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ORIGINAL

Work-Based Learning Independent Learning (WBL-MB): optimizing Learning Models Based on the Industrial World

Aprendizaje basado en el trabajo Merdeka Belajar (WBL-MB): optimization of basic learning models in the industrial world

Adi Fitra Andikos[1,2], M Giatman[3], Sukardi[3]

[1]Indonesian Postgraduate Student, Postgraduate School of Technical Vocational Education, Faculty of Engineering, Padang State University. Padang, Indonesia.
[2]STITNU Sakinah Dharmasraya. Dharmasraya, Indonesia.
[3]Graduate School of Technical Vocational Education, Faculty of Engineering, Padang State University. Padang, Indonesia.

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ABSTRACT

The selection of learning models can have a significant influence on the quality of the learning process. A new learning paradigm called Work Base Learning Merdeka Belajar (WBLMB) was created to increase the effectiveness of integrating learning into the workplace. The main purpose of this study is to evaluate the effectiveness of the WBLMB learning paradigm. In the January-June 2024 semester, the research was carried out at the Multimedia Department of SMK Negeri 1 Koto Baru, Indonesia. Samples from the experimental and control groups were obtained because this study used a pseudo-experimental design. The experimental group used the Work-Based Learning (WBL) model, while the control group used the WBLMB model. In this study, primary and quantitative data were used. Different test equipment is used to perform before and after testing to obtain these results. The N-Gain method was used to create this data to evaluate the efficacy of the WBLMB model. The N-Gain technique is based on the criteria of homogeneity test, normality test, and t-test. The experimental group scored 35,22 out of 40, while the control group scored 38,17. In the follow-up test, the experimental group scored 85,52, while the control group scored 67,12. Based on the post-test findings in the experimental group, the results were 62,44 % to 90,76 %, with an average score of 79,02 %. On the N-Gain value spectrum, a score of 79,02 % is classified as very high. The improvement of learning outcomes occurs if the WBL-MB learning paradigm is prioritized in the world of work.

Keywords: Work-Based Learning Merdeka Belajar; Learning Model; Industry-Based Learning.

RESUMEN

La selección de modelos de aprendizaje puede influir significativamente en la calidad del proceso de aprendizaje. Se ha creado un nuevo paradigma de aprendizaje denominado Work Base Learning Merdeka Belajar (WBLMB) para aumentar la eficacia de la integración del aprendizaje en el lugar de trabajo. El objetivo principal de este estudio es evaluar la eficacia del paradigma de aprendizaje WBLMB. En el semestre enero-junio de 2024, la investigación se llevó a cabo en el Departamento de Multimedia de SMK Negeri 1 Koto Baru, Indonesia. Se obtuvieron muestras de los grupos experimental y de control porque este estudio utilizó un diseño pseudoexperimental. El grupo experimental utilizó el modelo Work-Based Learning (WBL), mientras que el grupo de control utilizó el modelo WBLMB. En este estudio se utilizaron datos primarios y cuantitativos. Para obtener estos resultados se utilizaron diferentes equipos de prueba para realizar pruebas antes y después. Para crear estos datos se utilizó el método N-Gain para evaluar la eficacia del modelo WBLMB. La técnica N-Gain se basa en los criterios de la prueba de homogeneidad, la prueba de normalidad y la prueba t. El grupo experimental obtuvo una puntuación de 35,22 sobre 40, mientras que el grupo de control obtuvo una puntuación de 38,17. En la prueba de seguimiento, el grupo experimental obtuvo 85,52 puntos, mientras que el grupo de control obtuvo 67,12. Según los resultados de la prueba posterior en el grupo experimental, los resultados fueron del 62,44 % al 90,76 %, con una puntuación media del 79,02 %. En el espectro de valores N-Gain, una puntuación de 79,02 % se clasifica como muy alta. La mejora de los resultados del aprendizaje se produce si se da prioridad al paradigma de aprendizaje WBL-MB en el mundo laboral.

Palabras clave: Aprendizaje Basado en el Trabajo Merdeka Belajar; Modelo de Aprendizaje; Aprendizaje Basado en la Industria.

