PROCEEDINGS
International Conference
Asosiasi Pendidikan Teknologi dan Kejuruan Indonesia (APTEKINDO) 2018

Theme:
“Revitalization of Technical and Vocational Education to Face Industrial Revolution 4.0”

Surabaya, 11-14 July 2018

Speakers:

Prof. Dr. Muhadjir Effendy, MAP.
Minister of Education and Culture, Republic of Indonesia

Michael Freiherr von Ungern – Sternberg
Extraordinary and Plenipotentiary Ambassador of the Federal Republic of Germany to Indonesia, ASEAN and Timor-Leste (Jerman)

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Head of School of Engineering and Mathematical Sciences
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Rector of Universitas Negeri Surabaya period 2010-2014 (Indonesia)
PROCEEDINGS

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Asosiasi Pendidikan Teknologi dan Kejuruan Indonesia
(APTEKINDO) 2018

Theme:
“Revitalization of Technical and Vocational Education to Face Industrial Revolution 4.0”

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PREFACE

All praises be to Allah SWT, so that the 2018 International Conference of Asosiasi Pendidikan Teknologi dan Kejuruan Indonesia (APTEKINDO) could be held in Surabaya during 11-14 July 2018. APTEKINDO International Conference is conducted biennially in which this year host is Faculty of Engineering, State University of Surabaya. Therewere sixteen colleges attending this year Conference, most of which were former Institutes of Teacher’s Education (LPTK).

This year theme is “Revitalization of Technical and Vocational Education to Face Industrial Revolution 4.0” aimed to respond to the development and acceleration of the industrial revolution 4.0 that has become the most discussed issues in many countries. Industrial revolution connects machines with internet systems. In regard to facing such phenomena, Indonesian government through the Ministry of Industry has launched ”Making Indonesia 4.0”, of which the program focuses on industries that are driving the development of the industrial revolution 4.0 such as food and beverages, electronics, automotive, textiles and chemicals. To achieve better results of the program actualization, vocational education helps to prepare compatible and competitive workers for the areas of the aforementioned industries. Henceforth, numbers of Conferences, conventions, and meetings among Indonesian practitioners in FPTK / FT-JPTK need to be held to initiate ideas in strengthening the role of LPTK within industrial revolution 4.0 era.

The Conference’s proceedings contain 121 research papers and ideas that are relevant to the following nine sub-themes: Technical and Vocational Teacher Competencies, Technical and Vocational Education Curricula, Technical and Vocational Education Models, Technical and Vocational Education Evaluation, Technical and Vocational Education Policy, Public-private Partnership in Technical and Vocational Education, Technical and Vocational Education Management, Technopreneurship, and Competencies Certification.

Finally, all the committees send their gratitude to the participating speakers and all parties who support the run of the Conference. They also apologize for any inconvenience and wish a better undertaking event next year.
WELCOMING SPEECH RECTOR UNESA
Conference and Convention
Asosiasi Pendidikan Teknologi dan Kejuruan Indonesia (Aptekindo) 2018
Rich Palace Hotel Surabaya, 11-14 Juli 2018

Assalamu’alaikum Warahmatullahi Wabarakatuh.

Respectable Head of Universities, members of APTEKINDO
Distinguished Keynote speakers
Honorable authors, and fellow participants of APTEKINDO Conference and Convention 2018

Alhamdullilah, first of all, let us express our gratitude to Allah SWT because of his grace and blessings, we are able to attend this international Conference and convention of the Indonesia Association of Technology and Vocational Education or Asosiasi Pendidikan Teknologi dan Kejuruan Indonesia (APTEKINDO) held in Surabaya, 11-14 July 2018.

This international and national Conference is conducted biennially as a routine agenda held by Association of Technology and Vocational Education or Asosiasi Pendidikan Teknologi dan Kejuruan Indonesia (APTEKINDO), which consists of 16 different universities throughout Indonesia. We would like to thank for the opportunity given to Universitas Negeri Surabaya for hosting this year event.

In the raise of industrial revolution, Conferences, gatherings, and sharing of knowledge play an important meaning in supporting the acceleration of innovative science and technology. Therefore, this Conference’s theme is “Revitalization of Technical and Vocational Education to Face Industrial Revolution 4.0”. This is an interesting and challenging topic not only for academic researchers but also for stakeholders and industry owners.

Ladies and gentlemen,
Since 2011, the industrial sector has been integrated with the online system known as industrial revolution 4.0. The first industrial revolution was marked by the use of steam engines to replace human and animal power. The second stage of the revolution was marked by the utilization of electrical power and the concept of mass production. Furthermore, the application of automation technology brought the industrial revolution to its third stage. Tremendous revolution happened when information and communication technology was introduced and fully utilized in industrial area, of which the condition brought the world in the fourth stage of the industrial revolution. The utilization of this technology changed not only the production process, but also across the industrial chains that result in a new digital-based business model which can achieve higher efficiency and better quality in industrial products. The consequences of this revolution are the increase of production efficiency as well as changes in the employment prerequisite. There is an increasing demand for new manpower, whilst the machines are replacing the role of workers. This condition leads to the importance of a new and more advanced method of preparing human resources that are ready to compete in the industrial revolution.
Ladies and gentlemen, in regard to prepare Indonesian human resource in facing the era of media convergence, there are at least two aspects that need our attention, namely the quality of human resources in accordance with the requirement of the digital-based industry and the equal distribution of qualified human resources especially in suburban and urban areas. Both aspects could be meant as a challenge and an opportunity for the higher education especially technology and vocational education to innovate and harmonize curriculum that connects with the industry. Thus, this Conference becomes a perfect momentum for technology and vocational education to join and strengthen steps in preparing graduates that are ready to compete in the industrial revolution 4.0. Therefore, by starting with “Bismillahirrahmanirrahim” The Conference and Convention of Association of Technology and Vocational Education or APTEKINDO 2018, is officially started”

Ladies and gentlemen, we would like to thank the keynote speakers who are willing to attend and share knowledge in today’s Conference:
1. Prof. Dr. Muhadjir Effendy, MAP.Minister of Education and Culture, Republic of Indonesia
3. Prof. Dr. Wenny Rahayu, La Trobe University Victoria (Australia)

We also would like to thank the authors and all participants of the convention who have participated and contributed to sharing the knowledge and ideas. Hopefully, what we share and get here today can give benefits and contribute to improve a competitive atmosphere in Indonesia, Aamiin YRA.

Surabaya, July 2018
Universitas Negeri Surabaya
Rektor,

Prof. Dr. Warsono, M.S.
WELCOME SPEECH BY THE DEAN OF FACULTY OF ENGINEERING
at the International Conference and National Convention of
Asosiasi Pendidikan Teknologi dan Kejuruan Indonesia (APTEKINDO) 2018
Rich Palace Hotel, 12 July 2018

Assalamu’alaikum Warahmatullahi Wabarokatuh.

His Excellency, Rector of Universitas Negeri Surabaya
Respectable the Head of Universities asthe members of APTEKINDO
Distinguished Keynote Speakers
Honorable authors and Participants

Alhamdullilahahirrobbil alamiin. Thanks God. First of all, let us express our gratitude to Allah SWT because of his grace and blessings we are able to attend the 9th International Conference and convention of Asosiasi Pendidikan Teknologi dan Kejuruan Indonesia (APTEKINDO) and the 19th workshop of the Technology and Vocational Education for FPTK/FT/FTK-JPTK in Indonesia. It is an honor for us, the Faculty of Engineering, Universitas Negeri Surabaya, to host this year Conference and convention.

On behalf of Asosiasi Pendidikan Teknologi dan Kejuruan Indonesia (APTEKINDO), we would like to welcome keynote speakers, authors, delegates and participants from technology and vocational education to the city of heroes, Surabaya.

Today, we meet in Surabaya to attend a biennial agenda named APTEKINDO International Conference and Convention and National Workshop of the FPTK/FT/FTK-JPTK. Following the mandate from the 2016 APTEKINDO Convention in Medan, this year’s Conference is held in Surabaya hosted by the Faculty of Engineering, Universitas Negeri Surabaya.

Ladies and Gentlemen, the theme of this year Conference is "Revitalization of Technical and Vocational Education to Face Industrial Revolution 4.0". The theme is chosen due to the fact that we have to quickly respond and act accordingly to the effects of the industrial revolution on vocational education. Well-programmed and structured effortsshould be undertaken to ensure if technology and vocational education can produce globally competitive graduates especially for industrial revolution era.

Numbers of important topics for technology and vocational education are discussed in this Conference. The topics include Technical and Vocational Teacher Competencies, Technical and Vocational Education Curricula, Technical and Vocational Education Models, Technical and Vocational Education Evaluation, Technical and Vocational Education Policy, Public-private Partnership in Technical and Vocational Education, Technical and Vocational Education Management, Technopreneurship, and Competence Certification.

Today’s Conference has several outcomes. The accepted articles will be submitted for proceeding publication indexed by Atlantic Press. Meanwhile, the rejected articles by Atlantic Press will be published in the International Proceedings with International Standard Book Number (ISBN). Moreover, the articles written in Bahasa Indonesia will be published in the National Proceedings with ISBN.
Ladies and Gentleman, this meeting must be meaningful as a venue to communicate among researchers, academics, and members of FPTK / FT / FTK-JPTK from different universities as well as from related industries. By this regular Conference and convention, we can make a strong communication network and create innovative breakthrough and substantial blueprint of different aspects such as institutional quality, field study, and curriculum. We hope that this forum plays an important role in developing technology and vocational education to face the industrial revolution 4.0.

Finally, we would like to thank the organizing committee led by Mr.Tri Wrahmatnolo, M.Pd., M.T., who gave an extraordinary support. Moreover, we would like to express our appreciation and gratitude to the members of steering committee from various regions in Indonesia, delegates, SC and OC members, sponsors, as well as personal or institutional support that make this event well-organized. I apologize if there are shortcomings from my part.

Good luck with the Conference of Indonesian Association of Technology and Vocational Education, APTEKINDO 2018, and wish the best improvement for technology and vocational education in Indonesia. Thank you.

Wassalammu’alaikum Warahmatullahi Wabarakatuh
CHAIRMAN’S SPEECH
at the International Conference and National Convention of
Asosiasi Pendidikan Teknologi dan Kejuruan Indonesia (APTEKINDO) 2018
Rich Palace Hotel, 11-14 July 2018

Assalamu’alaikum Warahmatullahi Wabarakatuh.

