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The Use of Trainer Kits to Improve Learning Outcomes of Electrical Lighting Installation

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Abstract— Learning outcomes are mental processes that lead to mastery of knowledge, skills, habits, or attitudes that are acquired, stored, and implemented by causing permanent behavior. Therefore, to improve student learning outcomes, using the Class Action Research (CAR) method, the Kemis and McTaggart model design uses a spiral system that includes several cycles. Each cycle consists of the following stages: (i) Planning, (ii) Implementation and Observation, and (iii) Reflection. The results of the Classroom Action Research method show that teachers can use the trainer kit as a medium of learning and operate according to the time that has been arranged. Some students who are influential and become more knowledgeable in studying Electrical Lighting Installation materials using a trainer kit have also improved in learning outcomes. Some already know and understand and can even practice it well because students need guidance from subject teachers and facilities from majors and schools for better practice. Through learning with home lighting installation trainers in electrical lighting installations, students can improve learning outcomes for class XI SMK Negeri 2 Manado in the 2021/2022 academic year in the sub-competence of installing and connecting installation systems.

Keywords: trainer kits, learning outcomes, electrical lighting installations, classroom action research

I. INTRODUCTION

Teaching and learning activities are the main activities in schools' educational process (Kim, 2020). Therefore, the success of achieving educational goals depends a lot on the quality of the implementation of the teaching and learning process. Schools, as educational institutions, are obliged to provide the broadest possible learning opportunities for students to develop their potential as optimally as possible (Vershitskaya et al., 2020).

In face-to-face learning, many obstacles are faced by teachers as educators and instructors (Singh et al., 2021). The same thing happened to the researchers when carrying out a field research program at the SMKN 2 Manado, where researchers were allowed to teach Electrical Lighting Installation subjects in class XI. Learning that had been done online is now back to face-to-face learning.

The problem of learning at the time of face-to-face did experience several obstacles, which were caused by the pandemic that had passed and had an impact on the world of education (Lestiyanawati, 2020). Where all learning is done online, the problems include: the blank spot (the signal network is not good or does not exist), thus causing distance learning to be less efficient. Another obstacle is that the students' comprehension ability is deficient, especially for learning that requires a practicum. When face-to-face learning is carried out, the number of students does not exceed 10 people. In face-to-face learning, many obstacles are found. Such as arranging for students to keep their distance and comply with health protocols (C. J. Mamahit, 2021).

SMK Negeri 2 Manado, especially the Electrical Power Installation Engineering Department, has several tools that have been provided to be used as learning media. However, it is possible that these tools do not meet the requirements for use. Some tools do not function properly. Based on observations and experience, it is shown that one of the learning media contained in the Workshop of the Department, namely the trainer kit for Electrical Lighting Installations, indicates the need to use learning media properly and correctly because these subjects are subjects that students will understand and master (Isnur Haryudo et al., 2021). The current trainer kit can be used quite well. In addition, from the observations made, the teacher and the head of district head also said that the trainer was already starting to be inadequate because several functions were not optimal, and they had also switched functions. Only one was used for Electrical Lighting Installation subjects. In addition to learning media in

the practicum, a guide or job sheet is also needed to help students understand what will be tested during the practicum, while in the electric lighting installation practicum subject, there is a job sheet that needs updating to improve practicum results for students.

The problem faced in learning in SMK Negeri 2 Manado, especially in the subject of Electrical Lighting Installation, is the ineffectiveness of learning so that learning outcomes decrease. With this research, it is hoped that it can help students understand and improve, so the researchers made a study that aims to improve the learning outcomes of electric lighting installations for students at SMK Negeri 2 Manado by applying the use of a trainer kit.

II. METHOD

The Classroom Action Research model used in this study is the Kemis & McTaggart (1998) model, which further develops Kurt Lewin's model. The Kemis & McTaggart model is widely used because it is simple and easy to understand. The Kemis & McTaggart model design uses a spiral system that includes several cycles. Each cycle consists of stages: 1) Planning, 2) Implementation, 3) Observation, and 4) Reflection (Afriyuni Yonanada, 2017).

