Proceeding of 5th UPI International Conference on Technical and Vocational Education and Training (ICTVET 2018)

ATLANTIS PRESS

Link To Paper

Proceedings of the 5th UPI International Conference on Technical and Vocational Education and Training (ICTVET 2018)

It is a great honor and pleasure to bring you this collection of articles from the 5th UPI International Conference on TVET in conjunction with 5th UNP ICTVET. This conference was organized by the Faculty of Technology and Vocational Education and TVET Research Center (TVETRC), Universitas Pendidikan Indonesia (UPI) in collaboration with Universitas Negeri Padang (UNP), Universitas Palangkaraya (UPR), Universitas Negeri Manado (UNIMA), and Rajamangala University of Technology Thanyaburi (RMUTT), Thailand. This conference was held in The Trans Luxury Hotel Bandung, Indonesia, September 11th, 2018.

We would like to express our gratitude to all keynote speakers from overseas who travelled to our country to deliver and exchange their ideas. Our appreciation also goes to all the committee members who have worked hard to make this event possible.

The theme of the conference focuses on “Globalization, challenges, and disruptions in TVET” which implies that the world of TVET is undergoing substantial change to reconsider the role of TVET systems in a more globalized accentuated by interlinkages and convergence among social, economic and environmental issues. These issues pose the distinct challenges for TVET in terms of adapting to education markets, economic restructuring, and the migration flows. So, the role of rapidly growing technology provides not only new opportunities but also disruptions in unprecedented changes.

This volume of proceedings provides an opportunity for readers to engage with a selection of refereed papers that were presented during the TVET conference. Themes for the sections will be of interest to TVET scholars, professionals, and stakeholders from all parts of society and all regions of the world to disseminate their knowledge, experiences, concepts, examples of good practice, and critical analysis with their international peers. And so the reader will sample here reports of research on topics through a suite of issues related to standardization, policies, skills and personal development, curriculum design, social and culture, pedagogical innovations, and resource mobilization.

We wish you enjoy and discover valuable your engagement with their ideas in sustaining your own professional development in the world of TVET. Thank you.

Editor in Chief

Ade Gafar Abdullah

Editors

Iwan Kustiawan
Isma Widiaty
Ana
Tutin Aryanti

Link To Paper

Table of Contents

Link To Paper

Exploring Open Government Partnership as a Strategy for Promoting Transparency in Private University: An Initial Study
Mochamad Nizar Palefi Maady, Pelangi Eka Yuwita, Aprillia Dwi Ardianti, Fetrika Anggraini, Iin Widya Lestari

Blended Learning, Implementation Strategy: The New Era of Education
Maesaroh Lubis, Mujiarto Parsusah, Mumu Komaro, Asari Djohar

Multimedia Animated Corrosion for Corrosion and Coating Metals Course
Yusep Sukrawan, Tatang Permana, Enda Permana, Kebri Kein Moudy Pajung

Developing Soft Skills Learning Model for Mechanical Engineering Students Vocational High School
Suryo Hartanto, Asrul Huda, Ratih Fordiana

Integrating of E-learning to Improve Students Competence in Vocational School
Nuur Wachid Abdul Majid, Taufik Ridwan, Ahmad Fauzi, Rizki Hikmawan

Development of Multimedia Animation Brake System
Yusep Sukrawan, Tatang Permana, Enda Permana, Kebri Kein Moudy Pajung

Preliminary Design of Automatic Antenna Radiation Pattern Measurement System for Antenna and Propagation Laboratory Course
Asep Barnas Simanjuntak, Budi Mulyanti, Enjang Akhmad Juanda, Ade Gaffar Abdullah, Muhammad Naufal, Raksa Reza Pratama

Apprenticeship Implementation of Productive Teacher at Vocational School in Indonesia
Suharno Suharno, Nugroho Agung Pambudi, Indah Widiastuti, Budi Harjanto

Development of Interactive Instructional Media of Photography: Multimedia Skills Competency
Hendri Hendri, I Gede Yusartika, Nurie S. Athifa

Ongoing Process of Change Curriculum: Teaching and Learning Strategy of Vocational Teachers in Western Part of Indonesia
Nizwardi Jalinus, Syahril Syahril, Fahmi Rizal, Rahmat Azis Nabawi, Mahesi Agni Zaus