His Excellency, Rector of Universitas Negeri Surabaya, Respectable the Head of Universities, members of Aptekindo, Keynote speakers, Authors, and fellow participants of Aptekindo Conference and convention 2018.

Alhamdulillah, no words could represent the feelings but the gratitude of the presence of Allah SWT, for His blessings, so that we can attend APTEKINDO Conference with the theme “Revitalization of Technical and Vocational Education to Face Industrial Revolution 4.0”.

In this pleased occasion, we would like to welcome all keynote speakers, authors, and participants of the Conference to this city of heroes, the city of heroic histories, Surabaya. We would like also to welcome to APTEKINDO 2018 Conference and convention held at the Rich Palace Hotel Surabaya, 11-14 July 2018.

The theme of this year Conference is "Revitalization of Technical and Vocational Education to Face Industrial Revolution 4.0.". This theme is chosen to respond to the development and acceleration of industrial revolution 4.0 that has been impactful in various countries. This industrial revolution has connected the utilization of machines to an internet system. To face such phenomena, Indonesian government through the Ministry of Industry has launched a program called “Making Indonesia 4.0”. Currently, the government is focusing on industries that support the development of the industrial revolution such as food and beverage, electronics industry, automotive, textile and clothing, and chemical industries.

In addition, vocational education plays an important role in preparing competent and competitive human resources. That is, Faculty of Technical and Vocational Education or Fakultas Pendidikan Teknik dan Kejuruan (FPTK) in Indonesia aims to compile excellent ideas and vision, which later could be shared through Conferences, conventions or meetings, and also be useful to encounter industrial revolution 4.0.

Today’s Conference will present competent keynote speakers in the field of technology and vocational education, who are:
1. Prof. Dr. Muhadjir Effendy, MAP. Minister of Education and Culture, Republic of Indonesia
3. Prof. Dr. Wenny Rahayu, La Trobe University Victoria (Australia)
In addition, I would like to point out that there are 602 participants from 17 different universities participating in today's Conference involving:

1. Universitas Palangka Raya
2. Universitas Gorontalo
3. Universitas Islam Negeri Ar Raniry Aceh
4. Universitas Negeri Solo
5. Universitas Negeri Menado
6. Universitas Pendidikan Ganesha
7. Universitas Nusa Cendana
8. Universitas Malang
9. Universitas Negeri Jakarta
10. Universitas Negeri Padang
11. Universitas Negeri Yogyakarta
12. Universitas Pendidikan Indonesia
13. Universitas Negeri Makassar
14. Universitas Negeri Semarang
15. Universitas Negeri Medan
16. Universitas Negeri Surabaya
17. Universitas PGRI Adi Buana Surabaya

There are 491 articles submitted to this Conference covering papers and posters. 76 articles were accepted to Atlantic Press, 156 articles published in international proceedings with ISBN, dan 129 articles published in the national proceedings with ISBN. All articles will be available for an online access through the Atlantis Press official website and through APTEKINDO 2018 website.

Today's Conference is actually held with the helps and good cooperation of various parties. Therefore, we would like to express our gratitude to the Minister of Research, Technology and Higher Education, Rector of Universitas Negeri Surabaya, keynote speakers, participants, sponsors, and other stakeholders for the supports. We also send our highest appreciation to the committees who have worked hard to succeed this Conference.

At last, we hope that all participants get benefits and knowledge that can contribute to reinforce vocational education and technology in facing the industrial revolution 4.0. WELCOME TO APTEKINDO CONFERENCE AND CONVENTION 2018, Thank you.
# TABLE OF CONTENT

<table>
<thead>
<tr>
<th>Sub Theme 1: Evaluation of Technology and Vocational Education (ETVE)</th>
<th></th>
</tr>
</thead>
</table>
| 1 | THE DEVELOPMENT OF COMPUTER BASED LEARNING MEDIA FOR PLC COURSE USING ADOBE FLASH  
Syufrija, Ika Yunsita Pratiwi  
Universitas Negeri Jakarta | I.1.1-7 |
| 2 | DEVELOPMENT E-LEARNING AND E-ASSESSMENT MODEL FOR "TRANSMISSION MAINTENANCE" SUBJECT BASE ON PROBLEM BASED LEARNING AT LIGHT VEHICLE PROGRAME - SMKN 1 WEST SUMATRA  
Wakhinuddin Simatupang, Ambiyar  
Universitas Negeri Padang | I.8-13 |
| 3 | ANALYSIS OF RESISTANCE FACTORS IMPLEMENTATION KKNI ORIENTED CURRICULUM WITH SIX"S TADI SUTOPOUNIVERSITAS NEGERI MEDANASK AT ELECTRICAL ENGINEERING DEPARTMENT  
Adi Sutopo, Mustamam, Dadang Mulyana  
Universitas Negeri Medan | I.14-16 |
| 4 | HANDWRITTING RECOGNITION BASED ON CASCADING ADABOOST CLASSIFIER FOR AN ESSAY CORRECTION  
Kartika Candira Kirana, Slamet Wibawanto, Azhar Ahmad Smaragdina, Gres Dyah Kusuma Ningrum  
Universitas Negeri Malang | I.17-20 |
| 5 | THE STUDY OF STUDENT LEARNING ACHIEVEMENT IN FASHION EDUCATION PROGRAM UNIVERSITAS NEGERI MALANG  
Nurul Aini  
Universitas Negeri Malang | I.21-25 |
| 6 | RELEVANCE OF STUDENT KNOWLEDGE COMPETENCY ACCORDING TO NEEDS OF CONSTRUCTION BUSINESS  
Herry Sumual, Rolly R. Oroh  
Universitas Negeri Manado | I.26-30 |
| 7 | EVALUATION OF IMPLEMENTATION VOCATIONAL SKILLS LEARNING MOTORCYCLE ENGINEERING AT SPECIAL SCHOOL  
Sriyono, Soemarto  
Universitas Pendidikan Indonesia | I.31-36 |
| 8 | THE PROBLEMS SOLVING SKILLS ASSESSMENT ON STUDENTS’ EMPLOYABILITY SKILLS OF VOCATIONAL HIGH SCHOOL | I.37-40 |
Sri Subekti, Ana
Universitas Pendidikan Indonesia

9 THE EFFECT OF IMPLEMENTING KAHOOT INTERACTIVE BASED QUIZ TOWARD STUDENT’S LEARNING OUTCOMES
Gres Dyah Kusuma Ningrum, Kartika Candra Kirana, Ahmad Mursyidun Nidhom, Arisandi
Universitas Negeri Malang, STT STIKMA Internasional Malang

10 ANALYSIS OF NEEDS IN IMPLEMENTATION OF EDUCATION OF VOCATIONS OF HOSPITAL ACCOMODATION
Uswatun Hasanah, Nur Luela, Mulyati, Prastiti Laras Nugraheni
Universitas Negeri Jakarta

11 THE IMPLEMENTATION OF KIRKPATRICK EVALUATION MODEL ON THE TRAINING TO IMPROVE THE QUALITY OF PRODUCTS OF THE SALTED EGG INDUSTRY WORKFORCE IN THE SEMARANG REGENCY, INDONESIA
Hadromi
Universitas Negeri Semarang

12 ANALYSIS OF ACADEMIC QUALITY SERVICES AT DEPARTMENT OF AUTOMOTIVE TECHNOLOGY EDUCATION FACULTY OF TECHNOLOGY MAKASSAR STATE UNIVERSITY
Rusyadi
Universitas Negeri Makassar

13 ANALYSIS OF CURRICULUM RELEVANCE OF VOCATIONAL WELDING TECHNIQUES COMPETENCE TOWARD INDUSTRIAL PRACTICE OF VOCATIONAL HIGH SCHOOL STUDENTS
Amiruddin, Fiskia Rera Baharuddin, Andi Muhammad Irfan, Sunardi
Universitas Negeri Makassar, Universitas Negeri Gorontalo

14 IMPROVING VOCATIONAL SCHOOL STUDENTS’ ACHIEVEMENT THROUGH THE USE OF PROJECT BASED LEARNING-E-MODULE
Nyoman Sugihartini, Ketut Agustini, Komang Priatna, Pande Erick Suryadi, Kadek Sintya Dewi
Universitas Pendidikan Ganesha

15 THE INFLUENCE OF STUDENTS’ PERFORMANCE ON THE PRODUCTIVE COMPETENCE OF VOCATIONAL SCHOOLS IN PADANG
Ramli
Universitas Negeri Padang

16 THE NEEDS ANALYSIS OF HIGHER ORDER THINKING SKILLS ON ENGINEERING TO IMPROVE TECHNICAL INSTRUCTION IN HIGHER EDUCATION
Syarif Suhartadi
Universitas Negeri Malang

17 EVALUATION ANALYSIS OF NUMERICAL ABILITY AND LEARNING INTEREST IN LEARNING ACHIEVEMENT OF ELECTRICITY CIRCLE STUDENTS OF SMK PUBLIC SCHOOL 2 KUPANG
I Mada Parsa
Universitas Nusa Cendana

18 JOB SHEET DEVELOPMENT OF ELECTRIC MOTOR SPEED CONTROL USING DRIVE INVERTER IN THE ELECTRIC MOTOR INSTALLATION SUBJECT
Joko, Indra Gunawan
Universitas Negeri Surabaya

19 IMPLEMENTATION OF STUDENTS’ LEARNING OUTCOMES THROUGH THE APPLICATION OF

xiv
RECITATION METHODS IN ENVIRONMENTAL SANITATION ENGINEERING COURSE
Nurmi Frida D.B. Pakpahan
Universitas Negeri Surabaya

20 ASSESSING MATHEMATIC PROBLEM-SOLVING SKILL AT VOCATIONAL STUDENTS
Sriatun
Universitas Negeri Surabaya

Sub Theme 2: Technopreneurship

1 IMPROVEMENT OF ACADEMIC SERVICES WITH SELF SERVICE APPLICATION BASED ON SHORT MESSAGE SERVICE USING BREADTH-FIRST SEARCH ALGORITHM
Fahmy Syahputra, Rosnelli, Eka Daryanto
Universitas Negeri Medan

2 BISCUIT FORMULATION WITH SUBSTITUTION OF BROWN RICE FLOUR
Slamet Widodo, Saifuddin Sirajuddin
Universitas Negeri Makassar, Universitas Hasanuddin

3 CONTRIBUTION OF APPLICATION OF OCCUPATIONAL SAFETY AND HEALTH TO MECHANICAL WORK PRODUCTIVITY
Nuzul Hidayat, Remon Lapisa, Ahmad Arif, Fajar Maulana
Universitas Negeri Padang