The working procedure in Classroom Action Research (CAR) consists of four components, namely planning, acting, observing, and reflecting. The relationship of the four components is seen as a cycle. The working procedure in this Classroom Action Research (CAR) will be carried out in two cycles (Nurtanto et al., 2020).

A. Cycle I

1. Planning

   a. Designing a Learning Implementation Plan (abbreviated in Indonesian as RPP) using a trainer kits for electric lighting installations.
   b. Designing a worksheet with the following materials:
      1) Installation wiring using swap switch.
      2) Installation wiring using a single switch.
   c. Prepare the facilities and infrastructure needed for learning.
   d. Make observation sheets for students (Kunlasomboon et al., 2015).

2. Implementation/ action

   The implementation of learning in Cycle I consist of 1 (one) meeting, namely: the first meeting (Mettetal, 2012).

3. Observation

   Observations made include student performance and teacher performance during learning (Meesuk et al., 2020).

4. Reflection

B. Cycle II

1. Planning

   Based on the reflection in the first cycle, a re-planning was carried out.

2. Implementation/ action

   The implementation of learning in cycle II consists of 1 (one) meeting, namely: the first meeting.

3. Observation

   Conducted includes observations made at the implementation of the first meeting.

4. Reflection

   Done to see the final result between cycle I and cycle II.

C. Data Collection Technique

The methods used to collect data in this study are:

1. Observations were carried out at the TITL Electrical Installation workshop at SMKN 2 Manado, aiming to determine the facilities' condition and infrastructure supporting the subject of Electrical Lighting Installation.
2. The test is given to students after the learning practicum on the trainer kit.
3. Questionnaire of students' reflection on practice.

D. Data Analysis Technique

This classroom action research uses data analysis conducted by researchers from the beginning on every aspect of research activities.

1. Observation

   Observation as a data collection tool is widely used to measure individual behaviour or the process of an activity being observed. Observations must occur when the activity occurs (Sudjana, 2010) For the percentage analysis, the percentage distribution formula is used (Sudjana, 2010).

$$Score\ \% = \frac{\Sigma\ acquisition\ score}{\Sigma\ maximum\ score}\ x\ 100\% \quad (1)$$

2. Practice Results

Analysis of the results of student practice aims to determine the level of mastery of student learning obtained from each cycle. Mastery of the subject matter can be seen from the scores obtained by students for each cycle. To get the value of student learning outcomes, Formula 2.

$$Score\ \% = \frac{\Sigma\ acquisition\ score}{\Sigma\ maximum\ score}\ x\ 100\% \quad (2)$$

3. Complete Learning Achievement

$$Mastery\ of\ learning = \frac{\Sigma\ students\ who\ scored\ \geq 70}{\Sigma\ students\ taking\ the\ test}\ x\ 100 \quad (3)$$

E. Data Collection Procedures

The method of collecting data for this research is as follows:

1. Data on learning outcomes are taken from practice tests at the end of each cycle.
2. Data on the learning processing of the Electrical Lighting Installation at the time the action was taken with the teacher's observation sheet.
3. Data about student activities are taken with student observation sheets.
4. Student's reflection questionnaire on learning determines the response to learning Electrical Lighting Installations, especially applying practical learning using electric lighting installation trainers.

