</td>
<td>10. Work with others</td>
</tr>
<tr>
<td></td>
<td>11. Participate in Projects and Task</td>
</tr>
</tbody>
</table>

It can be concluded that the Employability skills are the ability to manage attitudes and behavioral skills to work, which includes the attitude and knowledge of the nature of the work.

2.2 Vocational Education

Vocational education has a very diverse sense, even in western countries the term vocational education has a different term. Vocational education is also known as vocational and technical education and training, vocational education and training, career and technical education, and workforce education.

Thompson (1973:216) defines vocational education: Vocational education is any education that provides experiences, visual stimuli, affective awareness, cognitive information, or psychomotor skills; and vocational development that enhances the process of exploring, establishing, and maintaining oneself in the world of work [9].

Wenrich and Wenrich (1974:3) states: "Vocational and Technical education is for people interested in youth and adults preparing for and progressing in the career in some type of satisfying and productive work". And vocational education is part of the education system that prepares a person to be able to work and develop a career in the field of work as the provision of life [10].

The United Congress (2007:1286) mentions the following definition of vocational education: Vocational education as organized educational programs roomates are directly related to the preparation of individuals for paid or unpaid employment, or for additional preparation for a career require other than a baccalaureate of advanced degree [11]. This means that vocational education is organized educational programs and composed to prepare individuals to work as live stock or as preparation for a career above the needs of baccalaureate -level professional.

Clarke and Winch (2007: 9) explains that " In the Anglo - Saxon world, vocational education is confined to preparing young people and adults for working life, a process Often Regarded as of a rather technical and practical nature". It is said that vocational education is designed or intended to prepare youth and adults to be able to work, which are preferred in the process of technical and practical in the real world [12].

Furthermore, according to Finch & Crunkilton (1999:14), vocational education has characteristics such as: "(1) a greater emphasis on performance capabilities, (2) preparing to get a job, and (3) emphasis on skills development " [13]. Vocational education is a type of education that has properties for setting up labor. For those reasons, the orientation of education should be on the output or graduates to be absorbed in the world of work.

2.3 Elements of Curriculum Changes in 2013

In 2013 there were some elements of the curriculum changes are quite essential that the elements of competency standards, process standards, content standards, and assessment standards. Here is a description of the element changes to the curriculum in 2013 for vocational schools as shown in Table 3 [14].
Table 3. Curriculum Elements of Change 2013

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competence of graduates</td>
<td>An increase in the balance of soft skills and hard skills and competencies which include aspects of attitudes, skills, and knowledge.</td>
</tr>
</tbody>
</table>
| The material (contents)      | • There is a balance between the material's ability to support the attitudes, skills, and knowledge.  
                                   • All three competencies support content above is balanced.  
                                   • Competence which was originally derived from the lesson turned into a lesson developed from the competency. |
| Learning Approach            | Competence is developed through:  
                                   Competency skills in accordance with industry standards. |
| The learning process         | • Learning does not just happen in the classroom, but also in the school and community environments.  
                                   • Teachers are not the only source of learning.  
                                   • Attitude is not only taught verbally, but through example and role model. |
| Assessment of learning outcomes | • Competency based assessments.  
                                       • The shift from assessment through tests [measuring competence based on knowledge alone], toward authentic assessment [measure all competency attitudes, skills, and knowledge based process and outcome]. |

Some prositif impact of this change are: of graduates. The detailed description of the assessment can be seen in Table 4 below [14].

Table 4. Competency Standards Assessment (SKL)

<table>
<thead>
<tr>
<th>Domain</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude</td>
<td>Having [through receiving, running, appreciate, appreciate, practice] behavior that reflects the attitude of the faithful, noble [honest, polite, caring, disciplined, democratic, patriotic], confident, and responsible to interact effectively with the social environment and natural and established itself as a reflection of the nation in the association world.</td>
</tr>
<tr>
<td>Skills</td>
<td>Have [through observing, asking, trying, process, present, reasoning, creating] the ability of thought and follow an effective and creative in the realm of the abstract and concrete as the development of the school independently studied in [the field of specific work] according to their talents and interests.</td>
</tr>
<tr>
<td>Knowledge</td>
<td>Have [through knowing, understanding, applying, analyzing, evaluating] procedural and metacognitive knowledge in science, technology, arts, culture with human insight, national, state, and civilization-related causes of phenomena and events [in the specific field of work] in accordance talent and interest.</td>
</tr>
</tbody>
</table>

When viewed in the form of an image, then learning KSA (Koginitif-Skill-Affective) utilized in the form of ASK (Affective-Cognitive-Skill) [14].
2. Adjustment mindset of teachers (and students) 

Some of the changes that affect the mindset of teachers (and students), as shown in Table 5 below [14].

<table>
<thead>
<tr>
<th>No.</th>
<th>Formulation of Curriculum 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Lessons include a structured balanced attitude competencies, knowledge, and skills</td>
</tr>
<tr>
<td>2.</td>
<td>Skills emphasis on thinking skills to the creation of creativity. Psychomotor ability is supporting skills.</td>
</tr>
</tbody>
</table>
| 3.  | Learning through a scientific approach:  
  - Observing  
  - ask  
  - Tried  
  - reasoning  
  - Communicate  
  (applies to all subjects / themes) |
| 4.  | Learning Model:  
  Discovery learning, Project-based learning, Collaborative learning |


**Conclusion**

Based on the discussion above, the following conclusions can be obtained as follows: 

Curriculum development in 2013 based on the acceleration of the implementation of national development priorities is the improvement of curriculum and active learning methods based on the values of the national culture and to form the character of the nation's competitiveness.

The concept that the curriculum offered in 2013 is good to produce the Indonesian man: Productive, Creative, Innovative, through strengthening Affective Attitude, Skills, Knowledge and integrated.

Learning models offered in the curriculum in 2013 can be used to develop and improve students vocational competence especially in the domain of attitudes, so the ability employabilitas as demands of the workplace can be integrated with a more robust implementation of the curriculum in 2013.
In addition, one philosophy offered in 2013 were education curriculum development provides the basis for students to participate in building the present life and the educational potential of developing a variety of learners. Thus the implementation of the curriculum in 2013 to improve the ability employabilitas vocational students in accordance with the demands of the workplace.

Reference:
Abstract

The analysis of training needs is the basis for planning of the training activity. Therefore, the needs assessment must be made as the first priority activity in the planning process of the training. The training needs analysis is also a critical activity for the training and development function. Furthermore, the need assessment is an essential perquisite and play important role for any effective training program.

This paper deals with the function and role of the needs orientation in occupational training. The paper will begin with an overview of the core concept of needs orientation as an important element for the success of the training activities, followed by process in the identifying of the need assessment. Finally, an in-depth look at the steps and methods involved in conducting a training needs assessment will be highlighted.

Keywords: Needs assessment, Training needs, Needs analysis, Further training

Einleitung


Um die Mängel, Defizite oder Probleme (bez. Fähigkeiten, Kompetenzen oder Qualifikationen) zu erkennen aber auch Potenziale besser zu nutzen, muss eine Bedarfsermittlung durchgeführt werden.

Die Bedarfsermittlung dient als „tool for detection“, um vorhandene Fähigkeiten, Kompetenzen oder Qualifikationen der Mitarbeiter aufzudecken. Durch eine Bedarfsermittlung werden Informationen über Mängel, Defizite oder Probleme bei den Mitarbeitern erhoben. Die Bedarfsermittlung informiert nicht nur über vorhandene Fähigkeiten, Kompetenzen, Qualifikationen und Entwicklungspotentiale des Personals, sondern führt zudem den Blick hin zu den möglichen künftigen...
technologischen und organisatorischen Veränderungen (vgl. Gerst/Kranz/Möhwald 2004)


Die wichtigste Ausgangsfrage bei der Analyse des Weiterbildungsbedarfs ist: Wodurch entsteht beruflicher bzw. betrieblicher Weiterbildungsbedarf im Unternehmen?

Die Entstehung des Bedarfs an Weiterbildung kann durch eine Vielzahl verschiedener Faktoren ausgelöst werden. Die IG Metall (2007, S. 10ff.) fasst die Faktoren für die Entstehung des Bedarfs an Weiterbildung zusammen:

  - neue Werkstoffe werden in der Produktion eingesetzt,
  - neue Kunden werden gewonnen,
  - neue Aufgabenfelder kommen auf einen Beschäftigten zu, da eine Kollegin/ein Kollege vertreten werden muss, und deren/dessen Arbeitsplatz vielleicht andere Tätigkeitsfelder aufweist,
  - die Einführung eines Updates des Betriebssystems oder die Anwendung von Programmen, mit denen ein Beschäftigter sich bisher nicht auseinandersetzen musste.


Ausgangspunkte der Analyse des Weiterbildungsbedarfs
Maschinen und die Neuorganisation der Arbeitsprozesse.


Im Allgemeinen gibt es unterschiedliche Gründe bzw. Anlässe eine Erhebung des Bildungsbedarfs durchzuführen. Scheff (2008, S. 22) nennt z. B. folgende Anlässe:

- Der tatsächliche Bedarf kann genauer analysiert werden.
- Überflüssige Maßnahmen werden verhindert.
- Trainer können sich besser auf die jeweilige Zielgruppe einstellen.
- „Maßgeschneiderte“ Materialien und Lernkonzepte können erstellt werden.
- Maßnahmen können dem aktuellen Qualifizierungsstand der Mitarbeiter angepasst werden.
- Praxis- und Arbeitsplatzbezug wird verbessert und damit der Lerntransfer erhöht.
- Problemlagen im Unternehmen können mit Weiterbildungsmaßnahmen gelöst werden.


Anders als Kailer, der sich mit seiner Position sehr stark an einem „Effizienz-Prinzip“ für Anlässe zur Ermittlung des Weiterbildungsbedarfs orientiert, sieht Schiersmann (2007, S. 6) folgende Anlässe für die konkrete Durchführung der Bildungsbedarfsanalyse im Unternehmen:

- Fehler in bestimmten Bereichen, z. B. im Arbeitsprozess oder anderen Abläufen;
- Defizite im Hinblick auf die Effektivität und Effizienz der Aufgabenerfüllung oder unterschiedlicher Ansprüche;
- Anstehen technischer Veränderungen, z. B. Einführung neuer Hilfsmittel, Geräte oder neuer Software;
- Veränderung der Produktpalette oder der Vertriebsformen (z. B. Vertrieb über einen Onlineshop);
- personenbezogene Defizite von Mitarbeitern, z. B. im Rahmen von
Mitarbeitergesprächen oder im Kontext von Coachingprozessen;
- geplante oder bereits durchgeführte Veränderungen in der Organisation, z. B. die Zusammenstellung neuer Teams, die Einrichtung neuer Projektgruppen, die Veränderung der Organisationsstruktur oder die Optimierung der Sitzungs- und Kommunikationskultur;
- Konkretisierung eines neuen Leitbildes oder einer neuen Unternehmensstrategie;
- Organisationsumwelt: (negative) Veränderungen zu beobachten, z. B. abnehmende Kundenzufriedenheit, Markt Schwäche des Unternehmens.


Ein Überblick über diese Ausgangspunkte wird in Tabelle 1 dargestellt.

### 3. Ermittlung der Anforderungen


- auszuführende Soll-Tätigkeiten mit ihren regulierenden geistigen und körperlichen Teilverrichtungen;

Tabelle 1: Ausgangspunkte der Analyse des Weiterbildungsbedarfs

<table>
<thead>
<tr>
<th>Strategieebenen</th>
<th>Unternehmenstrategie</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expansion/ Schrumpfen, Fusion</td>
<td></td>
</tr>
<tr>
<td>Outsourcing/ Insourcing, Produktions-konzept, Wettbewerbsstrategie</td>
<td></td>
</tr>
<tr>
<td>Beschäftigungsstrategie</td>
<td>Beschäftigungsstrategie, Zusammensetzung der Belegschaft; Mix aus Kern- und Randbelegschaften „Horizont“: Langfristige Bindung vs. „Hire &amp; Fire“</td>
</tr>
<tr>
<td>Personalstrategie</td>
<td>Personalentwicklung vs. Personal-</td>
</tr>
</tbody>
</table>
beschaffung, (Modifikation vs. Selektion; „make or buy“)

<table>
<thead>
<tr>
<th>Externe Einflüsse</th>
</tr>
</thead>
<tbody>
<tr>
<td>konjunkturell &amp; saisonal</td>
</tr>
<tr>
<td>Veränderungen auf den Kapital- und Absatzmärkten, internationale Krisen und saisonale Schwankungen</td>
</tr>
<tr>
<td>technologisch/prozessbezogen</td>
</tr>
<tr>
<td>Innovationsrate und -geschwindigkeit</td>
</tr>
<tr>
<td>Kundenanforderungen (z.B. Zertifizierung, TQM)</td>
</tr>
<tr>
<td>strukturell</td>
</tr>
<tr>
<td>Gesetzgebung, politische Bedingungen (Deregulierung, Handelshemmnisse), Konkurrenzsituation (neue Anbieter, Kooperationen), organisatorische Innovationen (Arbeitszeitmodelle, Lean Konzepte, Outsourcing)</td>
</tr>
<tr>
<td>gesellschaftlich</td>
</tr>
<tr>
<td>Wertewandel, Umweltsensibilität, Diversity-Management, demografische Veränderungen</td>
</tr>
</tbody>
</table>

- geistige und körperliche Leistungsvoraussetzungen: geistige Operationen mit den zugehörigen Kenntnissen und Fähigkeiten und Fertigkeiten.


