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The Development of Work Based Learning Kolaboratif (WBL-K) Model to Improve Automotive Maintenance Competence in Community Colleges

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Abstract

The enactment of the ASEAN Economic Community (AEC) has an impact on free movement of goods, services, capital, investment, and skilled labour entering to Indonesia. This case is a challenge for education in Indonesia to prepare competent human resources. One of the efforts to prepare the competent human resources is through the implementation of the Work Based Learning Kolaboratif (WBL-K) model. The implementation of WBL-K aims to make vocational education have a high level of efficiency and relevance to the industrial needs. The purpose of the study is to develop WBL-K model to improve automotive maintenance competence in community colleges. This study used Research and Development (R&D) method with the 4D development model, which consisted of define, design, develop, and disseminate. The instruments used in this research were (1) the WBL-K model assessment sheet; (2) practicality questionnaire for the WBL-K model; and (3) pre-test and post-test questions. The data analysis used in this study were (1) criteria to determine the feasibility level of WBL-K model; (2) criteria to determine the practicality level of WBL-K model; and (3) N-Gain and N-Gain difference test using the t test to determine the effectiveness of WBL-K model. The results of the feasibility test, practicality test, and effectiveness test of WBL-K model developed show that: (1) based on the responses of model experts and material experts (lecturers and automotive industry instructors), it is obtained that the criteria of the WBL-K model is very feasible; (2) based on the user responses (lecturers, industrial instructors, and students), it is obtained that the criteria WBL-K model is very practical to use; (3) from the effectiveness test in the experimental group, it is obtained the criteria that the WBL-K model is quite effective and significant to improve the competence of automotive maintenance in community colleges.

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INTRODUCTION

The enactment of the ASEAN Economic Community (AEC) has an impact on free movement of goods, services, capital, investment, and skilled labour entering to Indonesia. This case is a challenge for education in Indonesia to prepare competent human resources. Through Presidential Instruction No. 9/2016, the government instructs vocational education to do link and match with the competence of industrial needs. One of the efforts made to achieve this is through the application of the Work Based Learning (WBL) model (Boud & Solomon, 2001).

WBL is a learning model that combines learning activities on campus and working directly in industry. The implementation of WBL aims to make vocational education have a high level of efficiency and relevance to the industrial needs (Raelin, 2008: 532). Bailey & Merrit (1993) stated that the application of WBL has a good impact on achievement, motivation, and continuing education. Siswanto (2011) added that the application of the WBL model can improve the quality of learning outcomes, i.e. automotive mechanic knowledge, professional attitude, mental readiness for work, and student independence. Furthermore, Ismail, et al. (2015) proved that by the application of WBL, students are superior in theory, academics and technical skills. The application of the WBL model provides an increase in learning achievement, work motivation, work ethic, and work readiness (Andu, et al., 2015; Abukhori & Muslim, 2019; and Hidayatullah, et al., 2019). In addition, the implementation of WBL on the internship program has a positive impact on students, i.e. increasing professionalism, motivation, competence, life skills, entrepreneurial spirit, and soft skills (Lester & Costley, 2010; Suyitno, 2017; Sebayang, et al. 2017; Hadromi, 2014; Ali, et al., 2004).

However, the implementation of WBL in the internship program that has been carried out by vocational education still has several weaknesses; one of them is the lack of maximum competence. The lack of maximum competence is caused by several things, including: vocational education has never invited the industry to integrate the competence (Suyitno, 2017; and Anohina-Naumeca & Sitikovs, 2012); vocational education have not established the qualification standards of industrial supervisors (Suwarman & Parjono, 2014); Lack of provision and supervisory role both from campus and from industry (Adininggar & Wafa, 2016; and Iktiari & Purnami, 2019); and the absence of a structured evaluation exam (Lester & Costley, 2010). The problems were also found in the results of a preliminary study at the automotive study program study in community colleges.

There has been a lot of research on WBL. However, research on the development of WBL for community academies in Indonesia has never been done before. Different from the previous studies, this research focuses on the feasibility, practicality, and effectiveness of WBL *Kolaboratif* (WBL-K) model in the implementation on the internship program in community colleges in Indonesia. Furthermore, the WBL *Kolaboratif* model has a structured collaboration between the community colleges and the industry from the preparation to the end of the implementation of WBL on the internship program.