Application of Assessment for Learning to Improve Student Learning Outcomes in Engineering Drawing Using CaD
Ambiyar Ambiyar, Refdinal Refdinal, Waskito Waskito, Fahmi Rizal, Hendri Nurdin

Use of Products-based Module in the Process of Learning to the Practical Course
Elida Elida, Agusti Efi

The Practicality of Training Models Based on Knowledge Management System
Kasman Rukun, Gunawan Ali, Asrul Huda, Dedy Irfan, Muhammad Ihsan

Link To Paper

Link To Paper

Link To Paper

The Importance of Communicative Action to the Successful AIDS-Responsive Structured Peer Education
Argyo Dermatoto, Siti Zunariyah, Bhisma Murti

Competitive Intelligence framework for Increasing Competitiveness Vocational High School Management
Verry Ronny Palilingan, Johan Reimon Batmetan

The Tale of Two Type of Schools: The Comparison of Teacher Competencies and Graduation Rate between Vocational High Schools and High Schools in Buffalo Metropolitan Area, New York
Ilhamdaniah Saleh

Production Unit Management Based on Product Innovation in SMK Manado
Nontje Sangi, Altje Wajong, Luckie Sojow

Smart City Maturity Level Analysis Using ITIL Framework
Muhammad Nur, Johan Reimon Batmetan, Hizkia Kamang Manggopa

The Importance of Collaboration Between Government, University and Industry on Education for Developing Country
Julyeta Runtuwene, Audy Kenap, Rolly Oroh

Implementation of Blended Learning on Subjects of Building Science in Vocational Schools
Nurmi Frida Dorintan Bertua Pakpahan

The Mapping of Vocational School with Building Technical Drawing Concentration: Opportunities and Challenges in Construction Industry's Needs
Trias Megayanti, Lilis Widaningsih, Nitih Indra Komala Dewi

Development of Vocationalization Model of Basic Education Based on Local Wisdom in Era of ASEAN Economic Community
Ivan Hanafi, Irfan Zakir, Daryanto Daryanto, Taryudi Taryudi, Rina Febriana

Development of Performance Assessment Telecommunications Expertise based on KKNI to support Vocational Competencies Achievement
Rizky Hikmawan, Ahmad Fauzi

Implementation of Learning Models of Problem Based Learning to Improve The Creative Thinking Ability of Vocational Student
Tasya Aprilia, Lilis Widaningsih, Trias Megayanti

Comparison on Vocational Engineering Architecture High School Curriculum (Case study: Shizoukan High School and SMKN 2 Garut)
Rositha Mujica, Nevita Amelia Rahayu, Johar Maknun

Link To Paper

Link To Paper

Advances in Social Science, Education and Humanities Research, volume 299

5th UPI International Conference on Technical and Vocational Education and Training (ICTVET 2018)

The Create Skills of Vocational Students to Design a Product: Comparison Project Based Learning Versus Cooperative Learning-Project Based Learning

Syahril Syahril, Nizwardi Jalinus, Rahmat Azis Nabawi
Jurusan Pendidikan Teknik Mesin
Universitas Negeri Padang
Padang, Indonesia
nizwardi@ft.unp.ac.id

Yaumal Arbi
Jurusan Pendidikan Teknik Sipil
Universitas Negeri Padang
Padang, Indonesia

Abstract—**The graduates of vocational education are no longer expected to have only applicative skills that are limited ability to work competently. The skills of vocational education graduates should arrive at the skills to design a product that contributes to the nation's competitive ability. This study aims to see the comparison of the create skills of the students in the learning activities with the implementation of Project Based Learning (PjBL) and Cooperative-Project Based Learning (C-PjBL) model. This study carried out an experimental method by comparing the two research groups. The research data was obtained by authentic assessment technique on the product of student project task result. Based on the study showed that there is a significant difference between the class with the implementation of PjBL and C-PjBL model. The average create skills of the student with the implementation of the C-PjBL model is higher, this is based on the syntax of the C-PjBL model which provides an opportunity for students to learn the papers, so the students have understood the steps design of a product. From the results of this study can be concluded that the C-PjBL model is effective in developing the create skills students.**

Keywords—create skills; project-based learning; cooperative learning; cooperative-project based learning; vocational education; vocational students; experiment research; design a product

I. INTRODUCTION

The tight market competition that occurs due to the 4.0 industrial revolution and the global market in the 21st century requires the industry to continue to produce innovative products that have competitive value to be able to compete in the market. To achieve this, the industry certainly requires workers who have the ability to create innovation on a product. Technical and Vocational Education and Training (TVET) as an institution that prints the workforce must respond to this by producing graduates that are suitable for the needs of the industrial or employer. UNESCO states that essentially TVET is a means of preparing workers and must actively participate in the world of work [1]. TVET is a form of education that trains students to be ready to enter the workforce [2]. TVET aims narrowly to provide training to students for specific and general work TVET is designed to create productive young people both as workers and as citizens [3]. This indicates that TVET has an important role in advancing the industry by producing graduates who are ready to work.