Zukünftige Anforderungen beschreiben die Aktivitäten für geplante und erwartete Veränderungen und Entwicklungsplanung in einem Unternehmen. Bei zukünftigen Anforderungen sollte nicht nur ein Defizitansatz genutzt werden, sondern auch ein Potentialentwicklungsansatz. Für die geplanten und erwarteten Veränderungen können folgende Fragen auftreten:

- Welche inner- und außerbetrieblichen Veränderungen sind bekannt?
- Wie verändern sich dadurch die Anforderungen an die Mitarbeiter?
- Was kann man im Vorfeld tun?
- Wohin will sich das Unternehmen entwickeln?
- Welche Potentialentwicklung der Mitarbeiter ist erforderlich und möglich?

Als Fazit lässt sich festzustellen, dass man sich bei der Ermittlung der Anforderungen an dem Soll-Zustand eines Mitarbeiters im Arbeitsfeld orientiert. Der Soll-Zustand bezieht sich auf die gegenwärtigen und künftigen Tätigkeiten von Mitarbeitern, die mit bestimmten...
Fähigkeiten bzw. Kenntnissen oder Kompetenzen ausgestattet werden müssen, damit sie mit ihren alltäglichen und künftigen Tätigkeiten besser den Anforderungen entsprechen können.

4. Ermittlung des betrieblichen Weiterbildungsbedarfs

Die Ermittlung des betrieblichen Weiterbildungsbedarfs bildet für die Unternehmen einen Ausgangspunkt, um Weiterbildungsprozesse zweckmäßig und zielgerichtet zu gestalten. Die Unternehmen können die spezifischen Ziele der entsprechenden Weiterbildungsmaßnahmen nur formulieren und festlegen, wenn sie den Bedarf kennen.


Die Ermittlung des gegenwärtigen und zukünftigen Weiterbildungsbedarfs ist daher die Grundlage für die Entwicklung eines effektiven und erfolgsorientierten Qualifizierungsprozesses für die Unternehmen. In der Praxis ist der Ausgangspunkt der Bedarfsermittlung die Feststellung der Qualifikationsforderungen für einen Arbeitsplatz, eine Stelle, eine Abteilung oder für das gesamte Unternehmen sowie der Qualifikationspotentiale einzelner oder mehrerer Mitarbeiter (Pawlowsky/Bäumer 1996, S. 97).

Nach Steimer können betriebliche Analysefelder vom Weiterbildungsbedarf in vier Kategorien unterschieden werden:

- Analyse des globalen Bildungsbedarfs im Rahmen der Unternehmensplanung für den Bereich der Personalplanung;
- Analyse des individuellen Bildungsbedarfs;
- Analyse des Bildungsbedarfs durch Problemanalyse;
- Analyse des Bildungsbedarfs, hervorgerufen durch Innovationen und veränderte Rahmenbedingungen (Steimer 2000, S. 1).


- Vorbereitung;
- Durchführung;
- Auswertung.


Weiter ist im Vorfeld der Bereich festzulegen, auf den sich die Bildungsbedarfsanalyse beziehen soll: Es kann darum gehen, den individuellen Bildungsbedarf eines Mitarbeiters zu eruieren, den Bildungsbedarf einer Gruppe
bzw. eines Teams oder einer Abteilung oder den Bildungsbedarf der gesamten Organisation zu erheben.

In der Durchführungsphase müssen die Mitarbeiter rechtzeitig und umfassend darüber informiert werden, dass eine Bildungsbedarfsanalyse durchgeführt werden soll. Weiterhin sind betriebliche Gegebenheiten zu berücksichtigen. So sollten Erhebungen nicht zu Zeiten eines besonders hohen Arbeitsanfalls im Jahresverlauf durchgeführt werden. Ebenso ist in Bezug auf die Uhrzeit die Arbeitssituation der zu Befragenden zu berücksichtigen. Die Qualität der Bildungsbedarfsanalyse hängt auch davon ab, ob die ausgewählten Verfahren kompetent durchgeführt werden können und ggf. zuvor eine Qualifizierung der entsprechenden Personen stattfinden muss.

In der Auswertungsphase ist es ratsam, bereits im Vorfeld der Bedarfserhebung abzuklären, an wen die Auswertung gehen soll und welche konkreten Konsequenzen daraus abgeleitet werden sollen. Diese sind dann zu gegebener Zeit wiederum den Mitarbeitern transparent zu machen, um die Motivation der Mitarbeiter für die Beteiligung an Bedarfserhebungen aufrecht zu erhalten bzw. zu steigern. Es muss deutlich werden, wie die Bedarfe an Weiterbildung in welcher Zeit realisiert werden können bzw. sollen.


- **Phase 1 – Zielbestimmung und Anlass für die Qualifizierung feststellen:** Die Anlässe für Qualifizierungsmaßnahmen können mit Hilfe verschiedener Bedarfsermittlungsinstrumente z. B. Fragebogen oder Interviewleitfäden ermittelt werden, um das Ziel der Qualifizierung zu entwerfen.
- **Phase 2 – Festlegung der Anforderungen bzw. des Qualifikationsbedarfs:** Ausgangspunkt für diese Phase sind die vorhandenen und künftigen Arbeitsplatzanforderungen. Die Anforderungsprofile können fachliche, physische und psychische, arbeitsorganisatorische Anforderungen und Entscheidungsspielräume betreffen.
- **Phase 3 – Ermittlung des Qualifikationsstandes:** Das wichtigste Ziel dieser Phase ist die Sammlung der Informationen zur Erfassung des Qualifikationsstandes. Diese Informationen sind z. B. Aufgaben/Arbeitsgebiete, Informationen zu formalen Bildungsabschlüssen, Verweildauer in der derzeitigen Funktion, Alter etc.
- **Phase 4 – Festlegung des Qualifizierungsbedarfs:** In dieser Phase kann anhand der Bestandsaufnahme und eines Ist-Soll-Vergleichs der Bedarf an Weiterbildung festgestellt werden (Steimer 2000, S. 1).


### 5. Methoden der Weiterbildungsbedarfsanalyse

Ein Überblick über verschiedene Methoden der betrieblichen Weiterbildungsbedarfs-erhebungen wird in der folgenden Tabelle gegeben.

Tabelle 2: Methoden der Bildungsbedarfsanalyse

<table>
<thead>
<tr>
<th>Methoden</th>
<th>Merkmale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Befragung</td>
<td>mündlich / schriftlich strukturiert / teilstrukturiert / unstrukturiert quantitative / qualitativ zielgerichtet / allgemein narratives Interview</td>
</tr>
<tr>
<td>Beobachtung</td>
<td>systematische / unsystematische Beobachtung teilnehmende / nicht-teilnehmende Beobachtung</td>
</tr>
<tr>
<td>Einstellungs- und Klimaanalyse</td>
<td>Interview Feldanalyse Schriftliche Befragung bzw. Fragebogen</td>
</tr>
<tr>
<td>Dokumentenanalyse</td>
<td>Organisationshandbuch (Organisationsmanual) Organisationsplan / Organigramm Stellenplan Stellenbeschreibung</td>
</tr>
<tr>
<td>Moderation</td>
<td>Problemanalyse und Lösungsvorschläge</td>
</tr>
<tr>
<td>Arbeitsproben</td>
<td>Demonstration der standardisierten Aufgabe</td>
</tr>
<tr>
<td>Experiment</td>
<td>Simulationen</td>
</tr>
<tr>
<td>Profilanalyse</td>
<td>Berufsbibliographie (Lebenslauf) Zeugnisse Bewertungen Stellenbesetzungspläne</td>
</tr>
<tr>
<td>Kennzifferanalysen</td>
<td>Leistungskennziffern Markoff-Modelle</td>
</tr>
<tr>
<td>Assessment-Center (AC)</td>
<td>Auswahl-, Förderprogramm</td>
</tr>
<tr>
<td>Führungsstilanalyse</td>
<td>Interview Schriftliche Befragung bzw. Fragebogen</td>
</tr>
</tbody>
</table>

Um eine geeignete Methode zur Ermittlung des Weiterbildungsbedarfs zu nutzen, sollten die Ebenen der Weiterbildungsbedarfsanalyse bekannt sein. Becker (2005) unterscheidet drei Ebenen der Weiterbildungsbedarfsanalyse:

- Strategische Bedarfsanalyse: Auf dieser Ebene werden zukünftige Entwicklungen und die damit verbundenen Änderungen der Anforderungen an die Mitarbeiter antizipiert.
- Operative Bedarfsanalyse: Hier wird der Bedarf auf der Basis der aktuellen Anforderungen ermittelt.


6. Fazit
Da die Bedarfsermittlung eine wichtige Rolle in der betrieblichen Weiterbildung spielt, sollen die Erkenntnisse darüber im Sinne als ein Bestandteil der Personalentwicklungsaktivitäten in einem breiten Spektrum betrachtet werden. Darüber hinaus soll in der Weiterbildungspraxis der Bedarf nicht nur als Mangel, Defizit oder Problem verstanden werden, sondern auch als „Entwicklungspotential“ für zukünftige und tendenzielle Veränderungen und individuelle oder gesellschaftliche Anforderungen an die Mitarbeiter.

Die Bedarfsermittlung auch gerichtet auf Entwicklungspotentiale unter Partizipation der Mitarbeiter unter Berücksichtigung individueller Bedürfnisse zwingend umschließt.

REFERENCES


Bundesverband Job Rotation e.V. Frankfurt/Main.


Abstract

The purpose of writing this paper is to examine the influence of the philosophy and theory of two key figures of vocational education in the world namely John Dewey and Charles Prosser to the praxis of vocational education in Indonesia. Praxis vocational education in Indonesia tend to use philosophical essentialism that drives social efficiency. The main feature is the separation between vocational education with academic education. Praxis of vocational education in Indonesia is more strongly influenced by the ideas and theories of Charles Prosser. Structuring the content of the program, school infrastructure standards, process standards, assessment standards, strengthening cooperation, industrial work practices programs, coaching educators, all of which lead to the fulfillment of labor standards in the industries, continue to equip schools with the tools and machines such as those used in industries.

Keywords: vocational education, esensialism, pragmatism, Dewey, Prosser

1. Introduction

Indonesian vocational education development has gone through a long history. Since the preindependence period, the time of independence, the old order, new order, order reform. Development of vocational education Indonesia continue to proceed to make improvements container and contents "cucupu lan manik". Indonesian vocational education requires harmony between container and contents. The concept of harmony between the container and the contents of "cucupu lan manik" make something dynamically evolving. In the process of finding and perfecting form and content, the development of vocational education requires a conceptual framework that is appropriate and in accordance with the identity and philosophy of life of the Indonesian nation. The emergence of myriad phenomena as a result of globalization make the nations of the world continue to make updates and adjustments to the direction and orientation of vocational education. Myriad phenomenon illustrates the phenomenon of insect movement that beautiful but unpredictable, dynamic, free, open, uncertain, always changing rapidly. Therefore it is necessary vocational education development platform that is not only responsive but should be progressive.

In order not to miss moreover lost its way, vocational education forum in Indonesia, many activities held discussions about the best form of vocational education and vocational us. The central roles of what is right is run by Indonesian vocational education through formal, non-formal, and informal? What are the goals, objectives, and benefits of future vocational and vocational education for Indonesia? What strategies are chosen and how to implement it as a surefire strategy to achieve the goal of which is a series of questions to be answered.

Indonesian vocational education must grow from the identity and culture of his own people. The application of science and technology in supporting the growth of vocational education in Indonesia must continue to pay attention to the philosophy of the nation, the moral aspects, national culture, environment, tradition-art, populist
economic vision, social relations. Education is a true vocational education has unique characteristics and specific to a nation. The successful development of vocational education framework in other countries is not necessarily suitable to be adopted and adapted in Indonesia. Because the fundamentals of life philosophy of the Indonesian nation, practical work and social life is not the same as other nations. Social order and culture of Indonesia has been there and grow with different identities of other nations. Indonesia has a rich social capital and unique. The cultural diversity of Indonesia is an enormous social capital value and meaning for the development of vocational education.

Objectives of vocational education is very diverse and broad [1,10]. Organization of vocational education is very attached to the child's developmental needs of the nation and the visionmission of building a nation. Billet (2011) identified at least four objectives of the vocational education:

(i) the preparation for working life including informing individuals about their selection of an occupation; (ii) the initial preparation of individuals for working life, including developing the capacities to practise their selected occupations; (iii) the ongoing development of individuals throughout their working life as the requirements for performance of work transform over time; and (iv) provisions of educational experiences supporting transitions from one occupation to another as individuals either elect or are forced to change occupations across their working lives (Billet, 2011: 5).