The objectives of this study are: (1) to develop WBL *Kolaboratif* model in automotive maintenance competence; (2) to analyse the feasibility of WBL *Kolaboratif* model in order to improve automotive maintenance competence in community colleges; (3) to analyse the practicality of WBL *Kolaboratif* model in order to improve automotive maintenance competence in community colleges; (4) to analyse the effectiveness of WBL *Kolaboratif* model in order to improve automotive maintenance competence in community colleges.

METHODS

1. Model Development Method

This study used Research and Development (R&D) method. The R&D development method consists of 4D Sugiyono (2015: 133), i.e.

a. Define (Preliminary Study)

Preliminary studies are carried out to obtain the information needed by researchers so that the problems in the research are clearer and determine the solutions needed to answer these problems. This stage is carried out through direct observation in the field. The preliminary study begins by observing and formulating the potential and problems that occur in the field. Furthermore, the results of the observations were reviewed through literature studies. The results of the study from the preliminary study stage are in the form of factual model and theoretical models findings.

b. Design

The findings of factual models and theoretical models are developed by compiling the instruments to formulate the conceptual models.

Develop

The conceptual model is validated by the experts. After finding the weaknesses, the model is revised according to the suggestions of the experts to obtain a hypothetical model.

d. Disseminate

The dissemination stage was carried out with a limited scale test on students of Akademi Komunitas Negeri Demak because the limited costs and a wide range of R&D research areas. Analysis of the learning outcomes evaluation is carried out by comparing the conditions of before and after learning using a new learning model. The results of limited scale test produce a final model that is feasible, practical, and effective.

The model development stages are described in the following flowchart:

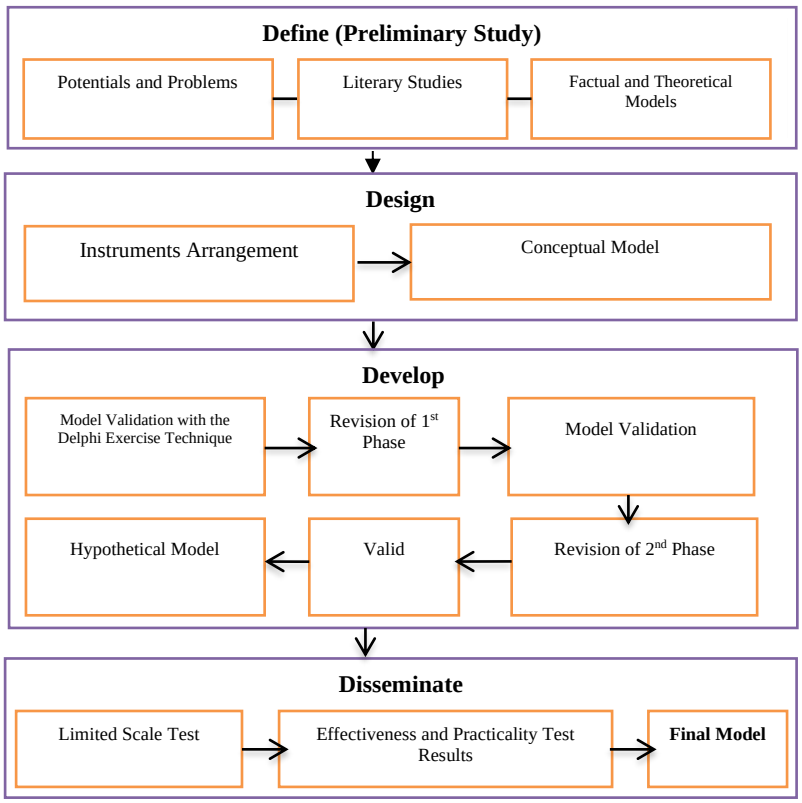

Figure1. Research Stages for WBL-K Model

2. Data Collection Methods and Instrument Validity and Reliability

The unit of analysis in this research was Work Based Learning *Kolaboratif* (WBL-K). The data sources of this research were (a) the experts in learning models related to the WBL model; (b) material experts, consisting of lecturers and instructors of the automotive industry; (c) the supervisors, the industrial instructors, and the students testing the practicality of the model; (d) the students testing the practicality and effectiveness of the model.

The instruments used in this study were (a) the WBL-K model assessment sheet; (b) practicality questionnaire of the WBL-K model; and (c) pre-test and post-test questions.