III. RESULTS AND DISCUSSION

A. Research Site Condition

This research was conducted at SMK Negeri 2 Manado, located at Jalan Pomorouw, Taas, Tikala Subdistrict, Manado City, North Sulawesi Province, with a three-year education level used for the study period in school and Field Work Practices (abbreviated in Indonesian as PKL). SMK Negeri 2 Manado is one of the Vocational High Schools (in Indonesian abbreviated as SMK) in Manado City, which has 8 Departments or Study Programs, namely Building Engineering, Building Drawing Engineering, Survey & Mapping Techniques, Electrical Installation Engineering, Electrical Usage Engineering, Electronics and Communication Engineering, Production Mechanical Engineering and Automotive Mechanical Engineering. More precisely, this research was conducted in the Department of Electrical Power Installation Engineering (in Indonesian abbreviated TITL) on the subject of Electrical Lighting Installation taught by class XI TITL students with a total of 30 students.

In carrying out this research, the researchers first conducted a survey. They held discussions with the subject teachers of Electrical Lighting Installation and the Head of the Electrical Power Installation Engineering Department. The survey was carried out during the Field Learning Practice (in Indonesian abbreviated PPL) (from May 2021 to June 2021) and continued from November 2021 until February 2022. The results are that there are still student scores below the Minimum Completeness Criteria (in Indonesian, it is abbreviated as KKM). Although some students have fulfilled the KKM and in the learning process, students use learning resources in the form of material books and learning media in the form of trainer kits. Referring to this, the researcher has discussed with the subject teacher of Electrical Lighting Installation and the Head of the Electrical Power Installation Engineering Department to conduct classroom action research. Researchers have prepared instruments that will later be used in research, including; observation and test sheets. This research was conducted in 2 (two) cycles: Pre-Cycle, Cycle 1 and Cycle 2.

B. Condition of Trainer Kits

For the condition of the trainer kit in the existing Electrical Lighting Installation workshop, its use is still being converted to Electric Motor Installation subjects. The trainer kit is multifunctional, not only used for lighting installation subjects. Therefore teachers and students there use the kit board for subject practicum materials. For the feasibility of the existing trainer kit, it is pretty feasible even to say it is feasible because students can immediately practice without difficulty and the teacher can supervise and direct. However, the teacher and the headmaster suggested using the kit board even more for the subject of electric lighting installations so that the researchers and students could use it to continue the research.

Figure 1. SMKN 2 Manado TITL-Trainer Kits

Previously, the trainer kit (see Figure 1) in the electrical workshop was used to supply current to the kit board. Researchers have asked the Kajur, but, Kajur also does not know what trainer kit to use. Researchers have discussed with teachers and heads of departments who are there, and they help with

some of the needs of researchers. Due to the pandemic, several schools have implemented a shift system for students entering school. And not all can come to school, so researchers and department heads plan to bring in additional students while still following the health protocols recommended by the Manado City government.

C. Description Before Action (Pre-Cycle)

The pre-cycle was carried out before the researcher took action for class XI TITL with 15 students. The pre-cycle will be held in May 2021 for 2x45 minutes, followed by all students. In this pre-cycle implementation, the teacher carries out the learning process as usual. At the same time, the researcher prepares material in the form of a Learning Implementation Plan (abbreviated in Indonesian as RPP). Furthermore, in the implementation of the pre-cycle on the subject of Electrical Lighting Installation, the teacher only prepares the whiteboard media during the learning process. As usual, the teacher first conditions the students to be ready to participate in the lesson, and then the teacher opens with greetings and prays. The teacher motivates with an overview of the industrial world that will be faced in the future. Then the teacher delivers learning materials with the lecture method.

In the pre-cycle stage, observations were made in the learning process prior to the researcher's action. To make observations, first, prepare an instrument as an observation sheet. Based on the instruments that have been provided, it can be seen the attitudes and activities of students during the learning process. The researcher carried out observation of the pre-cycle stage. Based on the results of observations at the pre-cycle stage, it can be seen that student activity is still low. The following data from observations at the pre-cycle stage are shown in Table 1.