Vocational education was held in preparation for students entering working life [4]; choosing a job, develop capacity, high skill jobs that have been [10, 8, 9] ; continuously develop problem-solving skills through working life [6], supplies educational experience to support a variety of possible transitions from one job to another; creating their own jobs as new entrepreneurs [6]. Vocational education concerned with the education and training efforts to assist learners in identifying suitable job for his career, fun, productive, and contribute positively both to the employer and to himself as a worker.

Vocational education in Indonesia is expected to meet the objectives: (1) preparation of competent manpower in certain occupations as supporting industrial development and production services; (2) reduction of unemployment and poverty; (3) an increase in local revenues; (4) equitable development; (5) the withdrawal of foreign investment; (6) improvement of social status. Besides vocational education is also directed to increase the capacity of the nation so that the child has the skill careers in various fields of work as part of a skill or skill through life (life skills).

Vocational education can also provide social security and poverty reduction if accompanied by job creation widest in many areas. As a supporter of economic development, the development of vocational education is very relevant and need to look at the Master Plan for the Acceleration and Expansion of Indonesian Economic Development (MP3EI) as the master plan the transformation of economic development activities in Indonesia. MP3EI designing high economic development, balanced, equitable, sustainable, and highly competitive. In later discovered MP3EI economic corridor development concept aims to attract investment and boost economic activity through the growth of leading sectors in certain regions known as economic corridors. Economic corridor development approach is also expected to make an impact spill over to encourage more rapid growth in the surrounding areas and ensure the realization of sustainable development.

Confirmation of the role of Technology and Vocational Education in guarding the vocational education in Indonesia to Indonesian gold requires a comprehensive
conceptual framework, good, true, and relevant to the development of the vision and mission of the Indonesian nation. How to build the scientific Technology and Vocational Education of Indonesia as part of the development of vocational education and the development of the nation is interesting to study. Philosophical views, two of the leading philosophers of vocational education in the world is John Dewey and Charles Prosser need to be studied. Because the thought of John Dewey and Charles Prosser colored the basics of thought and praxis reform of vocational education. Vocational schools should be educating and increasing relevance to the reality of the economic and social needs, even the needs of culture, environment, health, science, politics, and ideology of the nation. Although the two figures both agreed to increase the relevance of vocational education to the economic and social needs, but both have a different view of it [10, 2].

Prosser widely known as the father of vocational education world with sixteen theorem. Prosser looked vocational education in vocational schools should be organized as an industrial society and must always learn from the industries. According Rojewski (2009:20) Prosser view more towards social efficiency, rather than to meet the individual needs of the community, but to meet the needs of a country's workforce. Bastion of vocational education for social efficiency is the preparation of well-educated trained workforce that is always subject to the works developed by the employer. Thus developing the concept of competence-based education, competence-based training, competence-based curriculum, competence-based learning, the link-and-match, demand-driven, competency certification, licensing work and so on. In the view of Prosser, vocational schools said to be effective only if the vocational school can show the same school climate by working climate in the industry, and alumni of the user satisfied with the results and achievements of education, ready to print a skilled workforce to meet the needs of work in the industry.

In contrast to the views of Prosser, Dewey believed that the basic purpose of vocational education is to meet the needs of individuals and preparation through life. How do students learn to solve problems of life with different ways according to each condition. Dewey offers a democratic model of vocational education where students have the freedom to develop intellectual abilities and the opportunity to develop competence in working in the industries. Dewey rejected the impression that learners are individuals who passively controlled by the pressure of the market economy and the capacity in which the existence of intellectual forbidden [10]. In countries that have experienced advances in science and technology tend to develop vocational education toward Dewey thought. Vocational education in the developed countries does not stop at the demand-driven but it is up to the market driven. Vocational education aims to build on the market or the labor market with a high ability to innovate in the development of new technologies. The concept of vocational education development towards a knowledge-based industry.

Both mazab can be used as a basis for the development and enhancement of the role of vocational education to meet the Indonesian gold. What are the effects of both these mazab in the formulation of the definition and purpose of vocational education in Indonesia, particularly in the content standards, competency standards, standards of facilities and infrastructure, standards educators, vocational education management standards. Similarly, the effects on the structuring and development of curriculum and learning in vocational education in Indonesia. This paper discusses vocational and vocational education praxis Indonesia from a philosophical aspect, juridical, theoretical, and practical.
2. Philosophical Aspects of Vocational Education

The early development of vocational education throughout the world is based on the philosophy of essentialism in which the vocational education aims to meet the needs of the labor market. Essentialism philosophy which emphasizes that vocational education should function and relevant to the diverse needs of both learners, family needs, and the needs of the various sectors and subsectors of national development. Alignment relations (link & match) between vocational education in Vocational High School (VHS) and Academies, Polytechnic, Colleges, Institutes, and Universities should closely with development needs [11].

The philosophy of existentialism believes that education should nurture and develop the existing learners optimally implemented through the provision of facilities and dignity through education, pro-change (creative, innovative and experimental), grow and develop their talents, interests, and abilities of learners [11]. Organization of vocational education in VHS, Academy, Polytechnic, Colleges, Institutes, and Universities should pay attention to differences in intelligence, skill, talents and interests of learners. Learners should be treated maximally to actualize the potential for intellectual, emotional, spiritual, estetikal, and kinestetikal. The students are a valuable asset of the nation and is one of the world competitiveness factors are strong, which is potentially capable of responding to the challenges of globalization [11].

The main feature of this philosophy is the separation between vocational education with academic education. Vocational education curriculum are organized in a sequential, instructors require extensive experience in the working world and closely related to the industry [10]. Basic essence of vocational education in the perspective of the philosophy of essentialism and existentialism is to educate human worth, meaning for life, competent, emphasizing the role and function of the educator or trainer in the learning process, educators are the experts who mastered the subject matter and skills, learners are able to develop skills through training, repetition until obtaining a high skill, conditioning work in conditions resembling the workplace, and the development of learners’ work behavior habits, discipline, target-based work, time, quality work. Learning performed progressively from less complex skills to more complex skills [12].

Later vocational education increasingly influenced by the philosophy of pragmatism. Key feature of the philosophy of pragmatism is the emphasis on problem solving and higher order thinking, learning is constructed from previous knowledge. Require higher order thinking skills of critical thinking, creativity, communication skills, and collaboration capabilities. The purpose of education is to meet the needs of individuals and himself skilled through life (life skills) and carrier skill. Wagner (2008:14) states to enter the “new world of work” in the 21st century required seven survival skills are: (1) critical thinking and problem solving; (2) collaboration across networks and leading by influence; (3) agility and adaptability; (4) initiative and entrepreneurialism; (5) effective oral and written communication; (6) Accessing and analyzing information; and (7) curiosity and imagination.

Pragmatism is a philosophy of action, questioned how practical consequences of vocational education for human life. Relation to vocational education, pragmatism requires the division of theoretical and practical issues. Development theory gives stock of knowledge, ethics, and normative, while preparing for professional practice in accordance with the needs of the community. The proportion theoretical and practical
vocational training is important in order not to give birth to materialism disguised as too poor emphasis on theory and practical philosophy. Also can not ignore the practical needs of the community, because if that were the case means that education can be said dysfunction [12].

Thought Prosser tends to flow into the philosophy of essentialism, while Dewey thought, tend to get in the flow of the philosophy of pragmatism. Pragmatism in recent years been identified as the most vocational education philosophy major [7]. Vocational education to prepare participants pragmatically solve real problems in a logical and rational, open seek and find alternative solutions and ready to experiment. The expected outcome of a pragmatic education is vocational knowledge society that is able to adapt, self-sufficient, participate in a democratic society, and believes that learning and action is a long process [10].

According Sudira (2012) pragmatism searching for appropriate action to be executed in the right situation anyway. Miller stated vocational educators will be successful if it is able to practice and maintain the principles of pragmatism as a basic reference and educational practices in the workplace (workplace education). Pragmatism states that among educators and learners together to do the learning process [5, 2], emphasizes the reality or real-world situations, contexts and experiences become a very important part. Educators have a progressive attitude and rich in new ideas.

Pragmatists are humans capable of acting empirical, not mired in ideological quarrels barren without content, but obviously trying to solve the problems faced by concrete action. According Tilaar (2002:184) pragmatism see the value of knowledge is determined by its usefulness in practice. Therefore, for the pragmatic theory is only a means to act, not to make a man shackled and stagnates in the theory itself. Exact theory is a theory useful, ready-made, and in fact valid and allows humans to act practically. Truth of a theory, idea or belief is not based on abstract proof, but based on experience, the practical consequences, and the usefulness and the satisfaction it brings. In short, he was able to direct people to fact or reality that is expressed in the theory [12].

3. Vocational Education Mazab Charles Prosser

Basic principles of the organization of vocational education laid by Charles Prosser in 1925 as a vocational education theory most widely used. Prosser theory known as "PROSSER'S SIXTEEN theorems". It holds 16 major issues in the implementation of vocational education as the education workforce. Prosser is the figure most influential vocational education in the United States. The 16 theories is as follows:

1) Vocational education will be efficient in proportion as the environment in which the learner is trained is a replica of the environment in which he must subsequently work (work environment).

2) Effective vocational training can only be given where the training jobs are carried on in the same way, with the same operations, the same tools, and the same machines as in the occupation itself.

3) Vocational education will be effective in proportion as it trains the individual directly and specifically in the thinking habits and the manipulative habits required in the occupation itself (work habits).

4) Vocational education will be effective in proportion as it enables each individual to capitalize on his interests, aptitudes, and intrinsic intelligence to the highest degree (individual need).

5) Effective vocational education for any profession, trade, occupation, or job can
only be given to the selected group of individuals who need it, want it, and are able to profit by it (elective).

6) Vocational training will be effective in proportion as the specific training experiences for forming right habits of doing and thinking are repeated to the point that these habits become fixed to the degree necessary for gainful employment (gainful employment).

7) Vocational education will be effective in proportion as the instructor has had successful experiences in the application of skills and knowledge to the operations and processes he undertakes to teach (crafts person teacher).

8) For every occupation there is a minimum of productive ability which an individual must possess in order to secure or retain employment in that occupation (performance standards).

9) Vocational education must recognize conditions as they are and must train individuals to meet the demands of the "market" even though it may be true that more efficient ways for conducting the occupation may be known and better working conditions are highly desirable (industry needs).

10) The effective establishment of process habits in any learner will be secured in proportion as the training is given on actual jobs and not on exercises or pseudo jobs (actual jobs).

11) The only reliable source of content for specific training in an occupation is in the experiences of masters of that occupation (content from occupation).

12) For every occupation there is a body of content which is peculiar to that occupation and which practically has no functioning value in any other occupation (specific job training).

13) Vocational education will render efficient social services in proportion as it meets the specific training needs of any group at the time that they need it and in such a way that they can most effectively profit by the instruction (group needs).

14) Vocational education will be socially efficient in proportion as in its methods of instruction and its personal relations with learners it takes into consideration the particular characteristics of any particular group which it serves.

15) The administration of vocational education will be efficient in proportion as it is elastic and fluid rather than rigid and standardized.

16) While every reasonable effort should be made to reduce per capita cost, there is a minimum level below which effective vocational education cannot be given, and if the course does not permit this minimum of per capita cost, vocational education should not be attempted.

Prosser theory very powerful influence on vocational education and training in the various countries. Taiwan uses simulation system, which was built in the workshop working practices such as vocational schools or equal to pasilitas industry. The second with on-the-job training where work well for teaching. Likewise, the German dual system that uses, TAFE in Australia apply the work-place-learning for vocational education closer to the world of work.

4. Vocational Education Mazab John Dewey

Vocational education in mazab John Dewey, putting vocational education to prepare students as capable of solving the problems due to changes in ways of logic and reason with an open mind in finding various alternative solutions, ready to perform a variety of experiments. The impact of education in Dewey mazab is knowledgeable citizens who are able to adapt and meet the vocational himself in the midst berpartisipasi democratic society, have the insight to learn
and act to change as a process of lifelong learning [10]. Dewey also offers the view that vocational education should provide the solutions the problem of discrimination in hiring labor, the rigidity of women, minorities, the backward and the poor.

Dewey advocated modernization of vocational education curriculum to include the study "scientific-technical”. Dewey argued that traditional schooling has become dull and mechanistic. As a progressive educator must make changes to the curriculum and learning that reflects real changes in technology in the new century. In a democratic education, learners explore her capacity to participate fully in community life. Dewey saw schools that are isolated from community life full of waste. Dewey’s view that schools should be able to perform the transmission and transformation of culture with increasing loss of position differences of race, ethnicity, and socio-economic position. Each individual learners are expected to have a positive outlook to help each other.