The phenomenon of tight market competition that is happening at this time causes the industry to need TVET graduates who are no longer expected to only have applicative abilities limited to "able to work competently", but have the ability to create a product that has innovation value. Revision of Bloom's taxonomy on the domain of cognitive dimension, the ability to create is in the highest position, the ability to create is the ability to place elements to form a coherent unity in producing a real product that has a value of renewal [4]. In order for students to have creative abilities, it is necessary to upgrade the learning that is carried out. In the implementation of learning, lecturers generally use learning models that are relevant to the subjects taught and effective in achieving learning objectives. The learning model is a systematic learning pattern which is arranged in the form of syntax or learning stages used to achieve learning objectives, in a model contained strategies, techniques, methods, teaching materials, media and learning assessment tools.

One of the learning models that teaches students to develop the ability to think to create a real product is a project-based learning model [5,6]. Project-based learning is a learning model that allows students to gain knowledge of project tasks that they create themselves or collaborate with other students [7]. In project-based learning activities, students invest questions, propose hypotheses and explain, discuss their ideas and try new ideas [8]. Syntax of the project-based learning model syntax consists of 1) determination of project-based themes by teacher and students, 2) visualized of student group work, 3) observation and identification of various problems, 4) preparation of project proposal, 5) production process, 6) assessment of process or product and feedback of student work method, and 7) presentation of project report. In this article, researchers conducted a comparison of the Project based

Copyright © 2019, the Authors. Published by Atlantis Press.
This is an open access article under the CC BY-NC license (http://creativecommons.org/licenses/by-nc/4.0/).

learning model with a cooperative-project based learning model that the researchers developed in terms of the ability to create students. The syntax of the cooperative-project based learning model consists of 1) the formulation of the expected learning outcomes, 2) understanding the concept of teaching material, 3) the demonstration of media prototypes and learning videos, 4) project assignments (students are assigned to identify problems from the real-world as the basis of the project and relevant to the course), 5) approval of the student's project plan, 6) working on the project proposal, 7) progress check of the project proposal, 8) analysis design and create detailed engineering design (blueprint) of the project, 9) progress check of the analysis design and create detailed design engineering of the project students, and 10) presentation of the project [9]. This article aims to see differences in the ability of students to make a product from a comparison of the implementation of the PjBL and C-PjBL models in a learning activity.

II. METHOD

This research is an experimental research with two-group research design. One group of learning activities was carried out with the implement of the PjBL syntax stated by Kamdi with a total of 20 students and one other group carried out with the implement of a C-PjBL model that researchers had developed with 20 students. The study was conducted in the course of Energy Conversion Machine in the Diploma III Mechanical Engineering department of Universitas Negeri Padang. The sub-competence of creating ability consists of generating, planning and producing [10]. For generating and planning capabilities, this is reviewed from student project proposals and for this producing capability, it is viewed from the product of the student project assignment. Data collection ability to create students is done through authentic assessment techniques using assessment instruments consisting of:

A. *Instrument for Evaluating Project Proposals Students*

The work of the students in the form of project proposals reflects the ability to generate and plan. The lattice of student project proposal assessment instrument is presented in table 1.

TABLE I. THE INSTRUMENTS FOR PROJECT PROPOSALS

No.	Rated aspect	Score
1	Introduction and background to the issues raised in the proposal	
2	The level of functioning and benefits of the tool/machine that will be designed	
3	Literature study and working principles of the tools/machines that will be designed	
4	Analysis of tool/machine design	
5	Design method and budget plan for equipment/machinery	
6	Work steps, implementation procedures, design drawings, and work schedules	
7	Problem-solving framework and data collection methods	
8	Language writing, bibliography, and attachments	
	Total	

B. *Product Assessment Instruments*

Products from student project assignments are a form of producing ability. The lattice of product assessment instruments from student project assignments is presented in table 2.