Table 1. Results of Observation of Student Activity at the Pre-Cycle Stage

No	Predicate	Score	Σ Students	%
1	Very active	100-90	-	-
2	Active	89-80	4	37.50
3	Active Enough	79-70	9	50.00
4	Less Active	69-60	2	12.50
	Total		15	100.00

Based on Table 1, it can be explained that student activity is still lacking because students were belonging to the active category, as many as 4 students or 37.50%, belonging to the moderately active category, as many as 9 students or 50.00%, and belonging to the less active category as many as 2 students or 12.50% of all 15 students.

Based on the results of the explanation above, it can be interpreted that the use of the lecture method in learning Electrical Lighting Installations has not been able to stimulate student activity in learning. Referring to the problems above, it is necessary to take action or apply learning methods to increase student learning activities.

In addition to the results of the reflection above, the results of the reflection at the pre-cycle stage are as follows:

1. During the learning process, the students were seen to be less active and busy with their respective affairs, such as playing on cell phones, telling stories and leaving class.
2. Submission of material in the teacher's learning process only focuses on the blackboard. It uses the lecture method to make students seem bored and passive in following the lesson.

Explanation of the results of the reflection above, the class action is carried out by implementing the Kemis & McTaggart (1998) model (Vogelzang & Admiraal, 2017), which aims to improve learning achievement in class XI students of Electrical Power Installation Engineering.

D. Cycle I

Cycle I was carried out for 45 minutes in 1 meeting. The first action cycle was carried out on Monday, November 8, 2021, in class XI TITL SMK Negeri 2 Manado. The stages of learning carried out in the first cycle are as follows:

1. Planning

   a. Preparation of a lesson plan (RPP) for the first meeting in cycle I and a pre-compiled job sheet that the supervising teacher has approved. In essence, the preparation of lesson plans and job sheets emphasizes student competence through the board kit learning media.
   b. In the lesson plan, the steps in the kit board and job sheet learning media have been determined for the teaching and learning process.
   c. There is one topic and title to be worked on in the worksheet.

2. Acting and Observe

   The implementation of learning in cycle I consist of one meeting, namely:

   a. The first meeting

      The first meeting in cycle I was held in November 2021 for 1 X 45 minutes. The first meeting contained an explanation of the Electrical Lighting Installation material, namely the installation of a single switch

serving 1 lamp and an exchange switch serving 1 lamp, then continued with giving a job sheet to clarify and practical worksheets for each group. Then an assessment is carried out that concludes the explanation of the material together. Everything is implemented through the implementation of practical learning as follows.

- Introduction:
  1) The teacher conveys apperception.
     - The teacher reminds students about electrical installations with a single switch.
     - The teacher reminds us about the installation components.
  2) The teacher motivates the importance of electrical installation wiring material for daily life.
  3) The teacher conveys the learning objectives.
- Core activities:
  1) The teacher explains to all students the use of practical learning by using an electric lighting installation trainer as a student learning medium.
  2) The teacher presents a brief explanation of the practical material.
  3) Install and connect the wiring system with a swap switch and a single switch.
  4) The teacher presents the problem in front of the class.
  5) The teacher asks students to solve the problem according to their abilities.
  6) The teacher distributes the worksheets. Job sheets are given as the implementation of student practice. Each student is given a job sheet.
  7) The teacher explains the job sheet and gives practical examples of using the electric lighting installation trainer.
  8) Students try to practice with the worksheets given by the teacher.
  9) The teacher supervises students' practical activities so that practical activities run smoothly.
  10) Students are allowed to present the results of their practice, then provide opportunities for other students to respond (stage of developing and presenting the work).
  11) Provide practice evaluation.
- Closing:
  1) Students, together with the teacher, conclude the material studied.
  2) The teacher gives assignments to students to study the material discussed at the next meeting.

b. Research Results Data from Cycle I

From the implementation of the first cycle, various data were obtained, namely data on student learning outcomes, teacher observations, student performance, and student responses to learning questionnaires.