Vocational education is not exclusively focus only on how to enter the workforce but rather the provision of career development opportunities, adaptive to any changes in the workplace, based on knowledge. Vocational education curriculum in Dewey’s view must contain a broad academic ability or general competence, technical skills, interpersonal skills, and character. The issue of vocational education curriculum there are three, namely: (1) integration of academic education, career, and technical; (2) absence of articulation between primary, secondary, and higher; (3) the close relationship between the school/college to the world of work [10].

The best school is the school that is able to create a social community that invites all citizens develop a culture of community members. According to Dewey only true and authentic experiences that enable learners to develop theories through a process of linking a wide range of event or occurrence. Learners together educators should undertake joint research efforts and make the process of reflective thinking. According to Dow (2002), Dewey proposed semi-vocational approach, the confidence of all learners need to develop industrial intelligence in order to participate fully and freely in the midst of the flow of industrial democracy.

5. Juridical Formal Indonesia Vocational Education

Legally the definition of basic vocational education can be found in Indonesian Law System of National Education (Education) number 20 of 2003. Article 15 states secondary vocational education is an education that prepares students primarily for work in a particular field. Vocational education is higher education that prepares learners to have a job with a particular expertise applied the maximum equivalent degree program. Vocational education held at the Vocational School. Vocational education was held in the Academy, High School, Polytechnic, Institute, and the University. This article confirms that vocational education is the primary education to prepare students for work.

Later on Government Regulation No. 19 of 2005, article 19 of the National Education Standards (NES), stated that the Competency Standards (SKL) vocational education unit is to increase the intelligence, knowledge, personality, ahklak noble, as well as the skills to live independently and participate in education further according to the vocational field. SKL contains four main aspects, namely: (1) increasing intelligence and knowledge as part of the educational aspect of the brain; (2) its personality and noble character as a personification of educational conscience; (3) possesses the skills to be able to feed herself independently; (4) can be studied further appropriate vocational fields that have been taken.

Re-affirmed the definition of vocational education in government regulation (PP) 17
of 2010 on the Management and Operation of Education stating that the Vocational School, hereinafter abbreviated as SMK, is a form of formal education unit which organizes vocational education in secondary education as a continuation of the SMP, MTS, or equivalent or other form of advanced learning outcomes are the same or equivalent recognized junior or junior. District/city governments to ensure the implementation of special education and general education units vocational education units in accordance with the needs of learners. Article 157, paragraph 2 states the basic and secondary education units are developed based on local comparative advantages should be enriched with the charge of vocational education related to the potential economic, social, and local culture is a competitive advantage and comparative area.

The definition and purpose of vocational education in the Law no. 20 of 2003 is more impressive effect mazab Prosser with its philosophy of essentialism. While in Law 19 of 2005 description of competence standars SMK stronger shows the influence of the philosophy of pragmatism mazab Dewey. Observing the laws existing formal vocational education, yet actually confirms the direction and identity of Indonesian vocational education in the development of Indonesian human resources in the future.

Legally formal vocational education in Indonesia was held at SMK and MAK. In line with the implementation of regional autonomy development of vocational education in SMK and MAK organized by district/city governments to pay attention to the local potential advantages both in economic, social, and cultural areas. Terms of educational autonomy law turned out had repercussions that uneven regional capacity and capability in developing vocational education. Likewise equalization vocational education programs with economic development corridors not well ordered. Each of these districts and cities in Indonesia does not have the same capacity to undertake the development of vocational education. As a result, the growth of vocational education in Indonesia will be uneven, a gap between the quality of vocational schools across the country. Local governments have not been able to understand the position and function of vocational education well. Objectives of vocational education is to alleviate poverty, increase in local revenues, peningkatn quality workforce, increased prosperity, strengthening and conservation of culture and values.

6. Praxis Vocational Education Indonesia

Praxis vocational education in Indonesia is likely to be influenced by mazab Prosser. Indonesian education system divide in kejuruan education and vocational education separately with academic education. Middle-level vocational education held at SMK/MAK and vocational education was held in the Academy, High School, Polytechnic, Institute, University. While mid-level academic education held in SMA/MA and a high level of academic education was held at the University / Institute / College / Academy. Separation of vocational education and vocational with academic education is a key feature of essentialism philosophy of education with the flow.

Prosser theory is still very powerful influence on vocational education practices in Indonesia. Vocational schools and vocational campus developed curriculum based on competencies extracted from work competencies in the industries. Learning and training used the tools likely industry equipment. Skill development training activities require a high cost for energy, lab materials, and lab equipment.

Fostering the development of vocational education in SMK by the Directorate of Vocational (DIT PSMK) also shows the strong influence of mazab Prosser. Structuring the program content standards, school infrastructure standards, process standards, assessment standards, strengthening
cooperation, industrial work practices program, coaching educators all leads to the fulfillment of labor standards in the industry, leading the industry to continue to equip replica tools and machines such as those used in the industry. Implementation of learning theory and practice also leads to specific knowledge, functional, reproductive skill development, skilled physically as work preparation.

The structure of vocational education curriculum before the year 2013, a familiar grouping normative programs, adaptive, and productive. Indeed this implies a pragmatic grouping where vocational education should always be adaptive to changes. Normatively, all graduates have the competence, morality, and a good attitude. Unfortunately, this grouping is defined as a group of teachers in acquiring plots teaching hours after enactment load a certified teacher.

Vocational education as an education for the world of work is very important function and position in meeting the objectives of employment policies. Employment policies of a country are expected to cover four main topics: (1) provide employment opportunities for all labor force need; (2) provided a balanced and equitable work in every area and region; (3) provide adequate income in accordance with the feasibility of living in society; (4) education and training is able to fully develop all the potential and future of each individual; (5) matching men and jobs with minimum losses, high income and productive. Employment policy should not favor only on a group or a part of the community. The number and types of jobs available, spread evenly, balanced, and well worth for the entire life of the community. Vocational education and vocational become inefficient if no jobs available for graduates and balanced evenly.

To realize a good vocational education needed vocationalization process. Vocationalization main purpose is to improve the relevance of education and vocational guidance with the development needs of the world of work in creating a competitive and prosperous society oriented to sustainable development. Vocationalization should not be stuck only on the orientation of a narrow market. Vocationalization must build a prosperous society today and the future indefinitely. Vocationalization also carries the vision and mission of establishing and maintaining of the universe and all its contents be "hamemayu ayuning bhawana". World is already "pretty" either repaired or re-added continuously so good. Vocationalization should not be stuck in a narrow instantaneous needs let alone threaten survival. It is the moral message to society through vocational education.

Vocational education is not merely to obtain pleasure, ease, comfort, safety while, but for a more distant goal is a happy and peaceful living together on this planet. Besides seeking preparation to become increasingly literate society, becoming productive workforce, vocationalization be very potent in developing learning communities and continue to be committed to develop efficiency in various forms of thought.

The availability of employment opportunities equally important part of the development of vocational education. Vocational education as an education for the world of work in filling the job opportunities that exist need to carry out the basic functions of vocational education, namely: (1) to transmit culture; (2) the transmission of skills/abilities; (3) the transmission of values and beliefs; (4) preparation for a productive life; (5) fertilization group interaction; (6) the development of local wisdom and excellence.

Vocational education as education for developing job competence of human resources would work well if it is able to develop and the essence of human existence that is popular in the community through vocational education, cultural competence dimension in the order of life locally, nationally, regionally, and globally. As a
product of society, vocational education cannot be separated from the society in which vocational education is developed. Vocational education grows out of society, culture and traditions evolved with the local community, pay attention to local knowledge, local advantages, the potential of the area, community support, participation and cooperation of the community, there is a strong consensus among people with vocational education institutions. Vision of vocational education should be congruent with the vision of a society where vocational education is developed [14, 15].

7. Conclusion

Vocational education is a unique and universal education. As a unique educational vocational education should be developed based on the needs, problems, expectations, and challenges society needs social efficiency exceeding expectations as John Dewey. Structuring and development of vocational education is still heavily influenced by mazab Prosser express their views so that the ability of solving problem using higher order thinking skills is not well developed in vocational schools. Furthermore, educational programs should be developed towards improving vocational skills and career skills life skills, strengthening education and training with a focus on learning the skills and intelligence to use creativity, critical thinking skills, communicate, and collaborate using media and information technology.

ACKNOWLEDGMENT

Dear friends and colleagues, I would like to thank you for participating in ICVET. This conference is very important for our community. Aknowledgment should be submittede to the Faculty of Engineering and Graduate School Yogyakarta State University over the initiative in organizing this conference.

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INDUSTRY INTERNSHIP IN LOCAL INDUSTRIES TO IMPROVE ENGINEERING DESIGN COMPETENCE OF UNDERGRADUATE ENGINEERING STUDENTS

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Abstract

The aim of this study is to design a model of industry internship program in local industries for undergraduate engineering students to improve their engineering design competence. The students take this industry internship model in two months. During this program, the students, working in groups, design a machine or device that is needed by the local industries at that time. Methods used to analyse the effectiveness of the internship program in improving student's engineering design competence were observation during the program and product performance test. There were three groups of students taking the internship program in two different local industries. The student's engineering design competence were assessed in four different attributes: knowledge of procedures, operational skills, social skills and cognitive skills. Then, the results of these assessment were compared with those of students taking conventional industry internship. The product performance test was done to assess the quality of the machine. Results of the test showed that in all attributes of the competence (knowledge of procedures, operational skills, social skills and cognitive skills of the students) were better than those of students taking conventional industry internship. Results from the product performance test showed that the machines produced by the students taking the program had worked well.

Key words: industry internship, engineering design, competence, undergraduate student

Introduction

Indonesia is a developing country with more than 250 millions people. Most of them live in rural areas and have low economic and academic background. To provide better labour forces and to decrease the number of unemployment, the Government increases the number of vocational schools. In addition, local industries with low technology are developed to employ low educated workforces.

One program called industry internship in vocational schools is held to give an opportunity for students having a real experience in industry. Nancy O'Neill [1] stated that for those students who are clearer about their career interests and academic pursuits, an internship can help them apply what they are learning in "real world" settings, gain more substantial professional experience, and begin to develop a network of people in fields that interest them. From this statement, it is clear that internship program is a "bridge" connecting between academic world (classroom) and real world. For engineering students, mostly their real world is industries.

There are many models of internship. One of them is developed by Kiser (2000) [2]. Her model consists of four-stage: (a) pre-placement, (b) initiation, (c) working, and (d) termination. The pre-placement stage occurs before actually conducting the internship. It encompasses the process of identifying, investigating, interviewing and determining an internship placement site with input from the potential internship supervisor and academic instructor. After a mutual decision is agreed upon, pre-placement activities include setting a work schedule, continuing contact with the future internship supervisor, rearranging personal schedules and activities to include the demanding responsibilities inherent with an internship placement.
The initiation stage occurs when the internship experience actually begins. Orientation, becoming familiar with co-workers and clients, and becoming acquainted with agency policies and procedures are routinely associated with this second stage. Students observe their new surroundings while supervisors assess students’ strengths and weaknesses.

The working stage is the time for students to accomplish tasks and to reach internship goals. During this stage, students and supervisors become more comfortable communicating and identifying personal strengths and admitting limitations. Students work as regular workers, get an increasing self-confidence and work more autonomously.

Termination, the last of the four stages, begins when plans for ending the internship are considered. At this stage, it is important for students to complete tasks or give incomplete tasks to others. The internship supervisor accomplish assessment and feedback. It is also a time for the student to reflect on his/her performance, as well as professional and personal lessons learned.

To further improve the effectiveness of the industry internship, this paper will present a model of industry internship program in local industries for undergraduate engineering students to improve their engineering design competence.

**Engineering Design Competencies**

Engineering design is iterative, creative, at times both analytic and synthetic, incorporates elements of problem-solving, and incorporates intuitive as well as heuristic methodologies. Therefore, many engineering educators should teach and train students to understand how to generate design specifications and how to proceed from design specifications to a final product based on the specified objectives and criteria. The Canadian Engineering Board has proposed the definition of engineering design (CEAB 2002), engineering design integrates mathematics, basic sciences, engineering sciences and complementary studies in developing elements, systems and process to meet specific needs.

The perspective on design competency relates to the broad context of the practice of engineering. According to [3] the NSERC Design Chair Group, there are seven types of knowledge and skill competencies needed by engineers working on engineering design (Table 1). First, general knowledge, that is a knowledge needed to understand a phenomenon, a situation, a problem, a process, etc. Second, specific knowledge in a professional environment, that is knowledge of the technologies, the rules, the standards, the culture, etc. needed in working on design process. Third, knowledge of procedures, methods and processes, such as product development process, engineering design process, engineering design tools (market research, functional analysis, QFD, design for cost and cost estimation, etc).

Fourth, operational skills, such as how to use the procedures, the methods, the technologies, etc. Fifth, experiential skills, that is to know how to use tacit knowledge, such as doing design by similarity, design by experience, etc. Sixth, social/personal skills, these are to know how to listen, to cooperate, to work in team, to manage life (personal and professional), to feel (intuition, perception, etc.). Seventh, cognitive skills, these are skills needed to solve problem, to design, to manage a project, to take decisions, etc.