4 TECHNOPRENEURSHIP AND ECOPRENEURSHIP OF JAMBLANG FRUIT (SYZYGIUM CUMINI) BASED ON FACTORY
Jokebet Saludung
Universitas Negeri Makassar

5 WHAT PROMOTION STRATEGY ARE SUITABLE FOR DESA WISATA KUBU GADANG, PADANG PANJANG CITY THROUGH ELECTRONIC MEDIA?
Feri Ferdian
Universitas Negeri Padang

6 FUZZY FINANCIAL FEASIBILITY ANALYSIS FOR INTEGRATED LONTAR (Borassusflabellifer) SUGAR INDUSTRY: CASE STUDY IN ROTE NDAO DISTRICT, EAST NUSA TENGGARA PROVINCE, INDONESIA
Fahrizal, N.G. Yeheskial, Jasman, Kartiwan
Universitas Nusa Cendana

7 INTEGRATED LOCAL EXCELLENCE-BASED ENTREPRENEURSHIP CHARACTER IN MENSWEAR MANAGEMENT COURSE OF FASHION DESIGN EDUCATION STUDENTS
Sri Endah Wahyuningsih
Universitas Negeri Semarang

8 HOW IS THE IMPLEMENTATION OF SAPTA PESONA AT ARTA INDAH BEACH, SUNGAI LIMAU DISTRICT, PADANG PARIAMAN REGENCY
Ira Meirina Chair, Pasaribu
Universitas Negeri Padang

9 DOES THE MENU OF TH CAFE (A BUSINESS INCUBATOR, FPP, UNP) PROFITABLE AND POPULAR ENOUGH?
Pasaribu, Ira Meirina Chair, Feri Ferdian
Universitas Negeri Padang

10 DEVELOPMENT OF CONTEXTUAL BASED ENTREPRENEURSHIP MATERIALS FOR

XV
11 TEACHING FACTORY BASED LEARNING PARADIGM IN VOCATIONAL HIGHER EDUCATION ON THE ERA OF INDUSTRY 4.0
Ahmad Dardiri, Imam Alfiyanto, Mardji, Hadi Wasito, Sutrisno
Universitas Negeri Malang

12 THE VALIDITY OF ENTREPRENEURSHIP MODULE-BASED PRODUCTS IN VOCATIONAL EDUCATION
Asmar Yulastri, Syaiful Islami, Ganefri
Universitas Negeri Padang

13 IMPROVEMENT OF ACADEMIC SERVICES WITH SELF SERVICE APPLICATION BASED ON SHORT MESSAGE SERVICE USING BREADTH-FIRST SEARCH ALGORITHM
Mustika Nurmala Handayani, Arrafi Diena Amalia, and Sri Handayani
Universitas Pendidikan Indonesia

14 "THE EDUCATIONAL MOBILE GAME AS AN EFFECTIVE MULTIMEDIA TO IMPROVE STUDENTS’ ACHIEVEMENT IN ENGLISH LEARNING"
M Wahyudin Wachid, Subiyanto, Tatyantoro Andrasto
Universitas Negeri Semarang

15 "DEVELOPMENT OF MAKE-UP FANTASY VIDEO OF EDUCATIONAL PROGRAM FOR MAKE-UP EDUCATION"
Rohana Aritonang, Dina Ampera
Universitas Negeri Medan

16 THE ROLE OF BLENDED MOBILE LEARNING IN ALGEBRA
Lipur Sugiyanta, Moch. Sukardjo
Universitas Negeri Jakarta

Sub Theme 3: Technology and Vocational Education Model (TVEModel)

1 APPLICATION OF COOPERATIVE LEARNING MODELS OF TYPE JIGSAW TO IMPROVE STUDENT LEARNING RESULT IN SMK
Patang Makkunessa, Nurlinda, Lahming
Universitas Negeri Makassar

2 THE EFFECT OF INDIRECT INSTRUCTION STRATEGY ON STUDENT LEARNING OUTCOMES OF SMK WITH HIGH AND LOW ACHIEVEMENT MOTIVATION
Edy Suprapto
Universitas Nusa Cendana

3 CREATING THE ENVIRONMENTAL ATTITUDE BY WORKSHOP ACTIVITIES IN CONSTRUCTION ENGINEERING EDUCATION
Nurlita Pertiwi, Panennungi
Universitas Negeri Makassar

4 EFFECTIVENESS OF USING PROBLEM-BASED LEARNING MODEL ON ELECTRONIC LEARNING PROGRAM ELECTRONICS ANALOG AND DIGITAL OF INFORMATICS AND COMPUTER ENGINEERING EDUCATION UNM
Mustari Lamada, Satria Gunawan Zain
<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Author(s)</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Improving Students’ Learning Results Using Discovery Learning Model of</td>
<td>Syamdidah</td>
<td>Universitas Negeri Makassar</td>
</tr>
<tr>
<td></td>
<td>the Students of Family Welfare Education Department, Faculty of</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Engineering, State University of Makassar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Marine As Surya Desalination Learning in NTT</td>
<td>Hari Rarindo</td>
<td>Universitas Nusa Cendana</td>
</tr>
<tr>
<td>7</td>
<td>Statical Lectures with Approach Touch Reading Learning Constructiveness</td>
<td>Priyono</td>
<td>Universitas Nusa Cendana</td>
</tr>
<tr>
<td>8</td>
<td>The Contribution of Vocational Competencies Learning to the Creativity in Apparel Making of Vocational School Students</td>
<td>Siti Aisyah, Djoko Kustono, Syamsul Hadi</td>
<td>Universitas Negeri Makassar</td>
</tr>
<tr>
<td>9</td>
<td>Employing Andi Learning Model in Culinary Arts Course: How Does It Contribute to Emulation Ability and Students’€™ Creativity?</td>
<td>Andi Hudiah, Marji, Eddi Sutadji, Titi Mutiara Kiranawati</td>
<td>Universitas Negeri Makassar</td>
</tr>
<tr>
<td>11</td>
<td>Understanding Hydraulic Lesson Concept Through Thinking Crits (Critical Thinking) Students Building Students in SMKN 5 Kupang</td>
<td>Paul G Tamelan</td>
<td>Universitas Nusa Cendana</td>
</tr>
<tr>
<td>12</td>
<td>Method of Workforce Recruitment Programme for Industrial Class Students</td>
<td>Widiyanti, Yoto, Duwi Leksono Edi, Andika Bagus Nur Rahma Putra</td>
<td>Universitas Negeri Malang</td>
</tr>
<tr>
<td>13</td>
<td>Effect of Use of Trainer Kit Microcontroller MCS51 on Student Learning Creativity</td>
<td>Edidas</td>
<td>Universitas Negeri Padang</td>
</tr>
<tr>
<td>14</td>
<td>Development of Work-Based Learning SPSG Model on Blasting Technique</td>
<td>Murad Munir Soos, Selamat Triono Ahmad, Fahmi Riza</td>
<td>Universitas Negeri Padang</td>
</tr>
<tr>
<td>15</td>
<td>The Development of Mobile Learning Based on Android on Graphic Design</td>
<td>Nurhasan Syah, Rijal Abdullah, Yulius Marta</td>
<td>Universitas Negeri Padang</td>
</tr>
<tr>
<td>16</td>
<td>Windmill Techno Park for the Integrated Educational Tourism Model</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
17 APPLICATION OF PROJECT-BASED LEARNING TO IMPROVE CREATIVITY AND KNOWLEDGE COMPETENCE
Waskito, Hasanuddin, Hendri Nurdin, Yogi Dian Alfana
Universitas Negeri Padang

18 EFFECTIVITY OF THE COOPERATIVE-PROJECT BASED LEARNING (CPIJBL) IN ENHANCING HOTS OF VOCATIONAL EDUCATION STUDENTS
Nizwardi Jalinus, Syahril, Rahmat Azis Nabawi
Universitas Negeri Padang

19 BLENDED LEARNING: AN EXPERIMENTAL STUDY FOR CORROSION AND METALS COATING COURSE
Yusep Sukrawan, Soemarto, Mumu Komaro
Universitas Pendidikan Indonesia

20 THE READINESS OF STUDENT TO ENTREPRENEUR THROUGH INCORPORATION OF THE PILOT PROJECT PRACTICE
Ernawati Nazar
Universitas Negeri Padang

21 THE INFLUENCE OF COOPERATIVE LEARNING JIGSAW MODEL AND LEARNING MODULE ON LEARNING OUTCOMES IN VOCATIONAL EDUCATION
Suparno, Bulkia Rahim, Arwizet K, Zoni Amanda Putra, Jasman
Universitas Negeri Padang

22 THE OPTIMIZATION MULTIPLE SKILLS GENERATED WITH PROJECT-BASED LEARNING MODEL ON ELECTRONICS BASIC CLASS FOR AUTOMOTIVE
Muhammad Ihwanudin, Fuad Indra Kusuma
Universitas Negeri Malang

23 THE DEVELOPMENT OF GAME-BASED LEARNING MEDIA AS SUPPORT ON BASIC PROGRAMMING SUBJECTS IN SMK
Refdinal, Ambiyar, Sukardi, Novi Febriyanti
Universitas Negeri Padang

24 DEVELOPING LAB ACTIVITY MATERIALS FOR SEMI-AUTOMATIC PIPE WELDING
Solichin, Imam Sudjono, Muhammad Chabibi
Universitas Negeri Malang

25 THE INSTRUCTIONAL AND NURTURANT EFFECT OF EXPERIENTIAL LEARNING ON CONCRETE STONES PRACTICE
Syafiatun Siregar, Harun Sitompul
Universitas Negeri Medan

26 IMPACT MEDIA DEVELOPMENT BASED ON INFORMATION TECHNOLOGY LEARNING TO INCREASE CREATIVITY AND INNOVATION IN HIGH SCHOOL STUDENTS VOCATIONAL
Constantinus Rudy Prihantoro
Universitas Negeri Jakarta