1) Student Learning Outcomes (Practice Evaluation)

After analyzing the test data for the first cycle with the sub-material of wiring installation using a single switch and a series switch, the average score of students who completed was 11 children (73%), students who did not complete 4 children (26%) with a score of the highest value is 89, and the lowest value is 60. For more details, see Table 2.

Table 2. Frequency Distribution of Electrical Lighting Installation Practice Values in Cycle I

No	Class Interval	F	F Relative	F Cumulative	Category
1	100-90	0	0.00%	15	Very competent
2	89-80	4	26.66%	15	Competent
3	79-70	7	46.66%	15	Competent enough
4	69-60	4	26.68%	15	Less competent
5	59-50	0	0.00%	15	Incompetent

Based on Table 2, it can be seen that 0 students are very competent (0.00%), competent students are 4 people (26.66%), pretty competent students are 7 (46.66%), less competent students are 4 people (26.68 %), and incompetent 0 people (0%). To clarify the value of students' practice, we create a bar chart in Figure 2.

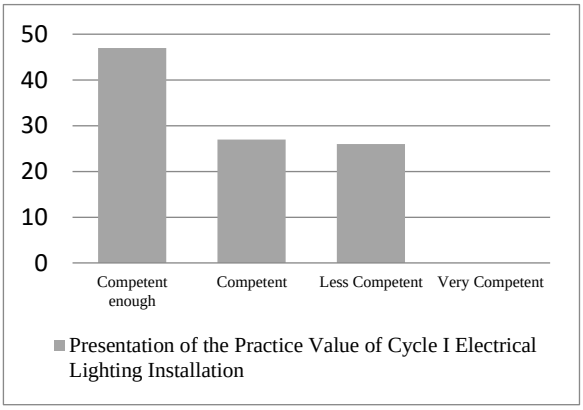

Figure 2. Percentage of IPL Practice Values in Cycle I

c. Teacher Performance Observation Results

In the pre-cycle, we obtained the number of teacher performance scores in learning management with a percentage of 62.50%, with the criteria for teacher performance in learning not being good. Meanwhile, for the first meeting of the first cycle, the total score of teacher performance in practical management was 78%, with the criteria for teacher performance in learning well (C. E. J. Mamahit, 2019). From the observation sheet obtained the following things:

1) The teacher's ability to motivate students is good. The teacher has given much motivation to students. This can be seen in the enthusiasm of students for learning.
2) Teachers' skills in classroom management are still not good, so there are still students who talk to their classmates during teaching and learning.
3) The ability of teachers to provide emotional encouragement to students in doing assignments is still not good. Some teachers only pay attention to active students (Mystkowska-Wiertelak, 2022).
4) Some teachers are still awkward using the electric lighting installation kit board. It can be seen from the way they observe and explain it to students.

d. Student Performance Observation Results

In pre-cycle, the number of student performance scores in learning with a percentage of 62%, with the criteria of student performance in learning less good. Meanwhile, for the first meeting of the first cycle, the number of students' performance scores in learning was obtained with a percentage of 73%, with the criteria of student performance in learning being quite good. From the student observation sheet obtained the following things:

1) Students still find it challenging to interact with the teacher. This can be seen from the discussions carried out by the teacher who are less able to walk.
2) The enthusiasm of students in doing the practice is quite good.
3) Students do not do the initial preparation before doing the practice.
4) Students are good at connecting the installation system.
5) After completing the practice, students do not tidy up the tools that have been used.
6) Students still like to pay less attention to the teacher's explanation.

3. Reflection

- In the first cycle, the learning outcomes have reached the expected indicators because the number of students who have completed their studies has reached 73%.
- Student performance
  At the time of learning, only a small number of students asked questions and could answer the teacher's questions and respond to what the teacher explained. For the subsequent follow-up done by the teacher so that students interact more actively, the teacher must be more active in interacting with students so that they are provoked, and the classroom atmosphere becomes more lively.
- Teacher performance
  The teacher supervises without guiding when practising using the electric lighting installation kit board. To follow up on this problem, the teacher must be better prepared to use the kit board by first studying the material before class.