Based on “Reference 3”, this study designed an assessment to measure internship student competency in engineering design in four categories to encompass the skills and knowledge essential for mechanical engineering design. Those were knowledge of procedures, operational skills, social skills and cognitive skills.
<table>
<thead>
<tr>
<th>No.</th>
<th>Type</th>
<th>Description</th>
<th>Engineering – All disciplines</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>General knowledge</td>
<td>To understand a phenomenon, a situation, a problem, a process, etc.</td>
<td>Mathematics: Linear algebra, calculus, differential equation, probabilities, statistics, etc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Basic sciences: Chemistry, Physics, Biology, earth Science, etc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Engineering sciences: Mechanics, Materials, Thermodynamics, Heat Transfer, Mass Transfer, etc.</td>
</tr>
<tr>
<td>2</td>
<td>Specific knowledge in a professional environment</td>
<td>To know the technologies, the rules, the standards, the culture, etc.</td>
<td>Technologies, standards, regulations, safety, liability, intellectual property, ethic, role in the society</td>
</tr>
<tr>
<td>3</td>
<td>Knowledge of procedures</td>
<td>To know the procedures, the methods, the processes, etc.</td>
<td>Product development process, engineering design process, engineering design tools (market research, functional analysis, QFD, design for cost and cost estimation, etc)</td>
</tr>
<tr>
<td>4</td>
<td>Operational skills</td>
<td>To know how to use the procedures, the methods, the technologies, etc.</td>
<td>To have executed and practiced the design process</td>
</tr>
<tr>
<td>5</td>
<td>Experiential skills</td>
<td>To know how to use tacit knowledge</td>
<td>Design by similarity, design by experience, etc.</td>
</tr>
<tr>
<td>6</td>
<td>Social/Personal skills</td>
<td>To know how to listen, to cooperate, to work in team, etc.</td>
<td>Teamwork, communications, leadership, negotiation, professionalism</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Initiative, thorough, curious, practical, humble, responsible, adaptable, confident, awareness, respectable, entrepreneurialism</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>To manage life (personal and professional), to feel (intuition, perception, etc.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Self-awareness, managing emotions, motivating oneself, empathy and handling relationships</td>
</tr>
<tr>
<td>7</td>
<td>Cognitive skills</td>
<td>To solve problem, to design, to manage a project, to take decisions, etc.</td>
<td>To know your limitations, to create, to look at the big picture, to manage project (including the system engineering perspective), to decide (decision-making), to learn how to learn, to manage information and knowledge, to define a problem, to define potential solutions, to learn from past experiences, to manage resources, to take and manage risk</td>
</tr>
</tbody>
</table>
3. Model and Results of Internship in Local Industry

Model of industry internship in local industries was developed in two industries: UPT Logam in Yogyakarta and UD RekayasaWangdi in Sleman. Three groups of student internship took part in this model. They did this internship model for two months in these industries. Then in the nest semester they took Final Project Course for one semester to continue working in the groups to manufacture what they had designed during the internship. In other this internship model is call an integrated internship model, where Final Project Course is initiated during the implementation of industry internship program.

The students implemented four-stage: (a) pre-placement, (b) initiation, (c) working, and (d) termination. They did pre-placement stage by identifying, investigating, interviewing and determining a local industry as an internship placement site with input from the potential internship supervisor and academic instructor. After a mutual decision is agreed upon, pre-placement activities include setting a work schedule, continuing contact with the future internship supervisor, rearranging personal schedules.

In the initiation stage, the students did orientation program for two weeks. They observed process of production and tried to find out the real problems in the industries under supervision. Then, during the working stage, the students worked in groups as regular workers to design and manufacture a machine. The students spent this stage for six weeks. In the termination stage, the students completed the tasks and wrote a report of the internship.

Products of the integrated internships model were three machines designed by the internship students. These machine were cutter machine, slondokmolding machine and sifter machine.

3.1. Cutter Machine

The students who did the internship in UPT Logam Yogyakarta designed a cutter machine (Fig. 1). This machine is used in finishing process. Traditionally after the casting process, workers cut the pouring line of casting by using a handsaw. To cut one piece of part, it took for about 10 minutes and very exhausting. The machine is operated manually. In one minute, it can cut 12 pieces.

![Figure 1. Cutter Machine](image1)

3.2. SlondokMoulding Machine

The students who did the internship in UPT Logam Yogyakarta designed a slondokmolding machine (Fig. 2). Slondok is a traditional food which is made of cassava as main raw material. Traditionally slondok is produced manually, as a results, the shape and dimension of slondok are not uniform. This traditional process is slow in production. Its only can produce 3 kg for one day (8 hours) by one operator.

The molding machine is operated by using an electrical motor. The operator pours the raw material into the pouring hole. By using this machine, slondok can be produced in uniform shape and dimension. This machine can produce 40 kg for one day (8 hours) by one operator.
3.3. Sifter Machine

The second group of students who did the internship in UPT Logam Yogyakarta designed a sifter machine (Fig. 3). This machine is used to sort out aluminum waste. Traditionally after the casting process, workers sort out the aluminum waste manually. It takes time and is very boring. This manual process is also dangerous, because some chemical materials can harm the hands of workers.

The sifter machine is operated by using an electrical motor. The operator pours the waste material into the pouring case. Then a roller crushes the material into small pieces. Below the crusher, there is a sifter moving back and forth. By this way, sand can go through and be felt down, but the aluminum material remains. Because of the slope of the sifter, then the aluminum moves down and is collected in a bucket.

4. Measure of Design Competency

In this study the design competencies assessed were knowledge of procedures, operational skills, social skills and cognitive skills. Every internship student wrote a report about how he or she manufactured the parts of the machine. Therefore the reports were different between one student and others. To assess the knowledge of procedures, the examiner used the report.

To assess the operational and social skills, the examiner observed the students, when they were working in manufacturing the machines. This observation was intended to know how students chose and used the machines and tools, how they applied the procedures, the methods, and the technologies. This observation was also intended to assess every student’s skills: to listen and speak to others individually, how to cooperate and to work in team.

The cognitive skills were measured by using oral examination. This examination was done by presentation of every student based on which parts of the machine they were responsible to manufacture. The students were asked about how they solved problem, designed and managed a project, and how they took decisions.

The product performance test was done to assess the quality of the machine. Each group of the internship students presented their machine. Firstly, they explained how to operate the machine, how every part works and its utilities and specification. Then the machine was run to know how well the machine work.

5. Results

Students who take traditional internship program are assessed by industry supervisor and by faculty supervisor. The results are combined to give final results. The faculty supervisor examines the internship students orally by examining the report written by the internship student. Mostly there is no direct communication between industry supervisor and faculty supervisor.

Results of the test show students who took the integrated internship model showed that in all attributes of the competence
(knowledge of procedures, operational skills, social skills and cognitive skills of the students) were better than those of students taking conventional industry internship. Results from the product performance test showed that the machines produced by the students taking the program had worked well.

6. Conclusion

Based on the results of this study, it can be concluded that four attributes of the design competencies could be assessed by using the integrated internship program. The students who took internship program in local industries were capable in designing machines. And all machines worked well. It showed that by doing internship program in local industries the students could increase their design competencies.

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CURRICULUM INTEGRATION OF VOCATIONAL TRAINING AND APPRENTICESHIP BASED TRAINING TO FULFILL COMPETENT WORKFORCE MARKET

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Abstract

Vocational training curriculum must be adaptive to industry in order to make competent workforce. Competency based training with apprenticeship program was an approach to vocational training center to ensure workforce could did activity in the workplace as a result of completing a program of training and matched with industry competency standards. This integrated system provides many advantages for government, industry and workforce. Involvement of stakeholders and apprentice partnerships started with vocational curriculum to pursue workforce competency and clear career pathways. Vocational curriculum were co-developed by vocational training center and expert from various industry which has aim to provide appropriate knowledge from vocational training center to the workplace in form apprentices in the respective industries. In simple word, apprentice partnerships with industry has encouraged part-time working and promoted flexible pathways of workforce recruitment.

A case study approach has been adopted to examine curriculum impact in fulfilling competent workforce market. Primary data were derived from observations, and conduct focus group interviews with workforces. Secondary data were obtained from websites, policy documents, curriculum and syllabus documents and teaching materials. This study focused on understanding of vocational curriculum, level of skill and qualification and apprenticeship outcomes.

Our finding highlight the importance of curriculum integration between vocational training and industry play an important role in improving the competence of the workforce to meet the needs of the workforce market.

Keywords: vocational training, curriculum, apprentice, competent.

1. Introduction

Future employment challenges increase heavily and more complex. Availability of employment opportunities in accordance with the level of workforce education increased in line with the opening of the free market. So, it was be mandatory to improve quality in order to compete in the international market and domestic market [1]. Improving quality of labor is done by holding a job training that aims to improve and develop competence, productivity, discipline, attitude, and work ethic at a certain level of skill and expertise and qualifications in accordance with the level of office or employment. The Association of Southeast Asian Nations (ASEAN) concentrates its emphasis on regional cooperation on security, sociocultural and economic integration with ASEAN Economic Community (AEC) by 2015. Establishing the AEC creates additional values in regional scope such as a common market economically connected through the basis of consistent production, free trade investment, capital transfer, labor market based on common and same for all ASEAN member countries. By 2015, ASEAN will have become a community. In place of ten heterogeneous labor markets there will be a large labor market in which nations recognize one another’s qualifications [2].

Vocational training programs should be developed base on labor market demands and needs of the industry. Thereby industry will get advantages directly when hire competent worker from vocational training programs. If the graduates have a high quality, the industry will get benefits directly, because at initial time of recruitment, industry no need to spend more cost to provide industrial training,
Therefore it is proper if the industry has a responsibility to care, concern and take charge together with vocational training institutions.

Three countries have implemented training programs which integrated with industry. First, Australia has implemented major vocational education training reforms in the last decade, including [3]:
1. introduction of a competence-based approach to training
2. implementation of the Australian Qualification Framework
3. development of the training market with a view to the needs of students and industry
4. mechanisms to enhance learning pathways
5. reform of apprenticeship training (new apprenticeship scheme)
6. introduction of a national framework for quality assurance and nationwide recognition of training providers.

Second, another best practices could be found in dual vocational education training systems in Austria, which has many commendable features, with well-structured apprenticeship that integrate learning in schools and workplace training [4]. Third, the German dual system has made the country has a competitive advantage by reducing unemployment rate successfully. In Germany there were no resident over 25 years who do not work more than 3 months [5]. To support the dual system, government has set up a vocational education (collaborated with the industry in social responsibility industry program) for residents who do not have the ability to continue to higher education.

From the description above defined problem statements as follows.
1. Vocational training curriculums were needed to match with labor market demands.
2. Different level of skill and qualification base on curriculum among vocational training providers.
3. Unstandard apprenticeship model between training provider and industry to ensure graduates competency.

2. Methodology

A case study approach has been adopted to examine curriculum impact in fulfilling competent workforce market. Primary data were derived from observations, and conduct focus group interviews with workforces. Secondary data were obtained from websites, policy documents, curriculum and syllabus documents and teaching materials. This study focused on understanding of vocational curriculum, level of skill and qualification and apprenticeship outcomes.

3. Training Programs in Vocational Training Center

Public non-formal vocational training providers (known as Balai Latihan Kerja / BLK), that are under the responsibility of district governments or Ministry of Manpower and Transmigration, provide training programs for poor individuals who dropped out of primary or secondary school [6]. BLKs are also divided into 3 types:
1. Type A (largest training providers located in urban areas)
2. Type B (training providers located in smaller urban centers)
3. Type C (the smallest training providers located in rural areas)

Larger centers provide industrial and service skills training, while smaller ones offer training in different technologies and skills for self-employment. There are 4 types of training offer by BLK:
1. Institutional training (job training programs which aim to increase the skills of job seekers)
2. Non-institutional training (training programs for people in remote areas organized through Mobile Training Units)
3. Apprenticeship programs
4. Demand-based trainings (trainings based on the demand of industries)

The success of vocational training can be measured from the absorption rate of graduates in the work market. If graduates have the capabilities as required work market, it can be said vocational institution learning process have direct and prepared learners for entrance work market. To achieve this, vocational training provider,
i.e. BLK, always improved the quality of learning through the curriculum in accordance with the demand of job markets[7].

Four types of training that be held in BLKs will succeed attempts aiming at measuring training provided by the employers tend to focus on formal training only and to neglect therefore the informal learning processes we can approach informal training using information on whether young workers declared they learnt their job on their own, and not through the three other forms of training. The apprenticeship in a large firm is another form of formal training, with traditional apprenticeship[8]. The categorization of vocational education and training was described in Figure 1.