The data collection techniques in this study were:

Table1. The Data Collection Techniques

Data Types	Method	Data Source
Feasibility Test	Model Assessment Sheet	2 Modelling Experts and 2 Material Experts
Practicality Test	Questionnaire	Lecturers, Industrial Instructors, and Students
Effectiveness Instrument Test	Questionnaire	Students
Effectiveness Test	Pre-test and Post-test Questions	Students

a. Instrument Validity and Reliability Test
   1) Validity and Reliability Test on Assessment Sheet Instruments to the Model

a) Validity

The Aiken formula is used to determine the validity level of an instrument with 4 experts. The Aiken V formula is used to calculate the content validity coefficient of the expert judgment of n people on an item. The formula proposed by Aiken V is as follows (Azwar, 2012:113):

$$V = \frac{\sum S}{[n(c-1)}$$

Explanation:

S : r – lo

lo : lowest number of validity assessments (e.g. 1)

c : the highest number of validity ratings (e.g. 5)

r : the score given by the assessor

The results of the instrument validity test according to the expert validator / ratter are as follows:

Table2. Instrument Validity Test Results

	Validity Items																	
	1		2		3		4		5		6		7		8		9	
Ratter	r	S	r	S	r	S	r	S	r	S	r	S	r	S	r	S	r	S
1	3	2	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3
2	4	3	3	2	4	3	4	3	4	3	4	3	4	3	3	2	3	2
3	4	3	4	3	3	2	3	2	4	3	3	2	3	2	4	3	4	3
4	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3
∑S	11		11		11		11		12		11		11		11		11	
V	0.92		0.92		0.92		0.92		1.00		0.92		0.92		0.92		0.92	

	Validity Items																	
	10		11		12		13		14		15		16		17		18	
Ratter	r	S	r	S	r	S	r	S	r	S	r	S	r	S	r	S	r	S
1	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3
2	4	3	4	3	3	2	4	3	4	3	3	2	4	3	4	3	4	3
3	3	2	3	2	4	3	3	2	3	2	4	3	4	3	4	3	4	3
4	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	3	2
∑S	11		11		11		11		11		11		12		12		11	
V	0.92		0.92		0.92		0.92		0.92		0.92		1.00		1.00		0.92	

	Validity Items																	
	19		20		21		22		23		24		25		26			
Ratter	r	S	r	S	r	S	r	S	r	S	r	S	r	S	r	S		
1	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3		
2	3	2	4	3	4	3	4	3	4	3	4	3	3	2	4	3		
3	4	3	3	2	4	3	3	2	4	3	4	3	4	3	4	3		
4	4	3	4	3	4	3	4	3	4	3	4	3	4	3	3	2		
∑S	11		11		12		11		12		12		11		11			
V	0.92		0.92		1.00		0.92		1.00		1.00		0.92		0.92			

The validity tests using the Aiken's V formula with an error rate of 5% showed that all items score were more than 0.92. It can be concluded that all items are valid.

b) Reliability

The reliability formula is:

$$r_{11} = \left(\frac{n}{n-1}\right)\left(1 - \frac{\sum \sigma_t^2}{\sigma_t^2}\right)$$

(Arikunto, 2016)

Explanation:

r_{11} : Reliability result

n : Number of tested questions

$\sum \sigma t2$: Total of score variants of each item

$\sigma t2$: Total variant

From the analysis of the response items on the validity test instrument, the reliability of the response items was 0.74. So, it means that the response items are reliable in high criteria.

2) Validity and Reliability Test on Practicality Instruments to the Model

a) Validity

To find out the validity, the formula is:

$$r_{hitung} = \frac{N\sum XY - (\sum X)(\sum Y)}{\sqrt{\left(N\sum X^2 - (\sum X)^2\right)\left(N\sum Y^2 - (\sum Y)^2\right)}}$$

(Arikunto, 2016)

Explanation:

r_{count} : Correlation coefficient between X and Y
N : Number of research subjects
∑X : Total score on each response item
∑Y : Total number of responses
∑X2 : Sum of the squares of the response items
∑Y2 : Sum of the squares of the total responses

Furthermore, the r_{count} score obtained was consulted with the r_{table}. Responses are declared valid if r_{count} has a greater correlation than r_{table} score with a significance level of 5%, whereas if $r_{count} < r_{table}$ then the item is declared invalid.

The results of validity analysis of the response items on the practicality test can be seen on the following table:

Table 3. Practicality Validity Test Results

Item	r_{count}	r_{table}	Criteria
1	0.898	0.707	Valid
2	0.914	0.707	Valid
3	0.80	0.707	Valid
4	0.772	0.707	Valid
5	0.711	0.707	Valid

b) Reliability

To find out the reliability, the formula is:

$$r_{11} = \left(\frac{n}{n-1}\right)\left(1 - \frac{\sum \sigma_t^2}{\sigma_t^2}\right)$$

(Arikunto, 2016)

Explanation:

r_{11} : Reliability result
n : Number of tested questions
∑ σt2 : Total of score variants of each item
σt2 : Total variant

From the analysis of the response items on the practicality test instrument, the reliability of the response items was 0.872. So, it can be concluded that the response items are reliable in very high criteria.