INTRODUCTION

An important aspect in education is the selection of learning models used in class. Various types of learning implementation require different stages in the learning model.[1,2] In terms of practical education, the Work Based Learning (WBL) paradigm has been around for a long time. However, until now there are still many people who use it. According to Stockard's research , which examined more than 100 papers on the WBL learning paradigm, this happened.[3] Practical learning is the main emphasis of the Work-Based Learning (WBL) model which is the educational paradigm. In 1996, Raelin was the one who founded the WBL model. Presentation, orientation, organized practice, guided practice, and autonomous practice form the WBL learning approach. The current WBL approach has several weaknesses in its implementation. Weakness The main WBL model is this model No succeed increase results Study student with expanding his knowledge base, stimulating thinking critical, or inspiring thinking creative.[4] Four classes of the Multimedia Department's Audio and Video (AV) courses were observed in the 2024–2025 academic year. The WBL learning paradigm is used to implement this learning.

We need to improve the quality of learning outcomes in AV courses based on what we see in classes XIA, XIB, and XIC. The WBL learning model requires further investigation into these improvements. Investigate potency replacement paradigm WBL learning or develop existing features.[5,6,7]

To illustrate how the WBL model can be used in conjunction with the Work model Based Learning to improve students' critical thinking skills, see the work of Rjal Abdullah et al.[5] and Sudjimat et al.[8] For increase ability students' critical thinking basic knowledge and understanding, Video of Real Conditions used in the WBL approach by Arjulayana et al.[9] To increase student creativity by integrating the WBL model with Contextual Learning, Nguyen et al.[10] used multimedia in the WBL paradigm. The approach we currently use, namely the Independent Learning Work Based Learning (WBL-MB) model, is a combination of the WBL and Independent Learning (MB) learning models.

Merdeka Belajar (MB) and WBL are two models that form the basis of the WBL-MB learning model. The WBL model fails to build a knowledge base, critical thinking skills, and capacity creative students , the MB model aims to compensate for this. The reason is the aim of the MB model is to improve student skills through blended learning. Therefore, the WBL-MB model is used in this research to investigate and demonstrate the superiority of the WBL-MB learning model.

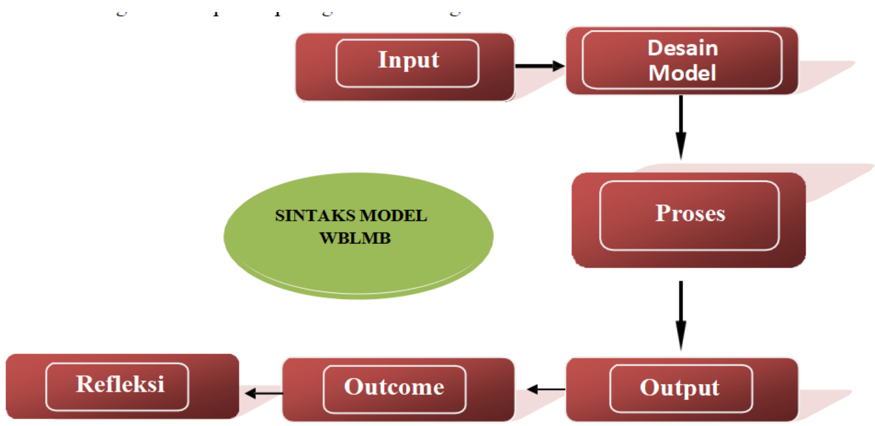

Figure 1. WBL-MB learning framework (Model)

Figure 1 depicts the six stages of the WBL-MB learning paradigm. The orientation and basic procedure simulation phases each form the first two stages. We ensure that students have a strong knowledge base in both periods. Outside the lab, students work in groups according to their individual needs while the teacher facilitates their knowledge creation. Students' Low Order Thinking Skills (LOTS). expected can improved with Study in a way group formed in accordance with individual needs, interests and talents for understand material.[11,12]