![Figure 1. Categorization of vocational education and training](image)

3.1 Vocational Training Curriculum

Vocational training curriculum must accommodate all of the needs of both the physical needs of learners, non-physical, and moral as well as their future to be able to live a safe, comfortable, good welfare, and harmony with nature and the surrounding communities. On the other hand based vocational training curriculum needs matching with job markets(demand-driven by job markets). The emphasis was on the mastery of the competencies required by industry job markets[9]. The world of work requires seven basic skills as follows[10]:

1. Critical thinking and problem solving.
2. Collaboration across networks and leading by influence.
3. Agility and adaptability;
4. Initiative and entrepreneurship.
5. Oral and written communication effectively.
6. Accessing and analyzing information.
7. Curiosity and imagination.

Competent graduates must have good fundamental skills and generic work skills. General skills consist of basic skills, thinking skills, and personal qualities[11]. Basic skills include listening skills, reading, writing, speaking, and math. Thinking skills include how to learn, how to create and solve problems, and make decision. Personal qualities affect in the form of responsibility, integrity, confidence, moral, character, and loyalty. Theoretically, the basic skills will support and become foundation of development individual career. Vocational training curriculum development, teaching and learning should provide a sufficient portion for the development of basic skills. Over fundamental skills were built generic work skills, industry-specific skills, and company/employer specific skills as shown in Figure 2.

![Figure 2. Structure development of vocational education and training skills](image)
above, to reduce weaknesses and improve the advantages of both methods.

President Decree No. 8, 2012 for Indonesian Qualification Framework has been a basic rule to develop competency based curriculum matching with job level in various industry. IQF consists of nine (9) qualification levels as shown in Table 1 below.

Table 1. IQF Level Description

<table>
<thead>
<tr>
<th>Level</th>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Job Skills</td>
<td>Able to carry out simple tasks, limited, routine, with using of tools, rules, and established processes under guidance from his supervisors.</td>
</tr>
<tr>
<td></td>
<td>Knowledge</td>
<td>Having factual knowledge.</td>
</tr>
<tr>
<td></td>
<td>Managerial</td>
<td>Responsible only for own work.</td>
</tr>
<tr>
<td>2</td>
<td>Job Skills</td>
<td>Able to carry out a specific task, using tools, information, and work procedures, and shows the performance with measurable quality, under direct supervision.</td>
</tr>
<tr>
<td></td>
<td>Knowledge</td>
<td>Having a basic operational knowledge and factual knowledge of specific areas of work.</td>
</tr>
<tr>
<td></td>
<td>Managerial</td>
<td>Responsible for own work and be responsible for guiding others.</td>
</tr>
<tr>
<td>3</td>
<td>Job Skills</td>
<td>Capable to carry out a series of specific tasks, by translating the information and use of tools, based on working procedures, and able to demonstrate the quality and performance with measurable quantity.</td>
</tr>
<tr>
<td></td>
<td>Knowledge</td>
<td>Having a complete knowledge of the operational, principles and general concepts related to the fact.</td>
</tr>
<tr>
<td></td>
<td>Managerial</td>
<td>Able to collaborate and communicate within working scope.</td>
</tr>
<tr>
<td>4</td>
<td>Job Skills</td>
<td>Able to complete the task with specific case information is limited to analyzed and select appropriate standardized method.</td>
</tr>
<tr>
<td></td>
<td>Knowledge</td>
<td>Master some basic principles of specific areas of expertise and are able to align with the factual issues in the field of work.</td>
</tr>
<tr>
<td></td>
<td>Managerial</td>
<td>able to work together and communicate, prepare a written report within a limited scope, and has initiative.</td>
</tr>
<tr>
<td>5</td>
<td>Job Skills</td>
<td>able to complete the work in extensive scope, select the appropriate method from various options.</td>
</tr>
<tr>
<td></td>
<td>Knowledge</td>
<td>Master in certain theoretical concepts in general, as well as to formulate procedural problem solving.</td>
</tr>
<tr>
<td></td>
<td>Managerial</td>
<td>Able to manage group work and prepare a comprehensive written report.</td>
</tr>
<tr>
<td>6</td>
<td>Job Skills</td>
<td>Able to apply their specific expertise and utilize science, technology, and / or the arts on the field in problem solving and able to adapt to the situation at hand.</td>
</tr>
<tr>
<td></td>
<td>Knowledge</td>
<td>Master in the art of certain theoretical concepts in general and theoretical concepts in a special section of knowledge and be able to formulate procedural problem solving.</td>
</tr>
<tr>
<td></td>
<td>Managerial</td>
<td>Responsible for own work and may be held for the achievement of the organization’s work.</td>
</tr>
<tr>
<td>7</td>
<td>Job Skills</td>
<td>Able to plan and manage resources under its responsibility, and evaluate works comprehensively using science, technology, and / or art to produce measures of strategic.</td>
</tr>
</tbody>
</table>
IQF provide qualification level framework of competency which can be equivalent and integrate among education, vocational training and work experience in order to give work competency recognition in various sector. Stage of levelling up of IQF can be shown in Figure 3.

Table 2. Curriculum composition in BLKs

<table>
<thead>
<tr>
<th>Position</th>
<th>Level Qty of Unit</th>
<th>Duration (Hours)</th>
<th>Trainee Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sewing Operator</td>
<td>1</td>
<td>4</td>
<td>SMP</td>
</tr>
<tr>
<td>Junior Mechanic</td>
<td>2</td>
<td>12</td>
<td>SMP</td>
</tr>
<tr>
<td>Junior Technician</td>
<td>4</td>
<td>4</td>
<td>D1 Otomotif</td>
</tr>
<tr>
<td>Senior Technician</td>
<td>6</td>
<td>150</td>
<td>D3 Teknik Mesin/Otomotif</td>
</tr>
<tr>
<td>Refrigeration Operator</td>
<td>1</td>
<td>6</td>
<td>SMP</td>
</tr>
<tr>
<td>Refrigeration Operator</td>
<td>2</td>
<td>9</td>
<td>SMP</td>
</tr>
<tr>
<td>Refrigeration Operator</td>
<td>3</td>
<td>7</td>
<td>SMP</td>
</tr>
<tr>
<td>Teknisi Akuntansi Ahli</td>
<td>6</td>
<td>8</td>
<td>S1 Akuntansi</td>
</tr>
<tr>
<td>Teknisi Akuntansi Madya</td>
<td>5</td>
<td>5</td>
<td>SMK Akuntansi/S1</td>
</tr>
<tr>
<td>Teknisi Akuntansi Pratama</td>
<td>3</td>
<td>3</td>
<td>D1 Akuntansi</td>
</tr>
<tr>
<td>Teknisi Akuntansi Junior</td>
<td>2</td>
<td>8</td>
<td>SMP</td>
</tr>
<tr>
<td>Teknisi Akuntansi Junior</td>
<td>3</td>
<td>33</td>
<td>SMU</td>
</tr>
<tr>
<td>Teknisi Akuntansi Junior</td>
<td>4</td>
<td>9</td>
<td>D1 Otomotif</td>
</tr>
<tr>
<td>Teknisi Akuntansi Ahli</td>
<td>6</td>
<td>8</td>
<td>S1 Akuntansi</td>
</tr>
<tr>
<td>Electrical Refrig. Operator</td>
<td>1</td>
<td>6</td>
<td>SMP</td>
</tr>
<tr>
<td>Electrical Refrig. Operator</td>
<td>2</td>
<td>9</td>
<td>SMP</td>
</tr>
<tr>
<td>Electrical Refrig. Operator</td>
<td>3</td>
<td>7</td>
<td>SMP</td>
</tr>
<tr>
<td>Automotive Operator</td>
<td>2</td>
<td>6</td>
<td>SMP</td>
</tr>
<tr>
<td>Automotive Operator</td>
<td>3</td>
<td>7</td>
<td>SMP</td>
</tr>
<tr>
<td>Automotive Operator</td>
<td>4</td>
<td>8</td>
<td>SMP</td>
</tr>
<tr>
<td>Automotive Operator</td>
<td>5</td>
<td>9</td>
<td>SMP</td>
</tr>
<tr>
<td>Automotive Operator</td>
<td>6</td>
<td>10</td>
<td>SMP</td>
</tr>
</tbody>
</table>

Each BLK has develop its own programs base on levelling of IQF appropriate with its district characteristics. Now, some of BLKs type A (large training provide) try to standardize training program which be held in BLKs. Curriculums were be derived from these programs. The structure of each core training programs consists of eight parts: (1) training program title, (2) training program code, (3) training program level, (4) goals, (5) list of unit competence, (6) duration of training, (7) trainee pre-requisite, (8) instructor requirement.

Over 80 training programs at BLK are now listed in the field of creative industry, business and management, automotive, electrical, construction, welding, information technology and manufacturing technology. Table 2 shows curriculum composition for some standardized training program in BLKs.
In general, vocational training programs in BLKs can provide competent workforce until level 5 which able to complete the work in extensive scope, select the appropriate method from various options. In managerial competency, able to manage group work and prepare a comprehensive written report. Training duration vary from 40 hours (equivalent with 1 weeks), 160 hours (equivalent with 1 month), until 640 hours (equivalent with 7 months). Trainee education requirement as a pre requisite vary from elementary school (SD), junior high school (SMP), senior high school (SMA/SMK), Diploma and Bachelor. It means, vocational training programs with Indonesian Quality Framework scheme were a flexible process in giving competency recognition.

### 3.2 Apprenticeship Based Training

Vocational training attempts to support both curriculum ideologies but through its alignment with industry is oriented more towards vocational educational outcomes than higher education[13]. Model of vocational training scheme needs to be reviewed and re-developed. At least there are four models of vocational training that can be applied in developing and developed countries[12].

1. Vocational training with school model was a model of vocational education in which education and training was fully implemented at the form of polytechnic. This model assumes everything that happens in the workplace can be educated at the polytechnic learning process. Thus, polytechnic must complete all types of equipment needed in large quantities. Polytechnic became very expensive because need to invest equipment in following state of the art, but actually changes in the world of business and industry more advanced and faster than what can polytechnic do.

2. Vocational training with dual system model, was a model to provide education and training that combines learning experiences in the polytechnic and value work experience in industry. This model was very good because it considers learning in polytechnics and work experience would be complementary, more meaningful, and real. Actually, work habits in the real world of work was difficult because the learning processes tend to form habits of study. Discipline on real work was very different with discipline in learning and training. The weakness of the dual system was very susceptible to changes in social, economic, and political.

3. Vocational training with a model of apprenticeship. This model was fully devolved to industry training and community without the support of the training provider. Training provider only held normative subjects, adaptive, and fundamental skills. This model only suitable for developed countries that already have strong system of vocation training and good industrial relation between industry and training provider.

4. Vocational training with a model of school-based enterprise. This model develop training provider as business and production base. This model will raise income and fully provide work experience value to training participants.
From explanation above, dual system vocational training programs with apprenticeship give many advantages in ensuring training participant competence. Moreover training provider can be positioned as business and production base. As an example, the crucial importance of dual training in Germany, the various training programs are brought together to give an overall picture showing the training status ultimately achieved by one cohort[5]. Figure 3 describe in 2004, approximately 53% of the young people in one cohort completed a course of vocational training in the dual system.

![Figure 3. Cohort structure by type of qualification in Germany](image)

BLKs have many dual system vocational training programs in collaboration with industry with apprenticeship scheme. Famous program was competency based training with 1 month on the job training or off the job training. For example in Surakarta Vocational Training Center has trained 2531 trainees (165 packages) at 2013[14]. Most of trainees did off the job training during following training programs in BLKs, others follow on the job training in industry.

3.3 Curriculum Integration for CBT programs

In the collaboration between training provider and industry, all programs must be formulated with the same cooperation between industry and the training provider. Programs consist of curriculum, teaching materials, evaluation, recruitment of participants, instructors, funding, and execution time. Vocational education will be efficient and effective if[15]:

1. environment where trainee trained was a replica environment in which trainee will work.
2. tasks given to the students were done in same way, tools and machines which appropriate with workplace.
3. conduct by instructors who have experience and success in applying the skills and knowledge of the work operations and processes.
4. could foster effective work habits to students. This only happen if the training was given in the form of a real job.
5. trainings given only to someone who needs it, who wants it and who can get benefit from it.

During 2013 Surakarta Vocational Training Centre did 4 packages (64 trainees) competency-based training programs (CBT) integrated with industry curriculum in field of Welding and Automotive. Programs held on 3 months training in BLK and 3 months in industry apprenticeship. This scheme give excellent result in outcomes workforce absorption and assure trainees competency.

Observation and focus group conduct to confirm curriculum appropriateness with questionnaire. Six questions were asked to trainees after they completing training and apprenticeship programs. Questionnaire questions as below.

1. Training contents have matched with training program goals.
2. Quality of training contents increase your skill and knowledge.
3. Training contents schemes have been arranged from basic until advanced.
4. Training contents were easy to be learnt and understood.
5. Training contents have fulfill your expectation.
6. Appearance, and training content format.

Measurement of curriculum acceptance from trainees side use 4 scales, that were 4 (very good), 3 (good), 2 (enough) and 1 (poor). Thus, expectationwas 4 (very good). After calculated the results of questions 1-6 were good and very good. It means improvement with curriculum collaboration competency-based training and apprenticeship give good impact for trainees.