3) Validity and Reliability Test on Effectiveness Instruments to the Model

a) Distinguishing Ability

The distinguishing ability of the questions is the ability of the questions to differentiate between students who have high and low ability based on the test instrument. The formula for determining the discrimination index is as follows:

$$D = \frac{BA}{JA} - \frac{BB}{JB} = Pa - Pb$$

(Arikunto, 2006:213-214)

Explanation:

J : Number of test participants
J_A : Number of participants in the top group
J_B : Number of participants in the lower group
B_A : Number of participants in the upper group who answered correctly
B : Number of participants in the lower group who answered correctly
P_A : the proportion of participants in the upper group who answered correctly
P_B : the proportion of participants in the lower group who answered correctly

The classifications of the distinguishing ability of questions:

D : 0.00–0.20 = poor
D : 0.21–0.40 = satisfactory
D : 0.41–0.70 = good
D : 0.71–1.00 = excellent
D : negative = nothing good

(Arikunto, 2006:218).

The calculation results of distinguishing ability from 40 questions showed that there were 5 questions in "poor" criteria, 8 questions in "satisfactory" criteria, 24 questions in "good" criteria, and 3 questions in "excellent" criteria. The calculation results of distinguishing ability can be seen in table 4.

Table 4. Questions Distinguishing Ability

Criteria	Question Items	Total
Poor	11,14,24,28,30	5
Satisfactory	1,3,12,13,19,22,26,29	8
Good	2,4, 6,7,8,9,10,16,17,18, 20,21,23,25,27,31,32,33, 35,36,37,38,39,40	24
Excellent	5,15,34	3
	Total	40

b) Difficulty Level

The formula of question difficulty level test used in the implementation of the WBL-K model is:

$$P = \frac{n}{N}$$

Explanation:

P : Question difficulty level

n : Number of participants who answered correctly

N : Number of test participants

According to Surapranata (2004: 21), the criteria of question difficulty level are:

Table 4. Difficulty Level Criteria

Difficulty Index	Criteria
0.00 – 0.30	Difficult Question
0.31 – 0.70	Medium Question
0.71 – 1.00	Easy Question

The results of the research instrument tests showed that there were variations in the difficulty level of the questions. The result of the difficulty level test from 40 questions showed that there were 4 questions in easy criteria, 35 questions in "medium" criteria, and 1 question in "difficult" criteria.

The results of the difficulty level test are presented in the following table 5:

Table 5. Question Difficulty Levels

Criteria	Question Item	Total
Easy	1,10,11,37	4
Medium	2,3,4,5,6,7,8,9,12,13,14,15,16,17,18,19,20,21,22, 23,25,26,27,28,29,30,31,32,33,34,35,36,38,39,40	35
Difficult	24	1
Total		40

c) Validity

The tool used to test the validity of the questions in this study was the point biserial correlation formula.

$$r_{pbis} = \frac{M_p - M_t}{S_t}\sqrt{\frac{p}{q}}$$

(Sudjana, 2009:144)

Explanation:

r_{pbis} : Correlation coefficient of point biserial

M_p : Average score for items answered correctly

M_t : Average score of the total score

S_{dt} : Standard deviation of total score

p : Proportion of students who answered correctly

q : Proportion of students who answered incorrectly

The questions validity was calculated using the point biserial correlation formula with a significance level of 5% from 20 students. The results of questions validity test showed that there were 35 questions from the 40 questions that were declared valid because the correlation coefficient was greater than 0.3.

The results of the question validity are described in table 6.