Stages three, four, and five include real case simulations. Students' capacity in higher order thinking skills (HOTS), including creativity and critical thinking, can be formed through these three stages. Therefore, these three steps are carried out simultaneously in the laboratory by teachers in partnership with the school itself. According to research[10,12,13,14] the WBL-MB approach helps students develop their HOTS skills by having them tackle real-world problems, share ideas, and practice what they have learned. Stage six covers asynchronous laboratory practice with learning led directly by the instructor through grouping students based on needs. Students whose knowledge has just been expanded are encouraged to practice their memorization skills during the single practice phase.[3] Practicing simulations and recording each student's work on practice reports is a great way to help them remember everything. The benefit of the WBL-MB approach is that it seeks to improve students' skills by making learning more effective from a work-based perspective. Therefore that's the goal study This is to assess the effectiveness of the WBL-MB learning model, which is a relatively new method designed with the aim of improving students' intellectual performance skills through exposure to scenarios. real world work.

METHOD

A quasi-experimental approach was used for this research. Study carried out in the Audio and Video (AV) class of the School Multimedia Department Intermediate State Vocational School (SMK) 1 Koto Baru, Indonesia in group Three Multimedia XI classrooms, room A (XIA), room B (XIB), room C (XIC) (divided into the group experiment and control), from January to by June 2024.

Business world moment This requires a lot of multimedia majors who are skilled in the fields of game modeling, game programming, computer graphics, multimedia editing, and audio editing. To answer the research question, this research was conducted on the topic of AV. With hypothesis Ha: there is a significant influence of using the WBLMB learning model on Audio and Video practicum learning outcomes or H0: There is no significant influence of using the WBLMB learning model on Audio and Video practicum learning outcomes.

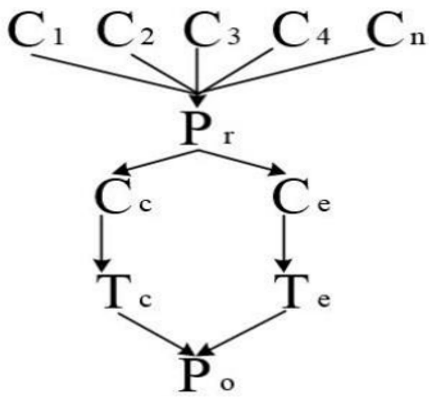

Figure 2. Research subject design

To provide a response to the research hypothesis, an entire group comparison approach was used. By using experimental and control groups as research samples, whole group comparison techniques approach the problem. The whole group comparison model used in this investigation is shown in figure 2.

K a, K b, K c, K d, K n = Group/Class First (1), Second (2), Second (3), Second (4), and so on (n).
Tp = Group/Class Selection Test.
Kk = Control Group/Class.
To = Experimental Group/Class.
P = Methods Used by the Comparison Group.
Pe = Intervention in the Experimental Group.
No = Final Control Group and Experimental Test.

The number of courses offered determines the research topic. The class order comes first, then the 'C' mark for each class. After labeling the groups, an initial test is carried out called the selection test class (Pr) for measure skills of each student in the class. The control class (Cc) and experimental class (Ce) which were used as research samples were selected based on the test results. The student whose average score difference is the smallest determines which two courses are chosen. This supports the claim that the selected class consists of students with equal or comparable skill levels. After selection, the experimental and control classes currently receive treatment.

Class The experiment (Te) was applied to the XIA group of 10 selected students get treatment with used the WBLMB learning model, while the control class (Tc) was applied to the XIC group with 10 selected students receiving treatment using the WBL learning model. The final exam (Po), also called post-test, is carried out after one semester of therapy. The N-Gain test is used to calculate the final test results. The degree of influence of therapy given to the experimental class was assessed using the N-Gain test. These results then become standards for responding to research hypothesis questions. There are some necessary factors remembered moment use N-Gain approach, and aspects This need criteria analytical, with condition as following:[12,13]

1. Normality Test: for test is spread the data is normal or No use method Shapiro-Wilk with sig benchmark > 0,05.
2. Homogeneity Test: to test sample data taken from a population that has the same variance method Homogeneity of Variance with sig benchmark > 0,05.
3. T-test: to test whether there are significant differences between groups using method Independent Sample Test with benchmark (2-tailed) < 0,05.