TABLE II. PRODUCT TASK INSTRUMENTS

No.	Rated aspect	Score
1	Background problems and selection of topics raised for project task	
2	Identification and formulation of the problems raised for project task	
3	Solution solutions to problems offered through project work	
4	Decision making on tools designed as project tasks	
5	Originality design tools designed to solve problems	
6	Design, calculation of construction and machine elements	
7	Drawing and simulation	
8	Teamwork in project task and presentation techniques	
Total		

Data analysis to find out the differences between the two study groups was done by T-test with a significant <0.05. Before the data in the difference test (t-test) is carried out a prerequisite analysis of research data, namely homogeneity, and normality. Normality test that is carried out using Kolmogorov-Smirnov with significant level is a > 0,05 and the homogeneous test is carried out an assessment using Levene Statistic test with significant level is a > 0,05.

III. RESULTS

A. *Proposal of the Project Task*

1) Analysis requirement test: The results of the normality assessment data for project proposals are shown in Table 3, the average value of Asymp. sig. (2-tailed) the project proposal of students was obtained for PjBL class of 0.476 and C-PjBL class of 0.713, both of these data higher than 0.05 which means that the two data of project proposal assessment of students were normally distributed. Homogeneity test was carried out on the data assessment of the project proposal students using Levene Statistic test with criteria can be called homogeny, if significant level higher than 0.05. The result of the homogeneity test on student project proposal assessment data is 0.299, this data > 0.05, it can be concluded that the project proposal assessment data obtained in this study has the same variance.

TABLE III. ANALYSIS REQUIREMENT TEST OF THE PROJECT PROPOSAL STUDENTS (NORMALITY AND HOMOGENEOUS)

No.	Rated aspect	PjBL		C-PjBL		Levene Statistic	Sig.
		Sample K-S	*Sig.*	*Sample K-S*	*Sig.*		
1	Introduction and background to the issues raised in the proposal	1.039	0.230	1.234	0.095	2.437	0.127
2	The level of functioning and benefits of the tool/machine that will be designed	0.866	0.441	1.129	0.156	0.835	0.367
3	Literature study and working principles of the tools/machines that will be designed	1.313	0.064	0.999	0.272	0.014	0.908
4	Analysis of tool/machine design	1.197	0.114	1.118	0.164	1.900	0.176
5	Design method and budget plan for equipment/machinery	1.129	0.156	1.333	0.057	0.389	0.537
6	Work steps, implementation procedures, design drawings and work schedules	1.180	0.123	1.028	0.242	0.506	0.481
7	Problem-solving framework and data collection methods	0.823	0.507	1.124	0.160	2.890	0.097
8	Language writing, bibliography and attachments	1.380	0.044	1.128	0.157	0.063	0.803
Mean		**0.849**	**0.467**	**0.699**	**0.713**	**1.110**	**0.299**

*2) T-Test on the Project Proposal Students:*Based on the results of the t-test on the assessment data of the project proposal students between classes with the implemented of PjBl and class with the implemented of C-PJBL as shown in table 4, the results of the significance of the two classes are 0.000, which means small of 0.05. From these results, it can be said that the ability of students to write project assignment proposals from both classes is not the same. The average value of students in the making of a project proposal, the class with the implement of the C-PjBL model is higher than the class with the implement of the PjBL model, where the class with the implement of C-PjBl averages 4.19 and in the PjBL class 3.37.

TABLE IV. A T-TEST OF THE PROJECT PROPOSAL STUDENTS

No.	Rated aspect	PjBL		C-PjBL		T	Sig. (2-tailed)
		Mean	**SD**	**Mean**	**SD**		
1	Introduction and background to the issues raised in the proposal	3.45	0.89	4.30	0.66	3.44	0.001
2	The level of functioning and benefits of the tool/machine that will be designed	3.10	0.91	4.25	0.72	4.43	0.000
3	Literature study and working principles of the tools/machines that will be designed	3.10	0.91	4.10	0.79	3.71	0.001
4	Analysis of tool/machine design	3.40	0.82	4.00	0.73	2.44	0.019
5	Design method and budget plan for equipment/machinery	3.75	0.72	4.40	0.60	3.11	0.003
6	Work steps, implementation procedures, design drawings and work schedules	3.15	0.93	4.15	0.75	3.74	0.001
7	Problem-solving framework and data collection methods	3.35	1.04	4.20	0.77	2.94	0.006
8	Language writing, bibliography and attachments	3.65	0.75	4.15	0.81	2.02	0.050
Total		**3.37**	**0.87**	**4.19**	**0.73**	**7.45**	**0.000**