Table 6. Question Validity Results

Item	Validity	Criteria	Item	Validity	Criteria
1	0.485	Valid	21	0.742	Valid
2	0.684	Valid	22	0.492	Valid
3	0.511	Valid	23	0.641	Valid
4	0.670	Valid	24	-0.453	Invalid
5	0.791	Valid	25	0.693	Valid
6	0.491	Valid	26	0.485	Valid
7	0.641	Valid	27	0.578	Valid
8	0.598	Valid	28	0.158	Invalid
9	0,683	Valid	29	0,474	Valid
10	0,707	Valid	30	0,076	Invalid
11	0,175	Invalid	31	0,627	Valid
12	0,472	Valid	32	0,748	Valid
13	0,481	Valid	33	0,652	Valid
14	-0,077	Invalid	34	0,715	Valid
15	0,715	Valid	35	0,608	Valid
16	0,532	Valid	36	0,599	Valid
17	0,693	Valid	37	0,707	Valid
18	0,502	Valid	38	0,532	Valid
19	0,569	Valid	39	0,800	Valid
20	0,599	Valid	40	0,742	Valid

d) Reliability

KR-20 formula is used to calculate the reliability of the questions.

$$KR_{20} = \left(\frac{n}{n-1}\right)\left(\frac{St^2 - \sum pq}{St^2}\right)$$

(Nurgiantoro, 2011:170)

Explanation:

KR_{20} : Reliability of the whole test

p : Proportion of subjects who answered questions correctly

q : proportion of subjects answering questions incorrectly

Σpq : Sum of multiple result between p and q

n : Number of n

St^2 : Standard deviation of the test (standard deviation is root of the variant)

The formula for calculating the standard deviation is:

$$St^2 = \frac{\sum x^2 - \frac{(\sum x)^2}{N}}{N}$$

(Surapranata, 2004:115)

Explanation:

St^2 : Standard deviation root

$(\Sigma x)^2$: Square of the total score obtained by the student

Σx^2 : Sum of the squared scores obtained by the students

N : the number of subjects

The reliability level criteria are shown in the table below:

Table 7. Reliability Level Criteria

Score Range	Criteria
$0.80 < r_{11} < 100$	Very high
$0.60 < r_{11} < 0.80$	High
$0.40 < r_{11} < 0.60$	Medium
$0.20 < r_{11} < 0.40$	Low
$r_{11} \leq 0.20$	Very Low

(Arikunto, 2006:35)

Based on the calculation results, the value of rcount 0.966 > rtable 0.423 with a significant level of 5%. So, it can be concluded that all the questions in this study were declared "reliable" in "very high" criteria.

b. Requirement Test of Data Analysis

1) Normality Test

The normality test is used to find out whether the data is normally distributed or not. To determine the distribution of the data obtained, normality testing was carried out using the Liliefors test formula. The Liliefors test steps are as follows:

a) Calculating the standard numbers:

$$Z = \frac{X - \bar{X}}{S}$$

b) Calculating the sample averages:

$$\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n}$$

c) Calculating the standard deviations:

$$S = \sqrt{\frac{\sum_{i=1}^{n}(x_i - x)^2}{n-1}}$$

d) Calculating the odds of F (Zi) = P (Z ≤ Zi)

e) Calculating the proportions:

$$S(z_i) = \frac{banyaknya\ z_1, z_2, \ldots, z_n \leq z_i}{n}$$

f) Calculating the difference F (Zi) - S (Zi)

g) Calculating the greatest value of F (Zi) - S (Zi) as L_{count}

The distribution of data tested will be normally distributed if $L_{count} < L\alpha$ (n) = normal.

2) Homogeneity Test

The homogeneity test is used to determine whether the pre-test and post-test groups have the same level of variance. The formula F is used to calculate the level of homogeneity of the same variance.

$$F = \frac{\text{Highest Variance}}{\text{Lowest Variance}}$$

(Sudjana, 2005:250)

3. Data Analysis Method

a. The Feasibility of WBL-K Model

The WBL-K model was tested using the Delphi exercise technique. Determination of criteria based on the amount of interval distance with the following formula:

$$\text{Interval Distance (i)} = \frac{\text{Highest Score Total} - \text{Lowest Score Total}}{\text{Number of Interval Classes}}$$

(Widoyoko, 2012:110)

Explanation:

Highest scores total : number of validation items x highest score

Lowest scores total : number of validation items x lowest score

Number of interval classes : 4

The criteria of feasibility for the WBL-K model are presented in table 8.

Table 8. Model Feasibility Criteria

Score	Feasibility Category	Criteria
0.00 – 1.00	Invalid	Not feasible
1.01 – 2.00	Less Valid	Less feasible
2.01 – 3.00	Valid	Feasible
3.01 – 4.00	Very Valid	Very feasible

b. The Practicality of WBL-K Model

The formula of practicality value is

$$P = \frac{f}{N} \text{ x } 100\ \%$$

Explanation:

P : Final score

f : Obtained score

N : Maximum score

Table 9. Practicality Category

No	Score	Criteria
1	80% < x ≤ 100%	Very practical
2	60% < x ≤ 80 %	Practical
3	40% < x ≤ 60 %	Sufficiently practical
4	20% < x ≤ 40 %	Less practical
5	0% < x ≤ 20 %	Not practical

c. The Effectiveness of WBL-K Model

The pre-test and post-test data from the control and experimental groups were tested using the normality test. If the data is normally distributed, the homogeneity test will be carried out to determine the variant of the data. Next, N-Gain is calculated to determine the effectiveness of the model. Finally, N-Gain was tested using the independent T test to determine whether the N-Gain average of the experimental and control group was significant or not. The gain test is carried out to determine the increase in the knowledge aspects in the implementation of WBL-K model.