Every need must undergo an N-Gain test so that this can be done. N-Gain is approach (1) is then can used appropriately after every need fulfilled.

$$N\ Gain = \frac{Skor\ Posttest - Skor\ Pretest}{Skor\ Ideal - Skor\ Pretest} \quad (1)$$

The concept of profit can be interpreted as the act of obtaining value. Post-test score refers to a numerical figure obtained after a person has received a particular therapy. Pre-test scores refer to scores obtained before any therapy or intervention is administered. The ideal value is equivalent to the minimum completeness value. Hake utilizes the N-Gain group rule to determine the extent to which the N-Gain estimate meets the intended goal. The group N-Gain can be seen in table 1.

Table 1. Category Profit Score[18]

N-Gain Value	Category
N-Gain > 0,7	Tall
Reinforcement 0,3 N 0,7	At the moment
N Profit <0,3	Low

Instruments with 2 types of instruments, first test the instrument first with the instrument type test objectives in the form of 20 Requirements and Validity test using Person moment product for formula (KR 20) Cronbach for dichotomous data. Second, test the next instrument with the instrument type Essays and practice tests in the form of 3 requirements and using N correction for Cronbach Alpha.

Study This using quantitative primary data. Both Excel and IBM SPSS Statistics 26 programs were used for each data test. Data collection involves the use of test equipment at both the pre-test and post-test stages. This is the sample used in this investigation. The selection of the two classes is determined by identifying students who have the minimum disparity in average scores. This is used as a basis to confirm that the selected class consists of students with roughly comparable or almost the same skills. If the calculated r value of an instrument is greater than the table r value then it is considered authentic, and vice versa. This is how instrument validity is traditionally determined.

RESULTS

The research results begin with an outline of the results of checking the research instruments. Table 2 shows the test results.

Table 2. Manual Table

Instrument	Table whose validity can be calculated				Value Status
Test the instrument first	0,797	0,446	Legitimate	0,992	Very high
Post instrument test	0,635	0,607	Legitimate	0,627	Tall

The calculated r value turns out to be higher than the table r value according to the pre and post test research tools. This represents the true nature of the instrument used. In addition, the pre-test instrument had very high dependability results and the post-test instrument obtained high dependability findings. The pre and post test processes are then carried out using valid and reliable tools. Three classrooms Multimedia (XI), room A (XIA), room B (XIB), room C (XIC) carried out a pre-test. Pre-test findings are shown in figure 3.

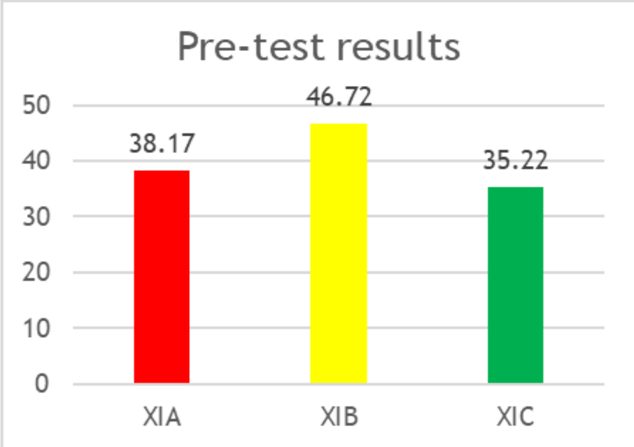

Figure 3. Pre-test results

The reason for selecting the experimental class and the control class is because of the pre-test findings in figure 3. The results of the selected control class are XIA for the control class and the experimental class, XIC. The experimental class and the selected control class received different treatments. The WBL learning model (class XIA) was assigned to the control class, the experimental class used the WBLMB learning model (class XIB). At the end of the semester, the results of varying these factors are then examined in a post-test. Figure 4 shows the results of the post-test implementation.