B. Product of the Project Task Result

1) Analysis requirement test: The results of the normality test of the product assessment result of the project task students are shown in table 5, the Asymp value. sig. (2-tailed), the average for PjBL class is 0.230 and C-PjBL class is 0.125 which means higher than 0.05, it can be concluded that the two product assessment data of the project task students are normally distributed. Based on the results of the average homogeneity test of the product appraisal data of the project task students of 0.158, this data is higher than 0.05, so it can be concluded that the product appraisal data of project task students obtained in this study have the same variance.

TABLE V. REQUIREMENTS FOR TESTING PRODUCT APPRAISAL OF PROJECT TASK STUDENTS (NORMALITY AND HOMOGENEOUS)

No.	Rated aspect	PjBL		C-PjBL		Levene Statistic	Sig.
		Sample K-S	**Sig.**	**Sample K-S**	**Sig.**		
1	Background problems and selection of topics raised for project task	1.039	0.230	1.177	0.125	2.070	0.158
2	Identification and formulation of the problems raised for project task	1.180	0.123	1.012	0.258	0.682	0.414
3	Solution solutions to problems offered through project work	0.952	0.326	1.138	0.150	0.585	0.449
4	Decision making on tools designed as project tasks	1.315	0.063	1.271	0.079	0.035	0.853
5	Originality design tools designed to solve problems	1.234	0.095	1.269	0.080	0.065	0.800
6	Design, calculation of construction and machine elements	1.113	0.168	1.128	0.157	1.765	0.192
7	Drawing and simulation	1.213	0.106	1.177	0.125	2.203	0.146
8	Teamwork in project task and presentation techniques	1.103	0.175	1.129	0.156	0.075	0.786
Total		1.039	0.230	1.177	0.125	2.070	0.158

2) T-test on the product appraisal of project task students: Based on the results of the t-test on the product appraisal of the project task students in table 6 obtained the results of the significance of the two classes of 0.000, which means lower than 0.05. From these results, it can be said that the ability to make a product from both classes is not the same. The average value of students in the create a product, the class with the implement of the C-PjBL model is higher than the class with the implement of the PjBL model, where the class with the implement of C-PjBl averages 4.18 and in the PjBL class 3.40.

TABLE VI. A T-TEST OF THE PRODUCT APPRAISAL OF PROJECT TASK STUDENTS

No.	Rated aspect	PjBL		C-PjBL		T	Sig. (2-tailed)
		Mean	SD	Mean	SD		
1	Background problems and selection of topics raised for project task	3.45	0.89	4.20	0.70	2.975	0.005
2	Identification and formulation of the problems raised for project task	3.15	0.93	4.05	0.76	3.346	0.002
3	Solution solutions to problems offered through project work	3.30	0.98	4.10	0.85	2.757	0.009
4	Decision making on tools designed as project tasks	3.45	0.89	4.15	0.88	2.515	0.016
5	Originality design tools designed to solve problems	3.70	0.66	4.35	0.67	3.096	0.004
6	Design, calculation of construction and machine elements	3.40	1.05	4.15	0.81	2.532	0.016
7	Drawing and simulation	3.65	0.88	4.20	0.70	2.200	0.034
8	Teamwork in project task and presentation techniques	3.10	0.85	4.25	0.72	4.619	0.000
Total		3.40	0.89	4.18	0.76	7.228	0.000

IV. DISCUSSION

Based on the results of an analysis of the assessment of project proposals and products of project task students, it can be concluded that there is a significant difference in the ability of students between the implement of the C-PjBL and PjBL models. Different learning models are applied, so the effect on student competence is different [11]. The ability of students to write project proposals in class with the implement of the C-PjBL model can be categorized as good or students have been able to compile a project proposal in accordance with the aspects that have been stipulated in the provisions of writing a project proposal. Likewise, with the ability to make products, from the analysis of the evaluation results of the learning done, students with the application of C-PjBL have good ability in producing, this is illustrated from the product of their project assignments in the form of a blueprint design of technology tools/machines appropriate.