E. Cycle II

Cycle II was carried out as much as 1 X 45 minutes in 1 meeting. Cycle II action was carried out on Thursday, 17 February 2022, in class XI TITL SMK Negeri 2 Manado. The stages of learning carried out in the second cycle are as follows:

1. Planning
   a. Preparation of a learning implementation plan (RPP) for the first meeting in cycle I and a pre-prepared job sheet that the supervising teacher has approved. In essence, the Preparation of lesson plans and job sheets emphasizes student competence through the board kit learning media.
   b. In the lesson plan, the steps in the kit board and job sheet learning media have been determined for the teaching and learning process.
   c. The worksheet has 1 topic and a title to be worked on.
2. Acting and Observe
   The implementation of learning in cycle II consists of 1 meeting, namely:
   a. Second meeting

   The second meeting in cycle II was held in February 2022 for 1 X 45 minutes. The second meeting contained an explanation of the

Electrical Lighting Installation material, namely the installation of a series switch serving 1 lamp and an exchange switch serving 1 lamp, then continued with giving a job sheet to clarify and practical worksheets for each group. Then an assessment is carried out, concluding the material's explanation together. Everything is implemented through the implementation of practical learning as follows.

- Introduction:
  1) The teacher conveys apperception.
     - The teacher reminds students about electrical installations with a single switch.
     - The teacher reminds us about the installation components.
  2) The teacher motivates the importance of electrical installation wiring material for daily life.
  3) The teacher conveys the learning objectives.

- Core activities:
  1) The teacher explains to all students the use of practical learning by using an electric lighting installation trainer as a student learning medium.
  2) The teacher presents a brief explanation of the practical material. Materials presented:
     - Install and connect wiring systems with serial switches and exchange switches.
  3) The teacher presents the problem in front of the class.
  4) The teacher asks students to solve the problem according to their abilities.
  5) The teacher distributes the worksheets. Job sheets are given as the implementation of student practice. Each student is given a job sheet.
  6) The teacher explains the job sheet and gives practical examples of using the electric lighting installation kit board.
  7) Students try to practice with the worksheets given by the teacher.
  8) The teacher supervises student practice activities so that practical activities run smoothly.
  9) Students are allowed to present the results of their practice, then provide opportunities for other students to respond (stage of developing and presenting the work).
  10) Provide practice evaluation.

- Closing:
  1) Students, together with the teacher, conclude the material studied.
  2) The teacher gives assignments to students to study the material discussed at the next meeting.

b. Research Result Data in Cycle II

From the implementation of the second cycle, various data were obtained, namely data on student learning outcomes, teacher observations, student performance, and student responses to learning questionnaires.

1. Student Learning Outcomes (Practice Evaluation)

After analyzing the data of the second cycle of the test with the sub-material of wiring installation using one serial switch and one exchange switch, the average score of students who completed was 13 students (86.65%), 2 students who did not complete the test (13%) with a grade of the highest value is 90, and the lowest value is 60. For more details, see Table 3.

Table 3. Frequency Distribution of Electrical Lighting Installation Practice Values in Cycle II

No	Class Interval	F	F Relative	F Cumulative	Category
1	100-90	1	6.66%	15	Very competent
2	89-80	7	46.66%	15	Competent
3	79-70	5	33.33%	15	Competent enough
4	69-60	2	13%	15	Less competent
5	59-50	0	0.00%	15	Incompetent

Based on Table 3, it can be seen that very competent students are 1 person (6.66%), competent students are 7 people (46.66%), and pretty competent students are 5 (33.33%). Less competent students are 2 people (13%), and the incompetent 0 people (0%). To clarify the value of students' practice, we create a bar chart in Figure 3.