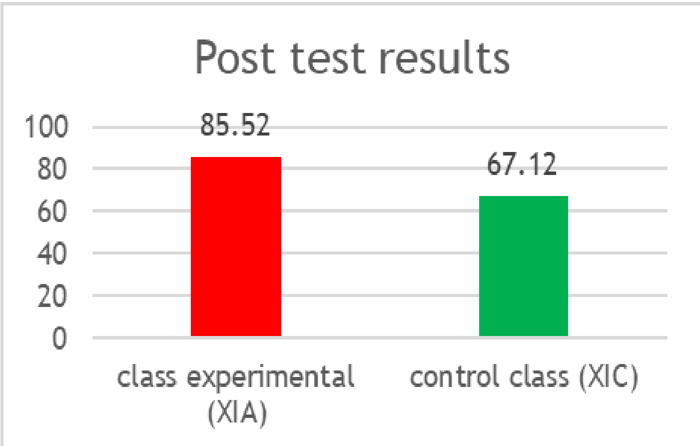

Figure 4. Post test results

The findings of the post-test implementation showed that the control class obtained a score of 67,12, while the experimental class obtained a score of 85,52. After comparing the two values, it can be seen that the implementation of the WBLMB learning model is more effective to implement. However, this alone does not provide a conclusive response to the hypothesis in this investigation. The N-Gain approach is still used to test and answer research ideas. The following text provides an explanation of the results obtained from the N-Gain examination.

N- Get Rating

Knowing how well a model or technique works in research is the goal of the Normalized Gain (N-Gain) Score. Using data collected before and after the test, the N-Gain test was administered to the experimental group. See table 3 for Gain-Score test results. The experimental class N-gain score determined using the WBLMB learning model ranged from 62,44 % to 90,76 %, with a mean value of 79,02 %. If the T-Test value provides statistically significant results, then the N-Gain value can be used to investigate the research hypothesis.(15) In contrast, the T test requires data that is normally distributed and has consistent values.(16) The following is an explanation of the T test, Normality test, and Homogeneity test.

Table 3. Gain-Score test results

No	Name	Experimental Class		N Earning Score (%)
		Pre-test	Post Test	
1	Student 1	21,00	91,71	90,76
2	Student 2	32,30	84,50	76,76
3	Student 3	25,70	86,37	82,92
4	Student 4	25,70	86,53	83,13
5	Student 5	25,70	88,11	82,44
6	Student 6	41,00	82,10	68,53
7	Student 7	52,30	83,51	62,44
8	Student 8	39,00	85,79	77,50
9	Student 9	24,70	85,38	81,43
10	Student 10	34,70	92,62	84,27
	Amount	34,01	86,80	
	Average			79,02
	Minimal			62,44
	Max			90,76

Normality test

Since the sample size was below 50, the Shapiro-Wilk test was used to determine normality.[17,18] The information used comes from post-test and pre-test scores obtained from the control and experimental groups. You can see the calculation results shown in table 4 below.

Table 4. Gain-Score test results

Class		Normality Test					
		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Static tick	df	signature.	Static tick	df	signature.
Learning outcomes	Pre-Test Experiment	0,255	10	0,067	0,911	10	0,295
	Post-Test Experiment	0,209	10	0,200*	0,947	10	0,657
	Pre-Test Control	0,213	10	0,145	0,921	10	0,287
	Post-Test Control	0,121	10	0,200*	0,950	10	0,781

*. This is the lower limit of the true meaning

A. Lilliefors Significance Correction

Table 4 shows that the test data in the experimental and control classes obtained significance values, namely 0,295, 0,657, 0,287, and 0,781. The value of the four data is > 0,05, which means all data is normally distributed. This concludes that the data can be processed with parametric statistics.

Homogeneity test

To determine whether the post-test variances of the two groups are comparable, a homogeneity test compares the experimental and control groups. To ensure that all data collected is consistent in type, procedure, and instrument, variable testing is used. Table 5 displays the results of the homogeneity test.