The formula of Gain Index is:

$$\textbf{Gain Index (g)} = \frac{\text{Posttest Score} - \text{Pretest Score}}{\text{Ideal Maksimum Score} - \text{Pretest Score}}$$

(Meltzer, 2002:1260)

Based on this formula, the criteria for the gain index are described in table 10 below:

Table 10. N-Gain Index Criteria

Gain Index (g)	Criteria
g < 0.3	Low
0,3 > g > 0.7	Medium
g > 0.7	High

Furthermore, the N-Gain score category (%) is interpreted into several categories according to the following conditions:

Table 11. N-Gain Score Interpretation

Percentage (%)	Interpretation	Group
<40	Ineffective	1
40-55	Less effective	2
56-75	Effective Sufficiently	3
>76	Effective	4

The formula of independent T test is:

$$t_{hitung} = \frac{X1 - X2}{\sqrt{\frac{(n1-1)si2+(n2-1)si2}{n1+n2-2}\left(\frac{1}{n1}+\frac{1}{n2}\right)}}$$

Explanation:

Xi : Average score of group i
Ni : Number of respondents of group i
si2 : Variant score of group i

If the $t_{count} > t_{table}$, there is a significant difference between the data. However, if $t_{count} > t_{table}$, there is no significant difference between the data.

RESULTS AND DISCUSSION

1. The Development of WBL-K Model

The results of the study were arranged in several stages according to 4D, i.e. define, design, develop, and disseminate. Model development stages are described as follows:

a. Define

The define stage (preliminary study) of this study was carried out through direct observation at community colleges in Central Java and East Java Provinces that have automotive study programs established for at least 7 years. There are 3 state community colleges having automotive study programs, i.e. Akademi Komunitas Negeri Demak, Akademi Komunitas Negeri Jepara, and Akademi Komunitas Negeri Bojonegoro. Literature studies and observations are carried out on the curriculum documents, RPS, SAP, guidelines of internship program, community college graduate competency books, and number of industrial collaboration data. Based on the results of preliminary observations, the research of WBL-K model was conducted at Akademi Komunitas Negeri Demak because it had complete facilities and infrastructure. Furthermore, Akademi Komunitas Negeri Demak has more collaboration with the industrial world regarding graduate placements than other community colleges.

b. Design

The developed product of this study was WBL *Kolaboratif* model in the internship programs. Furthermore, the WBL *Kolaboratif* model has a structured collaboration between the community colleges and the industry from the preparation to the end of the implementation of WBL on the internship program. This model is carried out by 1) giving collaborative theory before starting the internship program, 2) giving theories and practices in a rolling way, 3) giving the KKNI level IV competency design book of automotive maintenance, and 3) giving collaborative competency tests at the end of internship program.

c. Develop

The validation of this study was carried out by using an internal test with the Delphi exercise technique by giving a questionnaire to the experts. The internal test was carried out by 2 modelling experts and 2 material experts consisting of lecturers and instructors for the automotive industry. Model testing was carried out in five steps, i.e.

1. Compiling a model guide which contains the components of a conceptual and technical model in using the WBL-K model.
2. Making a validation questionnaire for the WBL-K model containing

instruments regarding the aspects of model assessment in the form of statements
3. Determining experts as validators.
4. Providing the validation sheet to validators. Furthermore, the validators provide assessments, inputs, and suggestions for the developed model on the validation sheet.
5. Determining the criteria used in assessing the model validity by referring to the frequency distribution table.

The designed products were revised according to input from experts. The results of the revision produced a hypothetical learning model because its effectiveness had not been proven. The hypothetical model was then implemented in the next stage, namely the field trial stage.

d. Disseminate

This stage is done by giving a pre-test to the experimental and control groups. The experimental group was given treatments in the form of implementing the WBL *Kolaboratif* model, while the control class was not given by any treatment. Then, the post-test was administered as the final result of scoring the respondents' responses. The next stage was compiling the final WBL-K model. The final model was declared valid by the experts and evaluated from the results of limited trials. Therefore, the final model can be interpreted as a model that has gone through various tests so that it is ready to use.