27 HANDBOOK OF DECORATIVE FASHION DESIGN ASSISTED BY CORELDRAW AND ITS EFFECT ON STUDENTS CREATIVITY
Yenni Idrus
<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>THE ROLE OF SOFT SKILLS IN IMPROVING THE COMPETENCE OF GRADUATES FOR ENTERING THE WORKING WORLD</td>
<td>I Made Sudana, Delta Apriyani</td>
<td>Universitas Negeri Semarang</td>
</tr>
<tr>
<td>29</td>
<td>DESCRIPTION AND MANAGEMENT OF PROBLEM BASED LEARNING MODELS IN VOCATIONAL EDUCATION TO AGAINST ERA DISRUPTION AND ERA INDUSTRIAL 4.0</td>
<td>Sri Sukamta, Totok Sumaryanto Florentinus, Rasdi Ekosiswoyo, S. Martono</td>
<td>Universitas Negeri Semarang</td>
</tr>
<tr>
<td>30</td>
<td>INTEGRATING STEM (SCIENCE TECHNOLOGY ENGINEERING AND MATHEMATICS) EDUCATION ON ADVANCING VOCATIONAL STUDENT’S TRANSVERSAL SKILLS</td>
<td>Marsono, Tuwoso</td>
<td>Universitas Negeri Malang</td>
</tr>
<tr>
<td>31</td>
<td>EFFECTIVENESS OF LEARNING MODEL BLENDED LEARNING BASED ON CONSTRUCTTIVISTIC EQUIPMENT Course CNC MACHINE TECHNIQUES</td>
<td>Muslim, Selamat Riadi</td>
<td>Universitas Negeri Malang</td>
</tr>
<tr>
<td>32</td>
<td>LEARNING MODEL DEVELOPMENT IN A COOKING CLASS ACTIVITY FOR EARLY AGE CHILDREN IN IMPROVING FINE MOTORIC SKILL</td>
<td>Octavianti Paramita</td>
<td>Universitas Negeri Semarang</td>
</tr>
<tr>
<td>33</td>
<td>CREATIVE AND PRODUCTIVE LEARNING MODEL OF CAKE DECORATING SUBJECT CULINARY ART DEPARTMENT OF STATE UNIVERSITY OF MEDAN</td>
<td>Fatma Tresno Ingtias</td>
<td>Universitas Negeri Medan</td>
</tr>
<tr>
<td>34</td>
<td>THE IMPLEMENTATION OF THE TECHNOLOGY PEDAGOGY CONTENT KNOWLEDGE (TPCK) FRAMEWORK TO CULTIVATE THE VOCATIONAL STUDENTS’ CREATIVE THINKING SKILLS</td>
<td>Tjahyani Busono, Erna Krisnanto, Nanang Dalil Herman</td>
<td>Universitas Pendidikan Indonesia</td>
</tr>
<tr>
<td>35</td>
<td>JOB SHEET DEVELOPMENT OF COSMETICS ASSISTED IN INQUIRY METHOD IN THE STUDY PROGRAM OF MAKE-UP EDUCATION UNIVERSITAS NEGERI MEDAN</td>
<td>Lina Pangaribuan</td>
<td>Universitas Negeri Medan</td>
</tr>
<tr>
<td>36</td>
<td>PROJECT-BASED LEARNING AS A STUDENT CHARACTER AND CREATIVITY BUILDING</td>
<td>Atika, I Made Sudana</td>
<td>Universitas Negeri Semarang</td>
</tr>
<tr>
<td>37</td>
<td>IMPLEMENTATION OF MEDIA COMPACT DISK INTERACTIVE SUB COMPETENCE OF HAND CARE AND NAIL MAKE UP (MANICURE)</td>
<td>Rizki Yulianingrum Pradani, Mutimmatul Faidah</td>
<td>Universitas Negeri Malang</td>
</tr>
<tr>
<td>38</td>
<td>DESIGN IMPROVEMENT OF ENERGY-SAVING AND ECO-FRIENDLY CAR AS TRANSPORTATION FACILITY</td>
<td>Zainal Arifin, Herminarto Sofyan, Moch. Solikin, Kir Haryana</td>
<td>Universitas Negeri Yogyakarta</td>
</tr>
<tr>
<td>Page</td>
<td>Title</td>
<td>Authors</td>
<td>Institution</td>
</tr>
<tr>
<td>------</td>
<td>----------------------------------------------------------------------</td>
<td>----------------------------------------------</td>
<td>------------------------------------------------</td>
</tr>
<tr>
<td>39</td>
<td>THE IMPLEMENTATION OF TEACHING FACTORY PROGRAM FOR EDUCATION OF FAMILY WELFARE (PKK) PROGRAM STUDY</td>
<td>Saptariana, Noor Hudallah</td>
<td>Universitas Negeri Semarang</td>
</tr>
<tr>
<td>40</td>
<td>IMPLEMENTATION OF THE SCIENTIFIC BLENDED LEARNING ON ELECTRICAL MEASUREMENT STUDY</td>
<td>Rosnelli, Kinanti Wijaya</td>
<td>Universitas Negeri Medan</td>
</tr>
<tr>
<td>41</td>
<td>VIDEO LEARNING MODEL IN CONSTRUCTION DRAWING COURSE</td>
<td>Abdul Haris Setiawan, Ida Nugroho Saputro, A.G. Tamrin</td>
<td>Universitas Sebelas Maret</td>
</tr>
<tr>
<td>42</td>
<td>THE INFLUENCE OF THE IMPLEMENTATION CHARACTERISTICS OF LIFE-BASED LEARNING ON THE LEARNING PROCESS TOWARDS ACADEMIC SKILLS</td>
<td>Syaad Patmanthara, Heru Wahyu Herwanto, Ni’matul Hidha Wulansari</td>
<td>Universitas Negeri Malang</td>
</tr>
<tr>
<td>43</td>
<td>THE MODULES DEVELOPMENT OF MATERIAL TESTING BY USING CONSTRUCTIVIST APPROACH AT MECHANICAL ENGINEERING DEPARTMENT OF UNIMED</td>
<td>Erma Yulia</td>
<td>Universitas Negeri Medan</td>
</tr>
<tr>
<td>44</td>
<td>DISCOVERY LEARNING MODEL ON LEARNING TECHNOLOGY IN DEPARTMENT OF FASHION EDUCATION UNIVERSITAS NGERI MEDAN</td>
<td>Dina Ampera</td>
<td>Universitas Negeri Medan</td>
</tr>
<tr>
<td>45</td>
<td>THE INFLUENCE OF THE PROBLEM BASED LEARNING AND PRIOR KNOWLEDGE TOWARDS THE RESULTS OF STUDY OF MECHANICS MATERIALS</td>
<td>Tri Kuncoro, Waras, Made Wena, A, Dardiri</td>
<td>Universitas Negeri Malang</td>
</tr>
<tr>
<td>46</td>
<td>JUST IN TIME” TEACHING MODEL AND PROBLEM BASED LEARNING AS ALTERNATIVES TO IMPROVE THE EFFICIENCY AND EFFECTIVENESS OF VOCATIONAL LEARNING</td>
<td>Bambang Supriyanto, Suparno, Made Wena</td>
<td>Universitas Negeri Malang</td>
</tr>
<tr>
<td>47</td>
<td>EFFECTIVENESS OF MODEL NATIONAL CHARACTER BUILDING THROUGH MANNERS EDUCATION BASED ON REGIONAL CULTURE OF NORTH SUMATERA</td>
<td>Efendi Napitupulu, Hamonangan Tambunan, Keyser Panjaitan</td>
<td>Universitas Negeri Medan</td>
</tr>
<tr>
<td>48</td>
<td>DESIGN FOR DEVICES OF PROJECT-BASED TRAINING PRODUCING OIL PALM EMPTY FRUIT BUNCH (OPEFB) FIBER</td>
<td>Batumahadi Siregar, Sumarno, Nizwardi Jalinus</td>
<td>Universitas Negeri Medan</td>
</tr>
<tr>
<td>49</td>
<td>AN ENVIRONMENTAL EDUCATION PROGRAM FOR VOCATIONAL HIGH SCHOOLS IN INDONESIA: A DISCOVERY LEARNING MODEL TO UNDERSTAND ENERGY SAVING STRATEGY</td>
<td>Maksun Johar, Surahman Usep, Barliana Mokhamad Syaom</td>
<td>Universitas Pendidikan Indonesia</td>
</tr>
<tr>
<td>50</td>
<td>THE EVALUATION OF BLENDED LEARNING PROGRAM BY USING KIRKPATRICK MODEL ON THE MACHINE INTERFERENCE DIAGNOSIS IN STATE UNIVERSITY OF MALANG</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Erwin Komara Mindarta, Eddy Sutadji, Andika Bagus Nur Rahma Putra, Fuad Indra Kusuma, M. Ihwanudin, Windra Irdianto
Universitas Negeri Malang

51 DEVELOPMENT OF ENGINEERING VOCATIONAL LEARNING MODEL FOR STUDENTS IN REMOTE AREAS
Sumarto, Wahid Munawar, Ridwan Adam MN
Universitas Pendidikan Indonesia

52 THE IMPLEMENTATION OF PROBLEM BASED LEARNING METHOD IN LEARNING PRACTICE OF GRINDING MACHINING
Thomas Sukardi, Achmad Arifin, Surono Surono, Endri Triwiyono
Universitas Negeri Yogyakarta

53 Implementation Of Problem Solving Learning Model To Increase Students’ Learning Outcomes
Budihardjo Achmadi Hasyim, Fery Kurniawan Ady Putra
Universitas Negeri Surabaya

Sub Theme 4: General Papers (GP)

1 THE EFFECT OF BLENDED LEARNING MODEL TO THE STUDENTS COMPETENCY ON THE ENGINEERING PHYSICS
Usmeldi
Universitas Negeri Padang

2 RELATIONSHIP OF EDUCATION 3.0 APPLICATION ON THE ABILITY OF ANDRAGOGY AND PEDAGOGY PROSPECTIVE TEACHER VOCATIONAL SCHOOL
Ahmad Mursyidun Nidhom, Setiadi Cahyono Putra, Hary Suswanto, Andika Bagus N.R.P.
Universitas Negeri Malang

3 BUILT DESIGN IN INTERACTIVE MEDIA APPLICATIONS BASED ANDROID PLATFORM ON DIGITAL SIMULATION SUBJECT
Almasri, Asrul Huda, Yasinul Huda, Rahmi Anita Azmi
Universitas Negeri Padang

4 SPREADSHEET BASED MODULE FOR STATISTICS COURSE
Adhi Kusumastuti
Universitas Negeri Semarang

5 WORK-BASED PEER ASSISTED LEARNING TOWARDS PNEUMATIC AND HYDRAULIC LEARNING OUTCOMES AT DEPARTMENT OF MECHANICAL ENGINEERING EDUCATION
Fiskia Rera Baharuddin
Universitas Negeri Makassar