Table 5 shows that the posttest data for the experimental class and control class has a significant value of 0,568. The value is 0,568 > 0,05, which means that the variance of the experimental and control class posttest data is the same or homogeneous.

Table 5. Homogeneity test results

Homogeneity of Variance Test					
		Levene Statistics	df1	df2	signature.
Learning outcomes	Based on Average	0,338	1	20	0,568
	Based on Median	0,333	1	20	0,560
	Based on Median and with adjusted df	0,333	1	18,777	0,560
	Based on trimmed mean	0,338	1	20	0,569

Independent T test

Post-test results from the control and experimental courses were used in the Independent T-Test conducted in this study. Table 6 contains the findings of the homogeneity test carried out.

Table 6. Homogeneity Test Results

Independent Samples Test						
		Levene's Test for Equality of Variances		t- test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Learning outcomes	Equal variances assumed	0,339	0,567	3,57	20	0,002
	Equal variances not assumed			3,60	19,740	0,002

Table 6 shows that the posttest data for the experimental and control classes has a sig (2-tailed) value of 0,002. Sig value. (2-tailed) of 0,002 < 0,05 means that there is a significant difference in the average learning outcome scores of posttest data for the experimental and control classes, this explains that the learning model has an influence on learning outcomes.

DISCUSSION

There is a positive influence on students' practical learning outcomes due to the introduction of the work-based learning model Independent Learning Learning (WBL-MB). This is supported by research results which show that the experimental class obtained a post-test score of 85,52, significantly higher than the control class score of 57,112. This positive impact shows a high level of efficacy for the organization, as evidenced by an N-Gain score of 79,02 %. The basic assumption of this investigation is that the results of practical learning on AV topics are significantly influenced by the application of the WBLMB learning model. This hypothesis is supported by the N-Gain results. The Alternative Hypothesis (Ha) is accepted in this research, while the Null Hypothesis (H0) is rejected. This research provides an answer to this hypothesis. Ha's hypothesis states that AV learning outcomes are significantly influenced by the use of the WBLMB learning model.

The WBLMB learning model can be used for many different things, not just in one subject or school. When the WBLMB learning model was created, the main goal was to make real learning more effective. This in turn has an impact on improving student learning outcomes. Children learn more after switching to the WBLMB model after seeing how the WBL model does not work as intended. In order for this reinforcement to occur in the WBLMB learning model phase, indirect asynchronous learning and direct synchronous learning must be used.

Students are given the opportunity to study independently and develop their own knowledge through the use of videos. Moreover, this is mainly due to the fact that learning through the use of films can be implemented and repeated dynamically.[21,22] This is in accordance with the development of the WBL model initiated by Alfeld et al.[23] The WBL model uses Real Condition Video in the WBL model. The integration of video content into educational environments is supported by the fact that it increases the adaptability of the learning process and has been proven to improve student learning outcomes.

The second stage, which is a continuation of this technique, can be said to be the model design stage. The simulation tasks integrated in this phase come from the learning content obtained at the orientation stage through the use of learning videos. The model creation process is carried out asynchronously and indirectly outside the laboratory using simulator media. This simulator media allows students to develop a deeper understanding of the material because observation is the main factor in the simulation process.[24,25,26] The possible reality represented by these observations is determined by a multifaceted series of events that can be controlled and transferred to the real world.[22,27]

Students will take part in activities that facilitate the development of basic knowledge in the form of Lower Order Thinking Skills (LOTS) in the procedure-based simulation stage. The onboarding phase and procedure-based simulation are solutions that have proven effective in overcoming the shortcomings of the WBL model. Students' capacity to strengthen their previous knowledge is inadequate.[10,11] The question of how to improve students' basic knowledge in the WBL paradigm has been raised by a number of scholars in the past.