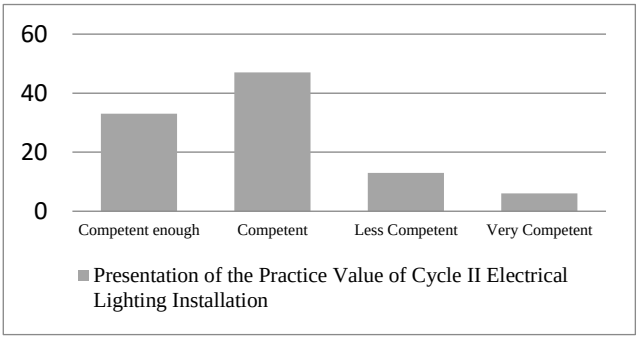

Figure 3. Percentage of IPL Practice Values Cycle II

2. Teacher Performance Observation Results

At the second meeting of the second cycle, the number of teacher performance scores in practical management was obtained with a percentage of 80% with the criteria for teacher performance in learning well. From the observation sheet obtained the following things:

1) The teacher is good at motivating students so that students become enthusiastic about learning.
2) The teacher can manage the class well so that students are enthusiastic about learning.
3) Teachers have been able to provide direction and guidance to students evenly.
4) Some teachers are already fluent in using the electric lighting installation kit board when guiding and giving examples.
5) As well as being able to use time effectively, the teacher has allocated time well.

3. Student Performance Observation Results

At the second meeting of the second cycle, the number of students' performance scores in learning was obtained with a percentage of 80%, with the criteria of student performance in learning being good. From the student observation sheet obtained the following things:

1) Students are familiar with practical learning using a home lighting installation kit board that is carried out so that it goes well.
2) Enthusiasm of students in doing good practice.
3) Students are active in asking questions, expressing opinions, and presenting the results of their discussions.
4) Students are good enough at connecting the installation system.
5) Students are pretty good at doing initial preparation before doing practice.
6) Students already want to tidy up the tools after using them.

4. Reflection

- In the second cycle, the learning outcomes have reached the expected indicators because the number of students who have completed their studies has reached 89.67% compared to the first cycle.

- Student performance

  In the second learning cycle, 15 students attended due to government policies. Students are very active in learning, so students are also brave in adequately using the electric lighting installation trainer and kit board. Furthermore, the classroom atmosphere is more lively because of the interaction between teachers and students.

- Teacher performance

  For learning cycle II, using the teacher's electric lighting installation kit board has been effective. In general, in cycle II, the teacher has succeeded in carrying out learning about electric lighting installations using a kit board.

  From the pre-cycle data, cycle I to cycle II, we can see the changes in the bar chart in Figure 4.

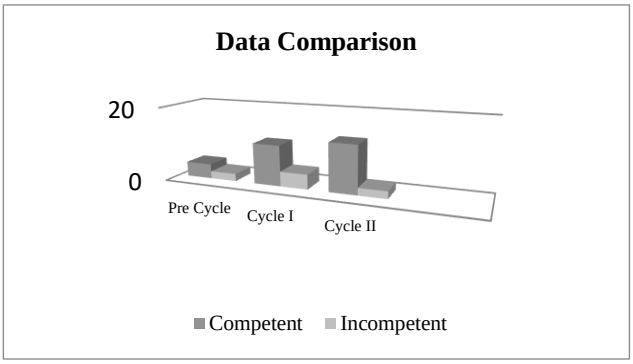

Figure 4. Comparison Diagram
of Pre-Cycle Data, Cycle I, and Cycle II

Based on reflection on learning, learning to install and connect electrical installations using an electric lighting installation trainer is fun and builds group work for students. The use of the lighting installation kit board is considered easier to understand. The existence of a worksheet is also beneficial in understanding and increasing interest and encouraging them to continue learning.