The thing that affects the differences in students' abilities is the syntax of the learning model applied. Students in the class with the implement of the C-PjBL model are first instructed to discuss and learn the results of the published research. From the results of reading, discussing and studying this article, students have knowledge in how to identify problems, find new ways and ideas in solving problems, and have knowledge of how to design a tool or machine that can solve problems that occur in the real-world according to with the scientific field he studied. Whereas in learning activities with the implement of the PjBL model, students immediately carry out project tasks, so they lack knowledge in terms of exploring or identifying problems that occur in the real world, and how the forms of project tasks can solve real-world problems. This is what makes the ability of students in the class to be low with the implement of PjBL

The results of observations that have been made on the PjBL class also found student motivation decreases when the problems found cannot be solved, whereas in the C-PjBL class, when students find problems in carrying out project tasks, they do not experience difficulties, because they have learned first how rare- steps in solving problems. Students with the application of the C-PjBL model are able to achieve better learning outcomes because they have high motivation to learn [12].

V. CONCLUSION

Based on the study showed that there is a significant difference between the class with the implementation of PjBL and C-PjBL model. The average create skills of the student with the implementation of the C-PjBL model is higher, this is based on the syntax of the C-PjBL model which provides an opportunity for students to learn the papers, so the students have understood the steps design of a product. From the results of this study can be concluded that the C-PjBL model is effective in developing the create skills students.

REFERENCES

[1] UNESCO, UNESCO Recommendation-Technical and Vocational Education and Training for the Twenty-first Century. Paris: UNESCO. Retrieved from http://unesdoc.unesco.org/images/0012/001260/126050e.pdf. 2001.

[2] M.A. Behroozi, "Survey About the Function of Technical and Vocational Education: An Empirical Study in Bushehr City." Procedia – Social and Behavioral Sciences, vol.143, pp.265-269, 2014.

[3] A. Fuller, "Vocational Education." International Encyclopedia of the Social & Behavioral Sciences Second Edi, Vol. 25, 2015.

[4] L.W. Anderson, D.R. Krathwohl, P.W. Airasian, K.A. Cruikshank, R.E. Mayer, P.R. Pintrich, J. Raths, and M.C. Wittrock, M.C, A taxonomy for learning, teaching, and assessing: A revision of Bloom's Taxonomy of Educational Objectives (Complete edition), New York: Longman, 2001.

[5] N. Jalinus and R.A. Nabawi, "Implementation of the PjBL Model to Enhance Problem Solving Skill and Skill Competency of Community College Student." Jurnal Pendidikan vokasi, vol.7, no.3, pp.304-311, 2017.

[6] N. Jalinus and R.A. Nabawi, "The Instructional Media Development of Welding Practice Course Based on PjBL model: Enhancing Student Engagement and Student Competences." Int. J. Innovation and Learning, vol.24, no.4, pp.383–397, 2018.

[7] S. Amamou and Belcadhi, "Tutoring in Project-Based Learning." 22nd International Conference on Knowledge-Based Intelligent Information & Engineering Systems-Procedia Computer Science, 126, pp.176-185, 2018.

[8] G. Arcidiacono, K. Yang, J. Trewn and L. Bucciarelli, "Application of Axiomatic Design for Project-Based Learning Methodology." The 10th International Conference on Axiomatic Design, ICAD 2016 Precedia CIRP., vol.53, pp. 166-172, 2016.

[9] W. Kamdi, "Implementasi Project Based Learning di Sekolah Menegah Kejuruan [Implementation project based learning on vocational high School]." Jurnal Pendidikan dan Pembelajaran, vol.17, no.1, pp.98– 112, 2010.

[10] L.W. Anderson, D.R. Krathwohl, P.W. Airasian, K.A. Cruikshank, R.E. Mayer, P.R. Pintrich, J. Raths and M.C. Wittrock, A taxonomy for learning, teaching, and assessing: A revision of Bloom's Taxonomy of Educational Objectives (Complete edition), New York: Longman, 2001.

[11] L. Chen, "cooperative project-based learning and students' learning styles n WEB page development." J. Educational Technology Systems, Vol. 32, no. 4, pp.363-375, 2004.

[12] Tafakur and W. Suyanto, "Pengaruh cooperative learning terhadap motivasi dan hasil belajar praktik "perbaikan moto otomotif di SMKN 1 Seyegan." Jurnal Pendidikan Vokasi, vol.5, no.1, pp.117-131, 2015.