Input is where the WBLMB learning model starts. During this stage, students explore practical instructional videos outside of the lab environment, independently and at their own pace, as part of a self-directed learning activity. On the other hand, in the orientation phase of the Work-Based Learning paradigm, the teacher provides a more direct explanation of the learning orientation through lectures in the laboratory.[23,28] Proposing incorporating multimedia into WBL models[28,29] proposed introducing real-life video scenarios. Although not impossible, this method might be much more flexible with the addition of simulation material to the WBLMB learning model video. New concepts built from video guides can be tested using simulation media. Students with little or no background in a field of study can greatly benefit from this tool.[26]

The next thing that must be done is to carry out laboratory operations in a coordinated and straightforward manner. Testing students' basic knowledge and asking them to complete learning case assignments is also part of this stage. By using Higher Order Thinking Skills (HOTS)[30,31] this activity aims to increase students' critical thinking capacity. Students can gain full knowledge regarding the benefits of practical experience gained in the field for future reference by listening to relevant situations that represent actual conditions and obstacles. Additionally, it has the potential to help students feel more grounded in the real world.[32]

Students work in small groups ranging from two to six for the case-based simulation phase. Working together, either as individuals or groups, helps people hone their cooperation skills, which are essential for solving problems based on a combination of theory and experience.[33,34] If the WBL paradigm fails to develop students' capacity for creative and critical thinking, then this approach will correct this.[2] Ambiyar et al.[3,35] detailed how the development of the WBL model was put into practice, and how learning outcomes were improved by 25,9 % also found an improvement of 12,8 % in their investigation. While this idea is laudable, it is worth mentioning that the difficulties faced in the WBLMB model are much more complex than those faced in real life. This is because the instance consists of a collection of problems that have a more complex pattern.

The next stage, after the simulation is complete, is to immediately apply the results in the laboratory. During the structured training phase, you will be asked to imitate and practice certain skills, as well as assess your attitudes and aptitudes related to the job. Conceptually, shaping underlies the structured training phase.[23] The goal of this training is to give students the tools they need to solve problems on their own with little guidance.

Next, the structured practice stage is designed to display procedure-based simulation material that has been implemented in the second stage realistically and sequentially. This practicum is conducted in three distinct phases to achieve autonomous proficiency with a significant degree of precision: controlled practice, outcomes, and introspection.

Stage five includes the results stage. At this stage, students work on their own assignments while the instructor supervises. In addition to evaluating the case-based simulations carried out in the third phase, this exercise aims to provide students with further opportunities to develop and demonstrate their creativity. Previous case-based simulations aimed to improve students' understanding. Evacuate potential hazards from the Guided Practice phase through analysis and mitigation. When the Guided Practice section is complete, students take a test to see how well they can think critically.

The sixth phase of the WBLMB paradigm is the Reflection Phase. Each student works on this phase indirectly and asynchronously outside the lab; this is an iterative process. Activities such as running the simulation several times and writing practice reports allow students to convey their thoughts and feelings. To help students remember what they have learned, teachers should have them participate in repeated simulations and have them write detailed practical reports.

CONCLUSION

The increase in practical learning outcomes is a direct impact of implementing the WBLMB learning methodology for audio video (AV). The efficacy of the practicum carried out has a big influence on improving student learning outcomes. The WBLMB learning paradigm facilitates the development of fundamental understanding, analytical reasoning, imaginative capacity, and practical skills, all of which contribute to better educational outcomes. A total of 85,52 points obtained from the post-test results of the experimental class, far exceeded the control group average of 67,12. An N-Gain score of 79,02 % illustrates the great effectiveness of this beneficial impact. The practical method learning outcomes have a significant effect on the application of the WBLMB learning model as indicated by the N-Gain value. This practical learning innovation is expected to increase the number of graduates who are adequately prepared to face the problems of the fourth industrial revolution and the 21st century.

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Conceptualization: Adi Fitra Andikos.
Data curation: Adi Fitra Andikos.
Formal analysis: M Giatman.
Obtaining funds: Sukardi.
Research: Adi Fitra Andikos.
Methodology: M Giatman.
Project management: Sukardi.
Validation: Adi Fitra Andikos.
Drafting – original draft: Adi Fitra Andikos.
Writing - proofreading and editing: Adi Fitra Andikos.