6 PERFORMANCE OF VOCATIONAL HIGH SCHOOL AND UNIVERSITY STUDENTS DURING APPRENTICESHIP
Hary Suswanto
Universitas Negeri Malang

7 THE EFFECT OF NEOODYMIUM-IRON-BORON MAGNETISM ON FUEL TOWARDS FOUR-STEP MOTORCYCLE EXHAUST EMISSIONS
Hasan Maksum
Universitas Negeri Padang

8 THE PIPE WELDING TRAINER FOR GROOVE JOINT IN ALL WELDING POSITIONS

xxi
Asep Hadian Sasmita
Universitas Pendidikan Indonesia

9 POTENTIAL AND NEED OF PRODUCTS BASED ON CATFISH TO IMPROVE NUTRITION QUALITY OF CHILDREN AND COMMUNITY FOOD SECURITY
Yuliana
Universitas Negeri Padang

10 DESIGN OF MOBILE APPLICATION TO IMPROVE THE QUALITY OF VOCATIONAL EDUCATION
Khoirudin Asfani
Universitas Negeri Malang

11 THE EFFECT OF A WATER EXTRACT OF BROWN SEAWEED ON THE CHARACTERISTIC OF JELLY CANDY AS A FUNCTIONAL FOOD
Anni Faridah
Universitas Negeri Padang

12 THE NEW INDUSTRIAL REVOLUTION IS BEGINNING: ELECTRICAL GENERATOR WITHOUT FUEL IS NOT A LIE (THEORETICAL REVIEW OF NEWTON LAW OF INERTIA PROVES THAT ENERGY CAN BE CONTINUOUSLY RESURRECTED)
Bambang Triatma
Universitas Negeri Semarang

13 THE VALIDITY OF ENTREPRENEURSHIP MODULE-BASED PRODUCTS IN VOCATIONAL EDUCATION
Asmar Yulastr
Universitas Negeri Padang

14 THE INFLUENCE OF LEARNING MEDIA AND TECHNIQUE DRAWING CAPABILITY TOWARDS THE LEARNING OUTCOMES OF CNC II TU-2A MACHINE TOOL
Robert Silaban, Keysar Panjaitan, and Hidir Efendi
Universitas Negeri Medan

15 HUMAN RESOURCES MANAGEMENT MODEL AS A SUPPORT FOR ELENA SYSTEM IN UNIVERSITAS NGERI SEMARANG
Djuniadi
Universitas Negeri Semarang

16 COLOR QUALITY OF MARBLING TECHNIQUE MOTIFS USING GEL OF TAPIOCA FLOUR
Siti Nurrohmah, and Rifani Nugraheny
Universitas Negeri Semarang

17 "WATER QUALITY ANALYSIS AND THE POSSIBILITY OF HEAVY METAL CONTAMINATION Hg, Pb AND Cd ON WATER ZONE IN VILLAGE PITUSUNGGU of Pangkep Regency"
Subariyanto, Patang, Fajar Wiramas Prabowo
Universitas Negeri Makassar

18 ELECTRICAL EQUIPMENT CONTROL BASED RELAY RASPBERRY
Yunus Tjandi, Ruslan, Syarifuddin Kasim
Universitas Negeri Makassar

19 UPGRADING THE CALORIFIC VALUE OF LOW RANK COAL WITH DRYING METHOD WITHOUT OXYGEN
Rijal Abdullah, Joni Pradinata
Universitas Negeri Padang

20 A PILE HEAD WORK ON INTEGRAL BRIDGE CONSTRUCTION SECTOR P18- P22 ON THE
<table>
<thead>
<tr>
<th>Project/Title</th>
<th>Authors</th>
<th>Page Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROJECT (SURABAYA-MOJOKERTO TOLL ROAD DEVELOPMENT) SECTION 1B STA 11 + 100 - 15 + 400</td>
<td>Djoni Irianto, Universitas Negeri Surabaya</td>
<td>21: I4.104-109</td>
</tr>
<tr>
<td>&quot;EMOTIONAL MATURITY DETERMINANTS OF VOCATIONAL EDUCATION STUDENTS&quot;</td>
<td>Nathanael Sitanggang, Putri Lynna A. Luthan, Universitas Negeri Medan</td>
<td>22: I4.110-115</td>
</tr>
<tr>
<td>THE INFLUENCE OF STUDENTS' UNDERSTANDING IN CONSERVATION CHARACTERISTICS AND SCIENTIFIC ATTITUDE TOWARDS ENVIRONMENTAL CARE IN UNIVERSITAS NEGERI SEMARANG</td>
<td>Asih Kuswardinah, Wahyuningsih, Universitas Negeri Semarang</td>
<td>23: I4.116-119</td>
</tr>
<tr>
<td>THE IMPORTANCE OF LITERACY COMPETENCY DATA AT SMK STUDENTS TO FACING ERA INDUSTRIAL REVOLUTION 4.0</td>
<td>Diana Putri Pratiwi Sulistyorini, Mohammad Zainal Sabarudin, Universitas Negeri Surabaya</td>
<td>24: I4.120-128</td>
</tr>
<tr>
<td>&quot;PERFORMANCE ANALYSIS OF TECHNOLOGY EDUCATIONAL STUDY PROGRAM BASED ON QUALITY OF ACCREDITATION&quot;</td>
<td>Agus Dudung, Lipur Sugiyanta, Universitas Negeri Jakarta</td>
<td>25: I4.129-135</td>
</tr>
<tr>
<td>NOMINAL OF MONEY AND COLOUR READER FOR THE BLIND PEOPLE</td>
<td>Jaja Kustija, Furqon Andika, Universitas Pendidikan Indonesia</td>
<td>26: I4.136-142</td>
</tr>
<tr>
<td>CAPABILITIES OF STUDENT ADAPTATION S1 PTE LPTK AS PRESERVICE OF VOCATIONAL TEACHERS IN JAVA INDONESIA</td>
<td>Setiadi Cahyono Putro, Tri Rijanto, I Made Sudana, Iwa Kuntadi, Wisnu Jatmiko, Giri Wiyono, Universitas Negeri Malang</td>
<td>27: I4.143-146</td>
</tr>
<tr>
<td>DEVELOPMENT OF VOCATIONAL EDUCATION BY LOOKING AT THE FACTORS INFLUENCE SUPPORTING TO REGIONAL POTENTIALS</td>
<td>Agus Wiyono, Universitas Negeri Surabaya</td>
<td>28: I4.14-152</td>
</tr>
<tr>
<td>THE APPLICATION OF SANITATION AND HYGIENE PRACTICE OF PRODUCTION UNITS TO ENHANCE THE ENTREPRENEURSHIP READINESS TO PRODUCE QUALITY FOOD PRODUCTS FOR VOCATIONAL HIGH SCHOOL STUDENTS OF CULINARY PROGRAM</td>
<td>Diana Evawati, Universitas PGRI Adi Buana</td>
<td>29: I4.153-156</td>
</tr>
<tr>
<td>PERCEPTION TOWARDS TRANSFERABLE SKILLS IN INDONESIAN UNIVERSITIES</td>
<td>Agus Setiawan, Iwa Kuntadi, Masriam Bukit, Universitas Pendidikan Indonesia</td>
<td>30: I4.157-161</td>
</tr>
<tr>
<td>THE PERFORMANCE OF MULTI-CYLINDER GASOLINE ENGINE FUELLED WITH THE MIXTURE OF BIOETHANOL FROM SOLANUM LYCOPERSICUM AND PREMIUM</td>
<td>Muhaji, Universitas Negeri Surabaya</td>
<td>27: I4.143-146</td>
</tr>
</tbody>
</table>
Sub Theme 5: Technology and Vocational Education Management (TVEM)

1. STUDENT ANALYSIS CHARACTERISTIC IN THE EFFORT OF APPLYING TOTAL QUALITY MANAGEMENT (TQM) IN LEARNING PROCESS
   Wawan Purwanto, Bahrul Amin, Nuzul Hidayat Sukardjo, Erzeddin Alwi
   Universitas Negeri Padang

2. MANAGEMENT AND OPTIMIZATION OF VOCATIONAL EDUCATION TECHNOLOGY (VET) AND DEVELOPMENT OF VOCATIONAL FIELD
   Legiman Slamet
   Universitas Negeri Padang

3. NEEDS ANALYSIS OF PRODUCTIVE SUBJECT TEACHERS OF CONSTRUCTION TECHNOLOGY AND PROPERTY PROGRAM
   Eko Nugroho Julianto, Soesanto, Fathur Rokhman, Heri Yanto
   Universitas Negeri Semarang

4. THE ACCELERATED LEARNING
   Dedy Irfan
   Universitas Negeri Padang

5. IMPLEMENTATION OF ISO CERTIFICATION IN EDUCATIONAL ORGANIZATION
   Sudjani
   Universitas Pendidikan Indonesia

6. VOCATIONAL EDUCATION MANAGEMENT IN DISRUPTION ERA
   Danar Susilo Wijayanto, Herminarto Sofyan
   Universitas Sebelas Maret

Sub Theme 6: Technology and Vocational Education Curriculum (TVEC)

1. FISH JOURNEY “INNOVATION EDUCATIONAL GAMES BASED ON PSYCHOMOTOR TECHNOLOGY AS IMPLEMENTATION CURRICULUM 2013 ON EDUCATION INDONESIA
   Dieta Wahyu Asry Ningtias, Muhamad Iqbal Fahrian, Arimaz Hangga
   Universitas Negeri Semarang

2. IMPLEMENTATION OF INTERACTIVE MULTIMEDIA LEARNING BASED ON WEBSITE FOR DISTANCE AND GEOMETRY OF VOCATIONAL HIGH SCHOOL
   Moch. Sukardjo, Lipur Sugiyanta
   Universitas Negeri Jakarta

3. IMPROVING PRE TEACHER'S SOFT SKILL THROUGH THE MIX AND MATCH LEARNING METHOD
   Anis Rahmawati
   Universitas Sebelas Maret

4. LEARNING METHOD FOR IMPROVEMENT THE QUALITY OF STUDENTS AS A MILLENIAL GENERATION
   Veronika Asri Tandirerung
   Universitas Negeri Makassar

5. EFFECTIVENESS OF THE PROJECT-BASED LEARNING (PJBL) INSTRUCTIONAL MODEL ON POWER ELECTRONICS COURSE
   Ruslan, Lu'mu Taris, Zulfiati Syahrial, Basuki Wibawa
   Universitas Negeri Makassar