The following is the final model of WBL-K in this study:

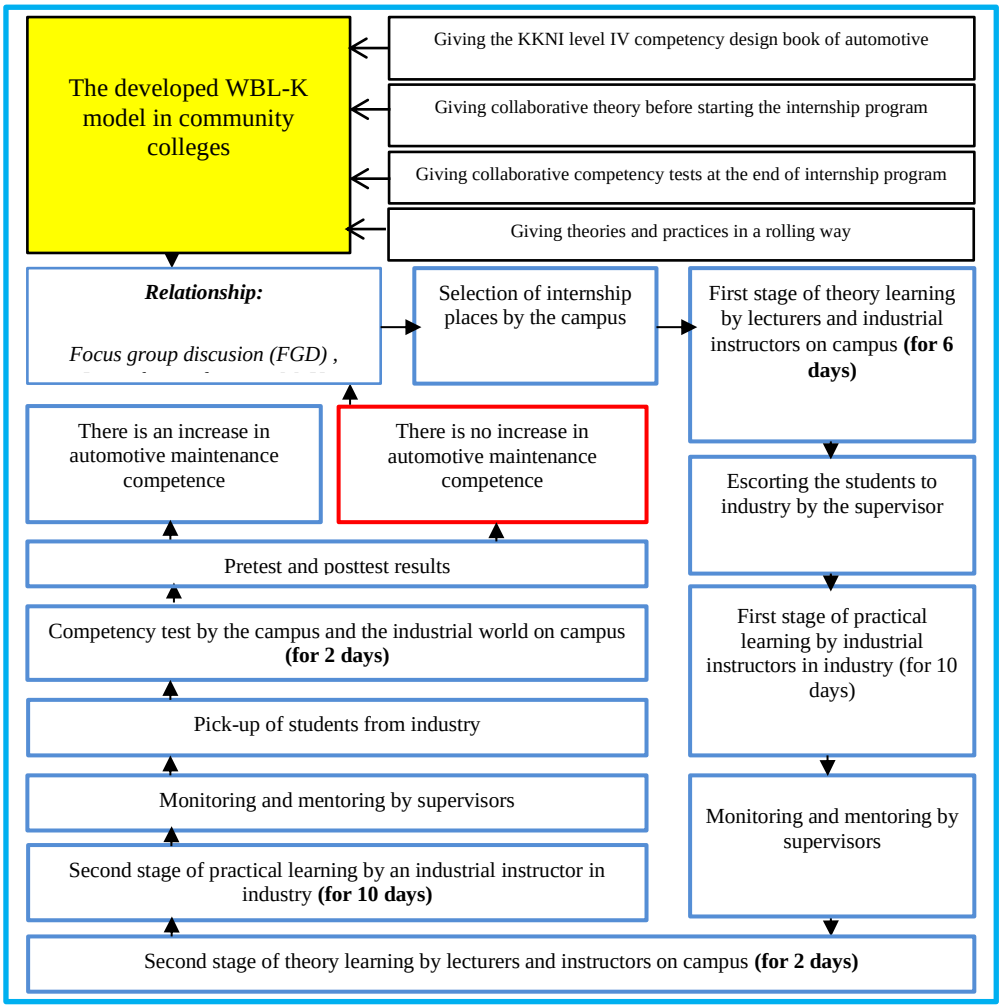

Figure 2. The Final Model of WBL-K

2. The Feasible of WBL-K Model

The feasibility test of the WBL-K model was carried out by the validators to get inputs in improving the model. The validators consist of 2 modelling experts and 2 material experts. The results of the WBL-K model validation can be seen in table 12.

Table 12. Model Feasibility Test Results

Validator	Final Score	Criteria	Conclusion
Dr. Trisyono, M.Pd	3.9	Very Valid	This model is feasible to use
Dr. RR. Noer Indah A., M.Pd	3.7	Very Valid	This model is feasible to use
Ir. Edy Ismail, M.Pd. IPP	3.6	Very Valid	This model is feasible to use
Handoyo Utomo, S.Pd., M.T	3.9	Very Valid	This model is feasible to use

The feasibility test of WBL-K model, which consisted of 26 assessment aspects, was carried out using the Delphi exercise technique. Based on the results of the feasibility test, the first expert score was 3.9, the second expert score was 3.7, the third expert score was 3.6, and the fourth expert score was 3.9. So it can be concluded that the WBL-K model is very valid and feasible to use.