F. Discussion

The discussion is based on the results of observations followed by a reflection on each cycle. In general, the learning process that took place in each cycle was running well. All stages in learning with the trainer and the electric lighting installation kit board

have been carried out well, although not yet perfect. Learning electric lighting installations using trainers and kit boards in cycle I have been carried out well. Several things that must be improved in the first cycle and are expected to be implemented in the following learning include:

1. Time management during the learning process is used to explain the material too long (C. E. J. Mamahit, 2019). This causes less time used for practice. For this reason, it must pay more attention to time so that the material and practice given can be completed on time.
2. Interaction of teachers and students during practice. Some students are still embarrassed to ask the teacher. The subsequent follow-up is done by the teacher so that students can interact more actively. The teacher must do some interactions so that students are provoked, and the class atmosphere becomes more lively (Rasmitadila et al., 2021).
3. Students who are still lacking in making initial preparations before practice and still lacking in tidying up practice tools (Ottenbreit-Leftwich et al., 2018). This is because students want to complete practical activities quickly. What must be done to follow up is that the teacher gives direction to students so that they do not rush to do practical activities.

From the observations, student activities in the first cycle were quite good. Some things that need to be improved are the activeness and courage of students to express their opinions during discussions. In addition, students' activeness in asking and answering teacher questions also needs to be improved so that the learning atmosphere becomes more enthusiastic. Based on the first cycle test, the average value of learning outcomes was 73. There were 11 competent students, while the less competent students were 4, with a learning completeness percentage of 73%. This may be because students understand more about practical learning using trainers and electric lighting installation kits compared to the learning done by teachers in lectures. However, from this learning, several things must be addressed. Among other things, students are still afraid to ask questions about the material or concepts provided, and the teacher's mastery of using electric lighting installation kits must be further improved.

From the results of the reflection questionnaire analysis in cycle I, students felt that learning in cycle II showed an increase. Based on the reflection questionnaire on the above learning, learning to install and connect installations using an electric lighting installation kit is fun. Students feel happy to practice using the kit board. Learning media in the form of trainers and lighting installation kit boards is considered easier to understand. The existence of a job sheet is also beneficial in understanding and increasing interest and encouraging them to continue learning the subject of electric lighting installation. Time management in cycle II was good. The time between the explanation of theory and practice is as determined. The teacher is fluent in using the trainer and the lighting installation kit board. The teacher has been good at motivating students so that students are more daring to express opinions. Students are good enough to do initial preparation before practice and tidy up practice tools after doing practical activities.

From the results of the second cycle test, the average value of learning outcomes achieved by students is 82. 13 students excel. In comparison, those who do not excel are 2 students, with the percentage of student learning completeness at 89.67%. The learning outcomes are determined and even better than in the first cycle. Namely, at least 70% of students get a score of 70 or more. Based on the results of the questionnaire analysis in cycle II with learning to use trainers and electrical installation kit boards, students felt that learning about electric lighting installations became more exciting and varied, and students became more aware of the practice of installing and connecting wiring systems.

The discussion above shows that learning achievement has been achieved. There is an increase in student learning outcomes in teaching and learning activities through learning Electrical Lighting Installation using a trainer and an electrical installation kit board in class XI students of SMK Negeri 2 Manado.

IV. CONCLUSION

Based on the results of research and discussion, it can be concluded that learning using home lighting installation trainer media has increased student learning outcomes. The results of the observed improvements are as follows:

1. The students' practical learning results in the first cycle showed the lowest score of 60. As seen from the classical learning completeness, it reached 73%. So that the classroom action research in the first cycle has been said to be successful but still needs improvement. In Cycle II, the students' practical learning outcomes showed the highest score of 90 and the lowest score of 60. As seen from the classical learning completeness, it reached 89.67%.
2. Learning with trainers and home lighting installation kit boards in the subject of electrical

lighting installations, students can improve learning outcomes for class XI students at SMK Negeri Manado in the 2021/2022 academic year in the sub-competence of installing and connecting installation systems. The result of the observed improvement is an increase in the average practical learning achievement from cycle I to cycle II, which is 16%.

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