6. STRENGTHENING VOCATIONAL SCHOOL WITH RENEWABLE ENERGY COMPETENCY TO FACE GREEN JOB ERA
   Universitas Negeri Makassar
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>MODELS FOR STUDENT COMPETENCY IN SUNDAPUTRI’S BRIDAL BASED ON INDONESIAN NATIONAL WORKING STANDARDS COMPETENCE (SKKNI)</td>
<td>16.30-34</td>
</tr>
<tr>
<td>Sri Usodoningtyas, Luthfiyah Nur Iela, Munoto</td>
<td></td>
</tr>
<tr>
<td>Universitas Negeri Surabaya</td>
<td></td>
</tr>
<tr>
<td>DEVELOPMENT OF STONEWORK JOB SHEET PRACTICES TOWARDS VOCATIONAL CURRICULUM</td>
<td>16.35-37</td>
</tr>
<tr>
<td>Nurhayati Aritonang, Nur Andajani, Satriana Fitri Mustika Sari</td>
<td></td>
</tr>
<tr>
<td>Universitas Negeri Surabaya</td>
<td></td>
</tr>
<tr>
<td>CURRICULUM 2013: IMPLEMENTATION AT ENTREPRENEURSHIP AND PRODUCTION UNITS IN VOCATIONAL HIGH SCHOOLS IN INDONESIA</td>
<td>16.38-42</td>
</tr>
<tr>
<td>Marniati, Mein Charanolis</td>
<td></td>
</tr>
<tr>
<td>Universitas Negeri Surabaya</td>
<td></td>
</tr>
<tr>
<td>ANALYSIS OF PROJECT MANAGEMENT NEEDS AND STUDENT’¢“S COMPETENCIES THROUGH A MAKERSPACE APPROACH IN DEALING WITH DISRUPTIVE TECHNOLOGY ERA</td>
<td>17.1-6</td>
</tr>
<tr>
<td>Andika Bagus Nur Rahma Putra, Amat Mukhadis, Eko Edi Purwanto, Hary Suswanto, Widiyanti, Tuwoso, Ahmad Mursiyidun Nidhom, Erwin Komara Mindarta</td>
<td></td>
</tr>
<tr>
<td>Universitas Negeri Malang</td>
<td></td>
</tr>
<tr>
<td>THE FIRST JOB OF CULINARY EDUCATION PROGRAM GRADUATES OF UNIVERSITAS NEGERI SEMARANG IN 2011 – 2017</td>
<td>17.7-10</td>
</tr>
<tr>
<td>Muhammad Ansori, Leli Rizka Mawalidia, Musdalifah</td>
<td></td>
</tr>
<tr>
<td>Universitas Negeri Semarang</td>
<td></td>
</tr>
<tr>
<td>THE INFLUENCE OF STUDENTS' PERFORMANCE ON THE PRODUCTIVE COMPETENCE OF VOCATIONAL SCHOOLS IN PADANG</td>
<td>17.11-14</td>
</tr>
<tr>
<td>Ramli Bakar</td>
<td></td>
</tr>
<tr>
<td>Universitas Negeri Padang</td>
<td></td>
</tr>
<tr>
<td>STUDENT TEACHING COMPETENCE EDUCATIONAL FIELD PRACTICE IN SMKN 5 PADANG</td>
<td>17.15-19</td>
</tr>
<tr>
<td>Juniman Silalahi</td>
<td></td>
</tr>
<tr>
<td>Universitas Negeri Padang</td>
<td></td>
</tr>
<tr>
<td>CONTINUOUS PROFESSIONAL DEVELOPMENT PROFILE OF MECHANICAL AND AUTOMOTIVE TEACHER AT VOCATIONAL HIGH SCHOOL IN SOUTH SULAWESI INDONESIA</td>
<td>17.20-24</td>
</tr>
<tr>
<td>Samnur, Asmah Adam</td>
<td></td>
</tr>
<tr>
<td>Universitas Negeri Makassar</td>
<td></td>
</tr>
<tr>
<td>EFFECTIVENESS OF TRAINING MODELS BASED ON KNOWLEDGE MANAGEMENT SYSTEM</td>
<td>17.25-30</td>
</tr>
<tr>
<td>Kasman Rukun, Gunawan Ali</td>
<td></td>
</tr>
<tr>
<td>Universitas Negeri Padang</td>
<td></td>
</tr>
<tr>
<td>CORRELATION BETWEEN SOFT SKILLS AND HARD SKILLS WITH PREPARATION TO BE TEACHER OF MECHANICAL ENGINEERING EDUCATION STUDENTS</td>
<td>17.31-34</td>
</tr>
<tr>
<td>Budi Harjanto, Budi Harjanto, Nyenyep Sri Wardani, NiaNurAini</td>
<td></td>
</tr>
<tr>
<td>Universitas Sebelas Maret</td>
<td></td>
</tr>
<tr>
<td>VOCATIONAL FIELD TEACHERS’ COMPETENCES IMPROVEMENT IN IMPLEMENTING CHARACTER VALUES IN STUDENTS</td>
<td>17.35-41</td>
</tr>
</tbody>
</table>
Sugiyanto Sugiyanto, Priyono, Made Wena  
Universitas Negeri Malang

9  MASTERY LEARNING BASED LEARNING ENRICHMENT THROUGH INFORMATION TECHNOLOGY TO INCREASE VOCATIONAL HIGH SCHOOL STUDENTS LEARNING RESULTS  
Priyono  
Universitas Negeri Malang

10  IMPROVING TEACHERS IN DEVELOPING & ANALYZING MADE TEST THROUGH FOLLOW-UP AT CNC MACHINE TRAINING  
Yufrizal, EkoIndrawan Abdul Aziz  
Universitas Negeri Padang

11  THE RELATION OF STUDENT PERCEPTIONS TO TEACHER PROFESSIONALISM AND PARTICIPATION IN CLASSROOM WITH SCIENCE SUBJECT STUDY RESULTS AT SMAN I MANADO  
Billy Morris Kilis, Moudy M. Kambey  
Universitas Negeri Manado

12  EFFECTIVENESS OF PATTERN CONSTRUCTION MODULE IN THE STUDY PROGRAMOF FASHION EDUCATION UNIVERSITAS NEGERI MEDAN  
Farihah, Dina Ampera, SurniayatChalid  
Universitas Negeri Medan

13  CONTRIBUTION OF HARD SKILL, SOFT SKILL AND WORK ENVIRONMENT ON K3 BEHAVIOR OF WELDING PRACTICE OF VOCATIONAL HIGH SCHOOL STUDENTS IN NORTH SULAWESI  
Parsaoran Tamba  
Universitas Negeri Manado

14  REDESIGNING THE TOOL OF BRIQUETTE PROCESSING AS A VOCATIONAL LEARNING MEDIA ON MECHANICAL ENGINEERING  
Indra Koto  
Universitas Negeri Medan

15  RESEARCH AND DEVELOPMENT APPROACH (R & D) IN THE PROCESS OF MENTORING TESTING CERTIFICATION SYSTEM OF COMPETENCY PROFITIENCY INFORMATICS BASED ON UBIQUITOUS LEARNING  
Rangga Firdaus, Basuki Wibawa, Khaerudin  
Universitas Negeri Jakarta

16  SEARCHING NEW FORMULA FOR INCREASING ICT COMPETENCE OF VOCATIONAL TEACHERS  
Wahyu Nur Hidayat, Muladi, Syaad Patmanthara, and Tri Atmadji Sutikno, Rahajeng Kartika Sari  
Universitas Negeri Malang

17  IMPROVING VOCATIONAL TEACHERS™ PEDAGOGICAL COMPETENCES THROUGH INTRODUCTION TO LIFE-BASED INNOVATIVE LEARNING PRACTICE MODEL  
Made Weno, Sugiyanto, Pribadi  
Universitas Negeri Malang

Sub Theme 8: Public-Private Partnership Technology and Vocational Education (PPPTVE)

1  OPTIMIZATION OF HYBRID POWERED REFRIGERATOR SYSTEM (SOLAR CELL PLUS DIESEL ENGINE) FOR TRADITIONAL FISHING VESSELS IN MAKASSAR.
2 DEVELOPMENT OF WEB-BASED INFORMATION SYSTEM FOR WOMEN EMPOWERMENT RESEARCH CENTER IN UNIVERSITAS NEGERI MAKASSAR
   Lu’mu, Harifuddin, Wahyuni Yusuf
   Universitas Negeri Makassar

3 THE PARTNERSHIP APPROACH BETWEEN VOCATIONAL EDUCATION INSTITUTIONS AND ENTERPRISES
   Nur Qudus, Virgiawan Adi Kristianto
   Universitas Negeri Semarang

Sub Theme 9: Technology and Vocational Education Policy (TVEP)

1 THE CONTRIBUTION OF EMPLOYABILITY SKILL TOWARD TECHNICAL ABILITY OF AUTOMOTIVE BUSINESS LABOR OF VOCATIONAL HIGH SCHOOL GRADUATE
   Darmawang
   Universitas Negeri Makassar
Development Of Work-Based Learning SpSG Model On Blasting Technique

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Abstract— This research aims to produce a software of eLearning and eAssessment by using a web-based PHP and MySQL. This product was used and tested in SMKN 1 Sumatera Barat. The system had been tested to find out data it’s ability to process general data such as administrator, teachers, and students. This study determined the level of proprietary software that was created to test the feasibility of information systems in SMKN 1 Sumatera Barat. The type of research was the research and development. The study measured identifying problems, requirements analysis, design, implementation, validation specialist, product revision, validation specialist, user testing. Respondents trial were 26 students of class XI TKR and 3 teachers SMKN 1 Sumatera Barat, on ‘To maintenance transmission’ course. The method of data collection was the literature and questionnaires. The study consisted of descriptive analysis techniques such as quantitative scores and percentages on a predetermined grading scale. The results showed that the system was able to process information in general data such as administrator, teachers, and students. Data feasibility level assessment software by experts indicated that the information system was very feasible. Based on the assessment of students and teachers, the feasibility of information systems was very decent. Percentage feasibility by software engineering experts and users in order to obtain a percentage of 97.5% and 91.54%. It could be concluded that the information system has good quality and very decent for student data processing.

Keywords— e-Learning and e-Assessment Systems, Web Based, Web, PHP, MySQL

I. INTRODUCTION

Implementation of Curriculum 2013 lead to changes in the learning process. In the Curriculum 2013 the learning curriculum oriented toward active learning. Active learning can be an inquiry scientific approach, discovery learning, and project based learning. Active learning wants student to be active in teaching learning process, so that the Lesson Plan of student activities should be designed in such a way. Teaching Problem Base Learning (PBL) can be classified as active learning, because learning PBL based on the methods of science, student center, and pay attention to all three domains of learning.