4. Workforce Market Needs

Efforts have been made to improve the relevance and absorption of graduates by building cooperation between the business / industry and training provider, especially
with BLKs. The cooperation contains curriculum improvement, implementation of apprenticeship, training together and so on. Moreover, training activities can only be expected from companies in a good or at least sufficient profit situation. On the one hand this reveals the risk that changes in profits are an important cyclical driver of apprenticeship supply. On the other, it points to the strong impact of cost considerations. This is not because the net costs of apprenticeship training (training costs minus the value of productive contributions by apprentices) are significantly high. It relates much more to the easier and cheaper alternative, which allows covering skills needs by the recruitment of vocational school graduate. From an employer cost perspective, apprenticeship training is cheap, as the apprentices mainly take the burden of costs. Employers particularly benefit when the apprentice is retained in the company after training, as a recruitment decision is already made during training. This helps to meet future skills needs more precisely and avoid skills shortages. Taking on an apprentice after training avoids the costs of on-the-job training for the would-be externally recruited employees and is often the cheaper solution. In order to retain apprentices and thus extend the pay-off period of training investments it is crucial to provide career opportunities in the company.[16]

From Table 3 can be described composition by workforces in 2013. Agriculture, forestry and plantation place first grade nationally to the number of 34.4%. Then following by trading and retail (24.4%), service (16.4) and manufacture industry (13.4).

A great quantities in workforce open opportunity in fulfilling competent labor market demand. With prediction of economic growth around 6 %, will create many hundred thousands of job opportunity. BLKs vocational training programs must meet with prospective sector which can offer job opportunity. Around 80 training program which have been mentioned at previous section already prepared against this opportunity. In 2013, for example at Surakarta Vocational Training Center, there are 125 companies send job opportunity from operator, technician until supervisor level.

Table 3. Field work composition by workforce in 2013

<table>
<thead>
<tr>
<th>No.</th>
<th>Lapangan Pekerjaan Utama</th>
<th>Februari</th>
<th>Agustus</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pertanian, Perkebunan, Kehutanan, Perburuan dan Perikanan</td>
<td>30,859,073</td>
<td>38,068,254</td>
<td>34.4</td>
</tr>
<tr>
<td>2</td>
<td>Perumahan dan Perdagangan</td>
<td>1,355,564</td>
<td>1,430,767</td>
<td>1.3</td>
</tr>
<tr>
<td>3</td>
<td>Industri</td>
<td>14,784,843</td>
<td>18,883,817</td>
<td>16.4</td>
</tr>
<tr>
<td>4</td>
<td>Listrik, Gas dan Air</td>
<td>254,528</td>
<td>250,945</td>
<td>2.2</td>
</tr>
<tr>
<td>5</td>
<td>Konstruksi</td>
<td>6,885,341</td>
<td>6,737,232</td>
<td>5.7</td>
</tr>
<tr>
<td>6</td>
<td>Perdagangan, Retail, Jasa Keuangan dan Keuangan</td>
<td>24,406,705</td>
<td>22,737,236</td>
<td>21.4</td>
</tr>
<tr>
<td>7</td>
<td>Transportasi, Pergudangan dan Komunikasi</td>
<td>5,231,775</td>
<td>5,040,849</td>
<td>4.5</td>
</tr>
<tr>
<td>8</td>
<td>Sehati-Sujud, Pendidikan, Keuangan, Ulang</td>
<td>3,012,770</td>
<td>2,912,418</td>
<td>2.6</td>
</tr>
<tr>
<td>9</td>
<td>Jasa Konsultasi, Keuangan, Keuangan</td>
<td>17,532,590</td>
<td>18,213,032</td>
<td>16.4</td>
</tr>
<tr>
<td>10</td>
<td>Lapangan Pekerjaan Utama</td>
<td>114,021,189</td>
<td>110,804,041</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source : SAKERNAS BPS 2013

5. Conclusion and Future Works

Vocational training was the training for workforce to provide skilled workers / professionals who have a key role in industry. Partnership between vocational training institutions and industry was a necessity. Vocational training institutions can not only organize the learning with school-based learning, but also have to work-based learning scheme to prepare competent graduates for fulfilling job market demand. For further research it is recommended to make curriculum comparison and curriculum of apprenticeship based training implementation evaluation to all vocational training under ministry of manpower and transmigration and vocational training under district governments.

Acknowledgment

The authors would like to acknowledge Directorate of Instructor and Personnel Training at Ministry of Manpower and Transmigration of Republic Indonesia for its support to this work.

Reference


ISSUES IN CURRICULUM DEVELOPMENT AND DECENTRALIZATION OF VOCATIONAL EDUCATION TO NATIONAL ECONOMIC GROWTH: THE CASE OF INDONESIA

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Abstract

ASEAN Economic Community (AEC) will be started next year 2015. ASEAN country members need be ready to exchange, or even to compete their products or services. Skilled labor is essential to be possessed by all the country members to successfully participate in AEC. Vocational school is a strategic institution assigned to prepare its students to possess competence for work in certain occupation. Therefore, the curriculum of vocational education needs to be developed then consistently executed in such a way to gain expected skilled labors. This paper will cover two discussions. First, in macro level, how the development of vocational education curriculum relevant to labor market as well as relevant to the national philosophy, and eight (8) National Education Standards. Second, in micro level, how the curriculum is to be implemented in school, especially in classroom and out of classroom settings. Furthermore, the roles and commitment of National and Local governments, in decentralization era, together with their stakeholders to support vocational education will also be analyzed. Summary as a conclusion will be provided at the end of this paper combined with recommendations especially for Government and people in business and industry.

Keywords: curriculum development, vocational education, decentralization, national economy growth.

1. Introduction

ASEAN Economic Community (AEC) that will be started next year (2015) has made Government of Indonesia (GOI) aware in responding the challenges. On April 1-2, 2014 GOI represented by Ministry of Education and Culture collaborated with Germany Ministry of Economic Collaboration and Development conducted a national conference involving Ministry of Workforce and Resettlement, Ministry of Industry, and National Board of Planning and Development. The theme of conference was “Assuring the Quality of Technical and Vocational Education and Training (TVET) in Preparing AEC2015”. The conference attended by business and industry community representations, vocational education observers, and other relevant parties. The main objective of conference was to facilitate collaboration work in the development of TVET in the region [1]. Vice Ministry of Education and Cultural, Musliar Kasim, then stated in the conference that there were any problems need to be solved in relation to VTEC, e.g., shortage of skilled teachers, limited having industrial experiences for vocational students, and regulation harmonization of work training and workmarket. The conference emphasized that TVET is one main driver force to elevate labor skilled and mobility in the future time. The impact will increase productivity in business sector at the same time contribute to national economic development.

This paper will discusses relevant to the impact above with focus on curriculum development of vocational school, the roles of national and local government in decentralization era, and business-industry participation. Finally, this paper will discuss
the impact of vocational education to national and local economic growths.

2. Curriculum Development

Reference [2] defines that curriculum is the sum of the learning activities and experiences that a student under the auspices or direction of the school. The definition covers not only experiences and activities in formal curricula, but also social and sport activities covered in co-curricular. Ref. [2] emphasizes that these experiences have the power to make contributions to the student growth in ways that cannot be accomplished in classroom and laboratory settings.

Furthermore, it is explained that the foregoing concepts also support the notion that a curriculum should focus on the developing the whole person. It is not enough to have the curriculum include courses and experiences that are exclusively only related to vocational education. General studies are clearly a part of every curriculum as they serve to provide the student with a broad knowledge base both for life and for earning a living.

This curriculum development approach is in line with Dewey's philosophy [3] that emphasizes students have potencies and dynamically develop their potencies. School programs need to be democratized so that every student has a possibility to maximize his/her potencies regardless their social economy status.

Regarding Vocational Education, Ref. [4] describes that at least there are five approaches are commonly used to determine curriculum content. The five are Philosophy, Introspection, Functional, DACUM, and Task Analysis. Furthermore, it is explained that philosophy is a set of belief belongs to one or group as a basis of his/her attitude and action. Historically, the thought of philosophers was used in determining curriculum content. It is also true in Indonesia.

National Philosophy of Indonesia is Pancasila (five principles) that consists of belief in the One and only God, just and civilized humanity, unity of Indonesia, democracy led by wisdom of deliberations among representatives, and the goal of social justice for the whole people of Indonesia. These five principles is mandatory content and have been accommodated by all National Curriculum used in Indonesia including the current Curriculum 2013.

The second approach in determining curriculum content is "Introspective". It means the content is determined by those who are directly involved in executing the curriculum. They are especially teachers, principals, school supervisors, and some administrators [4]. This approach is relatively better than the first one, however since the process is done only by the insider, therefore the product may not meet the needs of the users in this case people in business and industry. To overcome this shortage, certainly they need to involve business and industry representations and also expert from Technical and Vocational Education.

The third one is DACUM that stands for Developing A Curriculum [5]. This approach is a job occupational analysis performed by expert workers in the occupation. The philosophy of DACUM comprises three wise statements: (1) expert workers can describe and define their jobs more accurately than anyone else; (2) an effective way to define a job is to precisely describe the tasks that expert workers perform; and (3) all tasks, in order to be performed correctly, require certain knowledge, skills, tools, and worker behaviors.

Reference [5] explains the DACUM process for occupational analysis involves local men and women with reputations for being the "top performers" at their jobs, working on a short-term committee assignment with a qualified DACUM facilitator. Workers are recruited directly from business and industry. These workers become the Panel of Experts who collectively and cooperatively describes the occupation in the language of the occupation.

The Panel works under the guidance of a trained facilitator for two days to develop
the DACUM Research Chart. The chart contains a list of general areas of competence called DUTIES and the TASKS that define that duty. Brainstorming techniques are used to obtain the collective expertise and consensus of the Panel. As the Panel determines each task, it is written on a card. The cards are attached to the wall in front of the Panel. The completed chart is a graphic profile of the duties and tasks performed by successful workers in the occupation [5].

The panel also identifies the general knowledge and skills required of successful workers, the tools, equipment, supplies, and materials used, the important worker behaviors essential for success, and the future trends and concerns likely to cause job changes [5].

The fourth one is “Functional Approach”. The two previous approaches can be classified as subjective approach since the content is mainly determined by the internal side. This fourth approach one can be categorized as an objective one. Curriculum content is determined by referring to functions of an occupation for which graduates will work. An example some functions in executing building construction: understanding the features and characteristics of the building; establishing networking with involved parties; calculating the cost; project management and quality control; and building maintenance. Then each function is broken into activities. Some activities are classified into a certain competence. All competences are organized in sequence accompanied by knowledge, skills, attitudes, and tools and equipment needed as a basis in determining curriculum content.

The fifth approach in determining curriculum content is Task Analysis (TA). Ref. [6] describes that TA is the analysis of how a task is accomplished, including a detailed description of both manual and mental activities, task and element durations, task frequency, task allocation, task complexity, environmental conditions, necessary clothing and equipment, and any other unique factors involved in or required for one or more people to perform a given task [6]. Ref. [4] suggested that curricular developers need to differentiate among terminologies: job, duty, task, activity, operation, and steps. By knowing these sequent, it makes easier to do task analysis.

3. Indonesia 2013 Curriculum

In the case of Indonesia, the current curriculum is named “2013 Curriculum”. It covers academic as well as technical and vocational education.

There is no explicitly official statement from Ministry of Education and Culture regarding development approach used in resulting 2013 Curriculum. Traditionally, the Minister of Education and Culture formed an expert team accompanied by working team. The team member share representations from Ministry of Education and Culture, especially from Center of Curriculum, universities, and relevant communities. Additional members for vocational education team are people from business and industries.

National Philosophy (Pancasila) is mandatory to be included in all curriculum levels. Approaches used in determining curriculum content of vocational education are mostly combination among Functional and Introspective. DACUM and Task Analysis approaches were mostly not exercised in this work.

Structurally, 2013 Curriculum for academic and vocational education consists of threecourse clusters: A, B, and C. Cluster A and B are mandatory or core courses, while Cluster C is concentration. Cluster Acourses consist of Religious Education, Civics-Pancasila, National Language = Bahasa Indonesia Math, National History, and English. Cluster B courses consist of Culture & Arts, Physical Education & Sport, and Entrepreneurship. Cluster C for academic school are courses for academic concentration, while Cluster C for vocational school are courses for academic concentration as well as vocational concentration [7].
Credit-hour allocation for Cluster A plus Cluster B both for academic and vocational schools is equivalent, which is 24 hour/week. Cluster C for academic school during three years consecutively are 18, 20, 20 hours/week, while for vocational school are 24, 24, and 24 hours/week. Therefore, the total credit hours taken by vocational student for 3-year schooling is higher than those from academic student, which is 144 compared to 130. Following table illustrates the credit-hour comparison between academic and school schooling tracks [7].