3. The Practicality of WBL-K Model

The practicality test of the WBL-K model was carried out by giving questionnaires to supervisors, industrial instructors, and students. The practicality test of the WBL-K model carried out on 5 students, 2 lecturers and 3 instructors was included in "very practical" category.

The following are the results of the practicality test for the WBL-K model:

Table 13. The Practicality Test Results

Practicality Assessment	Average	Criteria
Students	86.08	Very practical
Supervisors and industrial instructors	86.95	Very practical
Average	86.52	Very Practical

4. The Effectiveness of WBL-K Model

The results of the pre-test and post-test data normality test in the experimental and control groups are as the following table:

Table 14. Normality Test Calculation

Group		L_{count}	L_{table}
Pre-test	Experiment	0.11	0.19
	Control	0.12	0.17
Post-test	Experiment	0.17	0.19
	Control	0.10	0.17

The results of the pre-test and post-test data normality test in the experimental control groups with a significant level of 5% or 0.05 indicate that $L_{count} < L_{table}$. It means that the data is normally distributed.

The results of the homogeneity test of the experimental and control groups are shown in table 15.

Table 15. Homogeneity Test Results

Pre-test	Variant	F_{count}	F_{table}
Experiment	86.68	1.00	2.04
Control	86.81		
Post-test	Variant	F_{count}	F_{table}
Experiment	51.98	1.82	2.04
Control	94.67		

The results show that F_{count} in the pre-test of experimental and control groups = 1.00 < F_{table} = 2.04 and F_{count} in the post-test of experimental and control groups = 1.82 < F_{table} = 2.04. So, it can be concluded that the data are homogeneous.

The calculation result of the N-Gain test is presented in the form of a percentage (%). The results of the N-Gain score test are summarized in table 16.

Table 16. N-Gain Test

Data	Experimental Group	Control Group
	N-Gain Score (%)	N-Gain Score (%)
Average	66.86	19.74

The calculation results of the N-Gain test show that the average N-Gain score for the experimental group is 66.86% or 67%. This means that the implementation of the WBL-K model (in the experimental group) is quite effective to increase automotive maintenance competences. Meanwhile, the N-Gain score for the control class was -19.74% or -20%. This value indicates that the implementation of the conventional WBL model (in the control group) is not effective to increase automotive maintenance competences.

The results of the pre-test and post-test of the experimental and control groups are as follows:

Table 17. T-Test Results for N-Gain Data

Data	Levene Statistic	Sig. (2-tailed)
N-Gain Percentage	0.948	0.039

Based on the table above, the significance score (Sig) of the Levene's test for equality of variances is 0.948> 0.05. This value indicates that the variance of the N-Gain data (%) for the experimental and control groups is homogeneous.

T-test results for N-Gain data show that the N-Gain Percentage data has a Sig (2-tailed) of 0.039 (smaller than the 0.05 significance level). In conclusion, there are significant differences in effectiveness before and after the implementation of the WBL-K model in community colleges.

The research proves that WBL-K model is feasible, effective, and practical to improve competence of the students of automotive study program in community college. This study also revealed new findings that the application of the WBL-K model made students superior in theory, attitudes, and skills in the automotive field. The advantages of implementing the WBL-K model are: 1) providing new innovations of WBL implementation collaboratively between vocational education and industry, 2) creating good relationships and understanding between vocational education and industry in planning, learning process, and assessment in implementation of internship program, and 3) improving professional attitudes because students work directly in the industrial world.

CONCLUSION

Based on the results and discussion, it can be concluded that (1) Research and development of the WBL-K model uses the Research and Development (R&D) with the 4D development model, which consists of: (a) the define stage (preliminary study) contains the findings of the factual model and theoretical model; (b) the design stage is carried out by compiling instruments to formulate a conceptual model; (c) the develop stage is carried out by validating the model to produce a hypothetical model; (d) the dissemination stage is carried out by giving a pre-test to the experimental and control classes, conditioning by applying the WBL-K model to the experimental class, and giving a post-test to the control and experimental classes. The final product of this research is the WBL-K model. (2) The WBL-K model developed is very feasible to use based on the responses given by model experts and material experts. (3) The WBL-K model developed is very practical to use based on responses from users (supervisors, industrial instructors, and students). (4) The WBL-K model developed is quite effective and significant to improve automotive maintenance competence based on the effectiveness test of the WBL-K model on community colleges students.

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