Increased diversity of expertise in vocational followed by increasing public participation can learn at vocational school. This makes some competence skills increase the number of students. Expertise competence of Lightweight Vehicle Engineering (LVE), as part of the automotive engineering disciplines, in 2013 was named skills competency of curriculum called packets. This package became the idol of junior high school to graduates, and the number of students has increased dramatically in taking the package. The increase of students, when not accompanied by enhancing the number of teachers and teaching facility will lead to the decline in the quality of learning. In order to anticipate the decline in the quality of education and changes in the vocational learning process, Information Technology, especially the Internet, could be expected to overcome this problem. It demands that we continue to make innovations to adjust to that progress.

The demands of these advances have logical consequences on attempts at improvement in continuously learning. One consequence is the change and increase in volume and complexity of the learning activities as well as overall problems faced in the education. The needs of communications, data and information quickly and accurately at different levels and classroom management, and in order to improve the quality of care and improving the quality of the material teaching is a vital necessity, and determine the success of the learning process. The availability of adequate facilities and information is the basis for implementing the learning in students. In this case the manufacture and development of learning facility by using the internet is an attempt to overcome the problems of education.

In order to participate the improvement of the quality service balance and quantity of student learning both technical and strategic as a result of the implementation of the curriculum 2013, researchers create and develop Internet-Based Learning and Assessment. These development include in the facilities and Resources development for teacher, the results of which are expected to contribute for improving the reliable learning quality, especially for vocational which have practical activities learning at SMK 1 of West Sumatra in Training and Technical Education (BLPT), Padang. Various innovations of teaching are continued by teacher, so that in order the learning process is going well. The usage of the Internet for learning and teaching combined with PBL, is an attempt to innovate development for learning strategies. The combination of these two strategies will be accompanied with the creation of learning tools and devices refers to the PBL.
The research was guided by a desire to contribute in solving the problems facing the teaching and assessment of teachers at SMK LVE. This desire is realized by designing a learning tool e-Learning and PBL-based e-Assessment for Electrical subjects in class XI SMK. More specifically, this study aims to develop and apply device e-Learning and e-Assessment-based PBL valid, practical and effective. The term is valid, practical and effective use refers to the criteria proposed by Nieven (1999).

The problem that develops in schools these days are generally to LVE teachers is having difficulty to design and implement the active learning and assessment in accordance with the curriculum 2013, on the other hand a new paradigm of education (reflected in the curriculum 2013), assessment of students is not only done by cognitive, but also on psychomotor and affective. Lack of teacher knowledge about a variety of assessment techniques (other than a "paper and pencil test"), how to design, as well as how to make the implementation assessment tool is invalid and unreliable. On the other hand, the demands on schools (especially for charging report) require teachers to carry out a comprehensive assessment.

The result of research interviews (as the facilitating RSBI team) with several teachers for LVE in West Sumatra shows that in general they do not understand how to assess the students' abilities. As a result, in a report charging the teachers tend to give a figure for the domains based on "estimates" are highly subjective, without making any special instruments to measure aspects of the question. In addition, also found the assessment of teachers who do not assess these aspects correctly. The assessment of learning during this model mostly only on cognitive aspects, measured and assessed through a "paper and pencil test". Referring to the problem of a large teaching load of teachers, and the implementation of curriculum 2013 need to develop an other learning method, e-Learning software development in problem based learning become significant for LVE package in reaching their vocational competence, considered to address these issues. On the other side to see the achievement of the curriculum objectives 2013, paper and pencil tests are no longer adequate for a comprehensive assessment, necessitating a variety of alternative assessment forms. This research will be developed through e-assessment tools that are expected to assess the ability of students in an authentic and comprehensive.

Through this research will develop a set of e-Learning and e-Assessment-based PBL for Electrical subjects in class XI for LVE package. The results of this study are expected to help teachers of LVE, especially the class XI SMK, overcome their difficulties in implementing the learning and assessment. Problems to be solved by this study are: how to develop and implement the tools of e-Learning and e-Assessment-based PBL valid, practical, and effective for learning package of LVE competency on the subjects of Electricity in class XI SMK can overcome the problems of curriculum implementation in 2013?

This research is driven by the desire to contribute in solving the problems facing learning and assessment teachers for Lightweight Vehicle Engineering (LVE-Automotive) in
implementing the vocational curriculum 2013. This desire will be realized in the form of making devices PBL-based learning and assessment for Electrical subjects. More specifically, this study aims to develop and apply device e-learning and e-assessment-based PBL valid, practical and effective.

e-Learning is a development of electronic technology, which can transfer the knowledge, attitudes, and skills for teaching and learning. e-Learning work by using applications and web-based learning working processes, computer, virtual and digital collaboration. E-Learning content is sent in the form of text, image, animation, video streaming and audio via the intranet, internet / extranet, audio or video tape, satellite TV, and CD-ROM. Initially the e-learning activity called the IBT (Internet-Based Training), CBT (Computer-Based Training) and WBT (Web-Based Training), and is synonymous with e-learning.

There are two main aspects in e-learning, the learning aspect and the aspect of electronic technology (software and hardware). Thus in an activity e-learning, should have an element of motivation (internal), communication, and technology. So at no discipline e-learning educational psychology, communications, and electronic technology (Naidu, 47: 2006).

The e-Learning Application. The software system to virtualizes the conventional teaching and learning process. How classroom management, the manufacture of the material or the content, discussion forums, a scoring system (report), online examination system and all its associated with the management of the learning process. The software system is often called the Learning Management System (LMS), can use PHP or JavaScript.

E-Learning content; content and teaching materials on the e-Learning system (Learning Management System). Content and teaching materials in the form of multimedia-based Content, namely in the form of interactive multimedia content. Text-based Content, which is text-based content such as textbooks usual. Content is stored in a Learning Management System (LMS) that can be run by students whenever and wherever they are.

Actor is a teacher, as a conventional classroom in implementing e-Learning, teachers need guide their students. Students who receive instructional materials, then the administrator who manages the administration and the teaching and learning process. Methods of delivery of teaching materials in e-Learning are of two kinds: Synchronous e-Learning: Teachers and students in the classroom and at the same time in different places can be used teleconference. For example, students from SMK Semen attending the course of 'Electric Car' via teleconference with Mr. Rudi who is in the centre of BLPT education. It is called the Synchronous e-Learning, it need large bandwidth.

e-assessment is the use of information technology for assessment (Crips. 2001: 13). E-assessment has the same procedure as in e-learning, even most e-assessment is a supplement of e-learning. The difference lies in the content processing. Because of obvious similarities to e-learning, e-assessment terms are often considered part of the e-learning, but a clear e-assessment describes the use of computers in the process of student assessment.

e-assessment has many advantages over traditional assessment (pencil and paper test). Advantages include: fee for long-term cheaper, feedback to students can be directly, greater flexibility with respect to location and time of the test, increase reliability (machine is more reliable than humans), impartiality (the machine does not 'know' anybody of students, so that no student is disadvantaged), greater storage efficiency - tens of thousands of manuscripts questions and answers can be stored on the server than the required room space for text matter, style questions can be refined so that there is interactivity. There is also a shortage of e-assessment, e-assessment system is expensive to make and are not always suitable for every type of assessment (such as the description about the long answer).

In PPBI application, against four entities of users accommodated. Users, consists of people who can access to the site to search for information PPBI school and learning conditions of e-learning: general public. In this related to academic, among others: students of SMK Negeri 1 Padang, which was not far from education centers of BLPT (500 m), and students of UIN Imam Bonjol only 200m from BLPT education centers. Users can conduct a search of the site of PPBI, in around BLPT education centers through the Internet, the output display will be seen generally is a table. Here is a list of views that can be accessed by the user in the general level: Searching by NIS; Searching by group practice; Searching by teaching materials code (Jobsheet code); Viewing profile of LVE program.

Application of PPBI at the managerial level access is divided into two components, In the application of PPBI, database will be used far beyond the features mentioned above, since it must allow storing spatial data (multimedia data bases). In addition, the database must have a trigger PPBI, business modeling, and explicit rules for maintaining its integrity. Other requirements needed PPBI database is that the database must be able to support:

Complex object. It is an object in real life that contains other objects. These objects can be very complex internal structure that is usually arranged hierarchically. The modeling of it has spurred the growth of an object oriented database that is based on the concept of object-oriented. Examples of complex objects in PPBI are student learning space consisting of objects, among others: the room, which consists of objects; Teaching and learning activities, which consists of objects: class, teacher, student's name.

Write Program. This work part the programmer translates from predefined algorithm into code that can be read by a computer and executed in accordance with the measures that have been agreed. Modular Testing. In line with the writing program, modular testing run a few days after you begin writing. What is a modular testing are the testing process modules from the total system so that if there are errors can be corrected immediately without waiting for the program had been completed. This process is expected to reduce the error of writing a program or the results of the program itself at the
end of writing. Determining the Interest Test. At this stage the team will determine the purpose of the test before writing the program is finished. It is expected to be completed determination test objectives simultaneously with the completion of writing a program. Thus when the program is finished, can be immediately followed by testing on the finished program. Designing a Test Case. After analyzing the test program and the objectives that have been completed, the team will design a test case. The possibility of what will happen when the system is used.

University of Washington in science textbooks, the Ministry of Education (2004: 19) inquiry based learning and problem based learning as a strategy called CTL colored student-centered and student activity. PBL is characterized by: a public statement, the democratic process, and the role of active students, in fact the whole process of helping students to become independent, autonomous students who believe in their intellectual skills, performing an active involvement in a safe environment oriented intellectual inquiry. Cycle inquiries are as follows: a) observation, b) asking (questioning), c) submitted allegations (hypothesis), d) the collection of data (data gathering). Ronis (2000: 42) Teachers can use the techniques to help students discuss and debate the conduct of Problem Based Learning in the classroom by way of: Provide opportunities for students to learn; Pose the open ended question; Stimulate students to ask; Stimulate students to submit ideas; Stimulate students to examine their own ideas and questions; Stimulate students to discuss and gather other ideas and understanding; Use the questions students and the response to the development of meaningful and relevant topics; Stimulate students to reflect.