Table 1. Academic and Vocational Comparison on Core and Concentration Courses by hours/week.

<table>
<thead>
<tr>
<th>Academic School (SMA)</th>
<th>Vocational School (SMK)</th>
<th>School Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core courses for SMA = SMK</td>
<td></td>
<td>1st</td>
</tr>
<tr>
<td>Elective courses for:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMA (hrs./week)</td>
<td>18</td>
<td>20</td>
</tr>
<tr>
<td>SMK (hrs./week)</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Total hrs./week for SMA/year</td>
<td>42</td>
<td>44</td>
</tr>
<tr>
<td>Total hrs./week for SMK/year</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>3-year total credit-hrs. for SMA 3-year total credit-hrs. for SMK</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>130</td>
</tr>
</tbody>
</table>

Based on Table 1 above, we can be confirmed that curriculum 2013 is an inclusive curriculum. The structure provides opportunity for vocational students not only to enhance their potencies through professional in a certain occupation but also to continue their academic study in higher education.

4. Decentralization of Vocational Education

The forces of public governance reforms may be classified as follows: (1) international challenges and pressure; (2) changing role of modern government in the global economy; (3) mixed economy of public, private and non-profit sector interactions in the production and delivery of public services; (4) society's participation in governance processes, equity and ethics in governance, new models of public governance. Furthermore, the arguments for the decentralized governance are: (i) participation in political life, (ii) institutional openness and closeness to people, thereby increasing the democratic accountability, (iii) legitimacy of governance and (iv) freedom, devolution of authority powers and interaction between government bodies [8].

Reference [9] describes that there are at least nine impacts may be gained by exercising decentralization of vocational education: (1) improving human resource quality; (2) lowering number of youth unemployment; (3) providing employment for the citizen; (4) lowering burden in academic education path system; (5) raising interest of foreign investors; (6) assuring the improvement of earning and employment; (7) lowering the earning gap between the rich group and the poor one; (8) a vehicle for the development qualified technology works; (9) culture and tradition conservation.

In the case of Indonesia, staring the enactment of Law number 32/2004 on Local Government and Law number 33/2004 on financial balancing between Central and Local Government, officially management of vocational education has been decentralized to local government.

In the decentralization education era, local governments need to maximize the role social parties [10] in improving the quantity and quality of vocational education and trainings. The social parties are e.g., business and industry association, chamber of commerce, and other related parties. Increasing number of study program and its specialization in vocational school and training need to be synchronize with the need of local labor market. Local government continuously need to survey on existing occupation spectrum as well as future spectrum. In respect this issue, local government should shift the paradigm from supply driven to demand driven. Do not
ignore the trends of supply-demand in many occupations at national, regional, and even global levels. Ignoring these trends, increasing the number even the quality of study programs (student) in vocational education will bear youth unemployment.

Local Governments need to enhance and facilitate their vocational schools and training institutions to intensify the course of Entrepreneurship. Vocational graduates ought to possess ability to be self-employed and provide employment for others. By doing this approach youth unemployment number might be lowered. To motivate graduates become entrepreneurs a stimulate loan as a basic capital in the business is essential. The load may bear from Education Office, Man Power Office, and other private sector.

Effective vocational school in decentralization era context, mainly when the graduates work and contribute to the benefit of local government. It can happen when the graduates work matching with their specialization and be professional. Their career development in workplace run well with a good payment. One of the most importance requirements for effective vocational school is to have field experiences in business and industry.

Local Regulation that drive mutual collaboration between school and business and industry is a must. The regulation is to be formulated by a collaborated working team among Local Education Office and business-industry representation (trade chamber, associations) and Manpower Office. It is important to describe in the regulation that there is financial incentive for those who provide training for vocational students. The incentive may be in the form of e.g., CSR compensation, deductible tax, or a loan.

Local Planning Board as a think-tank of Local Government Office plays vital function to make vocational education and training become effective. The Board should have comprehensive and accurate data on education, then articulates the local development planning among relevant Offices as well as Education Office and business and industry. Mid and long project planning are vehicle to lead vocational education to be more effective as shown in the following figure [11].

![Figure 1. Supply-Demand Synchronizations Planning](image)

Figure 1. illustrates the relation between planning and existing occupation in terms of type and number of occupations

5. National Economic Growth

Many studies [12], [13] have approved that Technical and Vocational Education contributes to economic growth. The later study states that “empirical results confirming the important role of vocational school (SMK) in supporting regional economic growth in Indonesia”. Ref. [14] also confirmed that: “All countries invest in technical and vocational education and training (TVET) – in fact, correlations indicate that the higher the level of country income, generally the higher the proportion of students enrolled in TVET Institutions”.

A historical study done by Langthaler in 2013 in Germany [15] quests: “What kind of Vocational Education is required for economic development?” This study mention common problems raises to the vocational training sector in many countries. They are (1) missing link with the economy; (2) employers do not interest in providing traineeship; and (3) the fragmentation of vocational training.
Therefore, the answer of the requirement of vocational education that contribute to economic development is that vocational training is free of those problems. The challenge is how to avoid them and fulfill the requirements? Following briefly discusses the three problems above.

First, missing links with the economy. It means education and training is conducted with out-dated curricula. Teachers in vocational schools and instructors in training institutions teach out of step with the economy’s real needs of business and industry. Occupation qualifications are often not recognized and are correspondingly not very relevant to employment. In the case of 2013 Curriculum, as little bit discussed earlier, the involvement of business and industry in determining vocational education curriculum contents is not clear. There is no publically confirmation that business and industry are involved in determining curriculum contents. Clearly DACUM approach was not used in determining the curriculum content.

Second, employers do not interest in providing traineeship. Some reasons, e.g., employer thinks the dollar return. Direct and indirect training costs decrease employers’ willingness to provide training, and that employers are less willing to provide training the older the workers are.

Furthermore, governmental reimbursements do not affect employer-provided training. This indicates that governments need to consider which strategies they use to support human resource practices. Ref. [15] discover that workers’ explicit interest in training stimulates employers’ willingness to provide training. The study results suggest that training decisions are more complex than proposed by a human capital framework, because motivational factors of workers play a role. This implies that employers do not take their decision solely based on costs or benefits, but that workers can affect employers’ behavior.

In the context of Indonesia, the Law number 13/2003 on Employment, Article 11 states that each worker has a right to improve his/her work competence and Article 12 states that each employer is responsible on improving work competence of his/her worker. However, the implementation of this law is not effective yet due to there is no one system in education and training. This law under umbrella Ministry of Manpower and Resettlement. There is no synchronization on training system between this Ministry and the Ministry of Education and Culture.

Third, the fragmentation of vocational training. The fragmentation applies both to the administrative responsibility, which in many countries is divided among various ministries and bodies, as well as to the absence of comprehensive systems. Instead there’s a coexistence of various forms of training, institutions, sponsors and individual measures, which extends from vocational training schools as part of the formal education system to various informal services all the way to forms of on-the-job training [15].

Langthaler give an example on training fragmentation in West Africa, traditional teaching continues to be the major form of vocational training. It is not standardized, however, and has no links with the formal education system. This means training opens up employment options only in the informal sector.

In Indonesia, there is an effort to link between National Qualification Framework (KKNI) developed by Ministry of Education and Culture (MOEC) and National Work Competence Standard (SKKNI) developed by Ministry of Labor and Resettlement (MOLR). KKNI becomes the reference used by MOLR to articulate training design. Under SKKNI a trainee be able to accumulate his/her training credit hours and even recognized prior learning (RPL) then the credits are converted to KKNI level to get formal acknowledgment from MOEC. However, currently the conversion and implement system is under consolidated [16].

6. Lessons From Singapore’s Experience
Most countries pronounce that Technical and Vocational Education and Training (TVET) is important, however they do not have commitment to drive TVET effectively. Contrarily, Singapore Government have commitment to drive TVET effectively contribute national economy growth [17]. In this respect, the Singapore Government believes in and has invested continuously and heavily in education and training, not only in the universities and polytechnics but especially so in vocational and technical education under the Institute of Technical Education (ITE).

Since independence in 1965 the Government has made close alignment between economic development and their educational policies and strategies. The Government leads the transformation of ITE through three economic phases into a world-class education institution as explain in the following description.

A “Factor-Driven” economy involving intensive labor in the 1960s-1970s, it progressed to an “Investment-Driven” economy, which was capital intensive in the 1980s-1990s and the “Innovation-Driven” economy powered by the needs of knowledge intensive industries in the 2000s. The three economic driven illustrated in the following figures [17].

**Figure 2: Phases of Singapore’s Economic Development**

**First Phase- Labour-Intensive Economy (1960s-1970s)**

In these early days of industrialization after Singapore’s independence, the main challenge was to create enough jobs. The economic strategy shifted in 1968 from one of import substitution to one of rapid industrialization by attracting foreign investment for export-oriented and labor-intensive manufacturing. From the education and training perspective, the immediate task was to ensure that the workforce has the basic vocational and technical skills to support the labor-intensive manufacturing activities such as ship repairing, turning and fitting, sheet metal working, plumbing and radio and TV maintenance and repair.

With respect to TVET, the first vocational institute, the Singapore Vocational Institute (SVI), was established within the school system in 1964. With the increasing pace of industrialization, there was growing concern on how best to expedite and expand TVET to meet the technical and skilled manpower needs of new emerging industries. The mainstream of education remained largely academic. In 1968, 84% of students in schools were enrolled in the “academic” stream.

**Second Phase-Capital-Intensive Economy (1980s-1990s)**

In 1979, the Government embarked on a major restructuring of the economy towards higher value-added, high technology and more capital-intensive industries. The new focus was the development of new industries such as petrochemicals, biotechnology, information technology as well as manufacturing services in testing, financing, warehousing and purchasing. To stay competitive through higher productivity, mechanization, automation and computerization of the industry were promoted. Once again, the education and training system was called upon to respond to the manpower needs of more capital-intensive industries [17].

**Third Phase- Knowledge-Intensive Economy (2000s):**

Moving forward into the 2000s, Singapore saw the need to increasingly develop into a globalised, entrepreneurial and diversified economy. While continuing to strengthen the higher-end manufacturing
activities, there was a clearer recognition of the importance of the service sector as another engine of economic growth. Concerted plans were formulated to attract and nurture new growth sectors such as the Biomedical Sciences, Info-Communications, Creativity Technology, Integrated Resorts and High-Value Engineering. The response in the educational sphere was to position Singapore as an Education Hub by attracting foreign students and internationally renowned institutions to Singapore. Local institutions would continue to seek quality and excellence in developing a first-class education at all levels.

In regards the success of ITE (Institute of Technical Education) and becomes a world known institution, the following some key features [17].

1) A Clear Mission, with a clear focus on its “Mission, Vision and Values”, ITE has developed an inner spirit of commitment and teamwork in always asking how it can better serve, add value and meet the needs and expectations of students and stakeholders.

2) A Unique Brand of an ITE Education: Called “Hands-on, Minds-on and Hearts-on”, this is a holistic College education that provides the motivation, assists student learning and nurtures all-rounded graduates.

3) A modern Campus Infrastructure: ITE’s campuses are modern and well-equipped with extensive workshops, an IT-rich web-based environment, student support services and other sports and arts facilities.

4) A Rigorous Curriculum Development Process: Called “Developing A Curriculum” or “DACUM” Process, the skills standards and competencies to be acquired by students are derived directly in consultation with the major sectors of business and industry.

5) A Process-Oriented Pedagogic Model: Called “Plan, Explore, Practice and Perform” or “PEPP” Model, the aim is to develop “thinking doers”, i.e., graduates who can apply what they have learned and put them into practice. The focus is on acquiring the three key competencies, i.e., technical, methodological and social in an experiential learning environment.

6) Close Partnership With Industry: Built on the mutual needs and benefits since the early days of Singapore’s efforts in industrialization, this partnership has further strengthened in terms of levels and quality of engagements.

7) Branding – a New ITE image: The effort to communicate and rebrand the ITE Image was an integral part of its journey. Supported by a comprehensive marketing and rebranding program, there was gradual turnaround in its public perception and image. Over a period of nine years, from 1997 to 2006, the image of ITE had significantly improved by 76%.

7. Summary and Recommendations

There is no one “universal” model that fit to establish and develop any TVET in anyone country. Each country will ultimately need to carefully assess and decide on the “TVET system” that it considers most relevant in meeting its national strategic goals. But, underlying a successful model are also some fundamental policies and principles.

1) There is the need to ensure that the TVET system is closely linked to the local economic development agenda. National economic plan and global economic trends should be also considered.

2) Curriculum content must be developed together with stakeholders, especially people from business and industry.

3) Decentralization is chance for Local Government to align economic development with vocational education and training policies to bear economic growth. Local Government to execute the alignment policy above.

4) The development of competences, in terms of variety and student number, in TVET must match the labor market demand (demand driven).
5) School-business/industry partnership must be based on mutual-benefit collaboration, e.g., rewards need to be offered for those who provide traineeship. Deductible profit tax may become one short of reward.

REFERENCES