All the above points are to avoid an answer or explanation from the teacher. From the research Martin (1986) presented the Ministry of Education in the science textbook I (2004: 51) concluded that the question of teachers play an important role in the form of attitudes, ideas and success of student learning. So on the Department of Education in science textbook I (2004: 52) states learning inquiry should include questions that are meaningful and significant for students. The success of using technology in the classroom activity has been shown to increase motivation and learning outcomes. Then, without giving a good question, classroom activities will degenerate and meaningless.

Schlecty and Vance (1981) concluded that teaching experience is positively related to teaching competency test scores (one indicator is the ability to create a test). However, the study Person, the opposite happens i.e. negatively correlated teaching experience. So, teaching experience is a factor that needs to be examined, so that a clear role in determining the quality of teacher-made tests. The reason of the importance of developing skills tests: Developing test helps clarify the important behavior to learn; Skills learned in developing the test can be applied in all planning aspects and curriculum development and instruction; The skills and knowledge gained in tests development help evaluate the quality of tests created by other people or other agencies.; Tests were well arranged to guide an objective and fair procedure to assess; Knowledge regarding the latest development of the test will lead to understanding about the limitations and circumstances of the abuse of their use. To be able to develop a qualified test, teachers require some special skills (Mehrens and Lehmann, 1973: 119-200); Mastery of the subjects to be tested; Awareness of the underlying the education values; An understanding of the individual characteristics who tested; The ability of express ideas; Mastery of the type and technique of writing about] Awareness of strengths and weaknesses to write about

To create a test, first planned steps that initiate the preparation of the test. Here consideration all aspects of the test manufactu. It is the hallmark of a good test specification development. Test specification is the description that shows the overall characteristics of the must-have test developed. The test specifications include: Define the general objectives and requirements of the test; Develop lattice test by reference; contain the scope, the pressure and the parts of test that is the subject matter test and cognitive levels measured; Choosing the type of questions in accordance with the purpose of the test, scoring, administration and printing tests. Determining the level of difficulty of questions and distribution.; Determine the number of grains for whole and partial tests, weight, reliability, time and experimented; Determining how to arrange the problem in the final form; Setting up the matter and reviewing that

Mehrens and Lehman (1973: 197-198) adds that the formulation of the question is clear, written test items on different paper, made more than necessary, written after the material is taught, do repairs before tested and prepared keys and rules of appraisal. In 2013 affirmed curriculum, assessment do teachers through a variety of authentic assessment techniques, including: objective tests (PG), essay tests, portfolio assessment, and assessment of assignments, assessment of affective, and performance assessment for practice (Cangelosi, 1990). Assessment models that will be developed and implemented in this study are the combination of PBL learning process and the availability of features on PPBI program.

II. METHOD
This study was conducted by using a combined approach to research and development and for the 2nd year experimental method. Development research approach used to design and develop learning tools and assessments are valid and practical subjects Electricity in class XI SMK. Research development that is used to produce a specific product and test the effectiveness of the product. In the development will be analyzed the current system is, what is the procedure to information process by teachers and students in obtaining the final result in the form of learning outcomes, The model used in the study development prototyping development. Research development is the effort to develop and produce a product in the form of teaching materials, media, tools, or learning and assessment strategies used to overcome the problem of learning in the classroom / laboratory, and not to test the theory. Research and development has three main objectives: Produce products design that will be developed and used to improve the quality of learning; Test the effectiveness of a
product that has been created as a function of the primary validation through testing; Test the effectiveness, efficiency and attractiveness of the product. In this research, to be develop learning device and a valid assessment and practical for the learning of productive teaching materials, and tested its effectiveness.

Procedure Development

This process begins with collecting data, such as data about the school, the teacher data (3), the student data (26), majors and teaching materials, classrooms, a data infrastructure in the schools. To study literature is to collect reference materials in the form of a book, a collection of articles, a collection of journals, articles in magazines and newspapers, translations, dissertation or referral reference from the internet in the form of a journal article. Make observations in the form of observations or direct observation to information systems that are running on February 29, 2015. How does the teacher in the process to obtain the value of students’ final grades for each subject and eventually all students can get a report card. The permits research process, beginning with a letter of introduction from the UNP Lemlit Kesbangpol then to the office of West Sumatra Province, early March. Conducting interviews of some teachers on March 15, 2015 both the teacher who serves as guardian class and subject teachers, Principal at SMK 1 Sumbar. Formulate the problems in the current system. Obstacles encountered, losses and risks derived from the conduct of the system that is being run was carried out. Analyzing the needs of what is required of the system. Information will be dug as much as possible so that it will create an information system that can perform the desired tasks. Doing the system that will translate requirements need to a software design that can be used before it is made coding. Designed are output, database, input, and the structure of the program. Tools used include: Flow of Information Systems, Context Diagram, Entity Relationship Diagram. Translate the system into a language that can be recognized by the computer. In this case the language that will be used is PHP. After the coding is done testing on the system that has been created. The purpose of testing is to find fault with the system and then can be fixed. After analyzing and coding the finished system will be used by the user. Once the system as needed, and if so just do the implementation of information systems student scores. If not then it will be back system that fits the needs of the school. The process will be repeated for the sake of fulfillment desired by the school.

The procedure development of software is described as below: Research in the first year is focused on designing prototypes of the software, which consist of learning tools and devices and Web-based assessment of PBL valid and practical for Electrical subjects in class XI. Research activities begin with needs analysis includes: analyzing curriculum of LVE, conducting interviews with teachers and students, as well as reviewing literature on assessment and design. Software testing is a stage of implementation that has the aim to determine whether the system is designed to support the process to be produced e-Learning and e-Assessment in SMK 1 Sumatera Barat, Padang. In the range on May and June 2015, teaching materials testing on KD ‘maintenance transmissionr’, and for teaching materials with KD ‘Electricity’ held Vocational School (SMK) 1 Muhammadiyah Sumbar and SMK Dhuafa taught in July and August 2015. The data on the type this development research is primary data, secondary data.

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Expertise</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dr. Dedy Irfan, MT</td>
<td>Information Technology</td>
</tr>
<tr>
<td>2</td>
<td>Drs. Rahmad Hadi, M.Kom</td>
<td>Information Technology</td>
</tr>
<tr>
<td>3</td>
<td>Drs. Andrzal MPd</td>
<td>Automotive</td>
</tr>
<tr>
<td>4</td>
<td>Drs. Prawoto, MPd</td>
<td>Automotive teachers</td>
</tr>
</tbody>
</table>

Instrument constructed on the aspects to be measured on the basis of a particular theory, then consulted with experts. Experts consulted about the instruments that have been prepared it. The indicators chosen for the validation of the information system is in terms of Functionality, Reliability, Usability, Efficiency, Maintainability, and Portability.

III. RESULTS AND DISCUSSION

Table 2. Assessed Percentage of Validation Aspects of Software Engineering Expert

<table>
<thead>
<tr>
<th>No.</th>
<th>Rated aspect</th>
<th>Percentage Rate (%)</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>functionality (1, 2, 3)</td>
<td>88.33</td>
<td>very Valid</td>
</tr>
<tr>
<td>2</td>
<td>Reliability (4)</td>
<td>95</td>
<td>very Valid</td>
</tr>
<tr>
<td>3</td>
<td>Usability (5, 6)</td>
<td>97.5</td>
<td>very Valid</td>
</tr>
<tr>
<td>4</td>
<td>Efficiency (1, 8)</td>
<td>90</td>
<td>very Valid</td>
</tr>
<tr>
<td>5</td>
<td>maintainability (9)</td>
<td>90</td>
<td>very Valid</td>
</tr>
<tr>
<td>6</td>
<td>portability (10)</td>
<td>80</td>
<td>valid</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td>90</td>
<td>very Valid</td>
</tr>
</tbody>
</table>

And so it goes for the calculation of the aspects that the validation of software experts to Usability, Efficiency, Maintainability, and Portability. The feasibility percentage of software engineering experts indicate the category of very decent. The calculation of the total score percentage feasibility of software engineering experts are as follows.

Table 3. Feasibility Assessed Percentage Aspects of Software Engineering Expert

<table>
<thead>
<tr>
<th>No.</th>
<th>Rated aspect</th>
<th>Percentage Rate (%)</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>correctness (1, 2)</td>
<td>100</td>
<td>very decent</td>
</tr>
<tr>
<td>2</td>
<td>Reliability (3, 4, 5)</td>
<td>93.33</td>
<td>very decent</td>
</tr>
<tr>
<td>3</td>
<td>Integrity (6, 7)</td>
<td>100</td>
<td>very decent</td>
</tr>
<tr>
<td>4</td>
<td>Usability (8)</td>
<td>100</td>
<td>very decent</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td>98</td>
<td>very Decent</td>
</tr>
</tbody>
</table>

From table above it can be seen that the percentage of aspects that assessed the feasibility of software engineering experts indicate the category of very decent. Aspects rated No 4 aspects where each aspect has a very decent category. Calculation of percentage score of the feasibility aspects measured by software engineering experts.

Table 4. Feasibility Assessed Percentage aspect of the user
Table 5. Category of validity Value from each Expert

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Total Score</th>
<th>Percentage (%)</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>validator I</td>
<td>46</td>
<td>92</td>
<td>very valid</td>
</tr>
<tr>
<td>2</td>
<td>validator II</td>
<td>45</td>
<td>90</td>
<td>very valid</td>
</tr>
<tr>
<td>3</td>
<td>validator III</td>
<td>47</td>
<td>94</td>
<td>very valid</td>
</tr>
<tr>
<td>4</td>
<td>validator IV</td>
<td>43</td>
<td>86</td>
<td>very valid</td>
</tr>
</tbody>
</table>

From the table above can be seen, the maximum score of all aspects of the expert is 50 (the maximum score x number of questions = 5 x 10 = 50). Based on the data in the table above, it is concluded that 4 experts said the information system is very valid value.

IV. CONCLUSION

Based on the research and development of e-Learning systems and e-Assessment can be concluded as follows:

1) Software or programs required in the development of the student information system is a PHP value.

2) E-Learning information system development process and e-Assessment begins with data collection, build prototyping, evaluation, prototyping made if an evaluation according to the needs so it will proceed with the coding system and if not then the process of repetition is done. The next test if the system is valid and feasible then the system is ready for use.

3) Validation of software engineering has been assessed by validator from various aspects such as functionality, reliability, usability, efficiency, maintainability, and portability with very valid category.

4) Feasibility of e-Learning and e-Assessment information system is considered by experts the software engineering of various aspects of correctness, reliability, integrity and usability earn an average percentage of 98% and the user response of students and teachers earn an average percentage of 91.54%. This shows the value of information systems being developed includes the category of very decent.

References