

## Implementation of Contextual Learning Improves the Lighting Installation Learning Outcomes of Students of SMKN 1 Tomohon

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**Abstract**—This study is expected to improve learning outcomes. Electrical lighting installation for grade XII students using a contextual learning model during the 2022–2023 academic year. The study was conducted in two cycles, with planning, implementation, action, observation/evaluation, and reflection as components of each cycle. This study involved 30 grade XII TITL students. The collected data were analyzed through test techniques. It was analyzed using qualitative descriptive techniques. The results of the study showed that the average student learning outcomes in cycle 1 in the electrical lighting installation component were 67.4% in the moderate category, which in cycle 2 increased to 80% in the high category, indicating an increase of 85.66%. Thus, the contextual learning model has been proven to improve the learning outcomes of grade XII TITL students at SMKN 1 Tomohon in the 2022–2023 academic year.

**Keywords:** learning outcomes, learning, contextual, electrical lighting installation

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### I. INTRODUCTION

Learning outcomes are defined as students' abilities after learning activities (Hussey & Smith, 2008). They basically include the achievement of competencies, attitudes, and principles shown in the way we think and act. Learning outcomes can also be used to show how well students understand what the teacher teaches. If students achieve satisfactory results, learning is considered successful. However, some students have different levels of understanding, so they may need help understanding what the teacher teaches during the learning process (Mahfudz MS, 2023).

In addition, learning outcomes can be defined as a measure of students' success in understanding the lessons taught in school. Learning outcomes are measured through scores generated from tests that measure students' understanding of a particular topic (Hill & Chin, 2018). The goal of the teaching and learning process is to achieve adequate learning outcomes, which are assessed and monitored by teachers.

Internal and external factors influence learning outcomes (Corno, 2023). Internal factors are elements within an individual and can be classified into two parts: physical, which relates to the physical, and psychological, which relates to the mental and emotional aspects. The physical condition of the individual. Psychology has eight parts: intelligence or skill, attention, interest, ability, drive, maturity, readiness, and fatigue (Asih & Utami, 2018).

External factors, which come from the environment independent of the individual (Ardoyn et al., 2020), can be classified into three categories: first, family factors, which include the influence of parenting patterns, family relationship dynamics, household conditions, and family financial conditions. Second, school factors include learning approaches, curriculum structure, teacher-student relationships, student interactions, school discipline, learning facilities, and homework. Third, community factors are student participation in social activities, media influence, and peer relationships.

The main challenge in formal education today is the lack of student involvement in learning (Singh Malik, 2018), which is reflected in the low average learning outcomes, mostly due to teachers' use of conventional or traditional learning models (Magdalena, 2018).

Learning models are essential factors that influence learning outcomes, so a teacher must have the skills to use appropriate learning models (Supena et al., 2021). A concept known as the contextual learning approach helps teachers relate subject matter to students' real-life situations. It encourages students to consider how they can use their knowledge daily as members of society and their families.

Learning models are still centered on teachers, who often need more space for students to develop critical thinking and learn independently (Keiler, 2018). As a solution, traditional approaches, such as lectures in class, can be changed into more interactive forms, such as audiovisual or video media, so that

students can learn the material more deeply and repeatedly without being limited by the classroom (Cahyaningtias & Ridwan, 2021).

Learning should maximize students' mental processes by creating an atmosphere of continuous discussion and Q&A to improve their thinking skills (Sasson et al., 2018). Learning at every level of education should be interactive and inspiring, provide adequate opportunities for initiative, creativity, and independence according to students' talents, interests, and developments, and encourage active participation.

The best learning is a combination of teachers providing information around 10–30% of the time, students seeking and using their own sources of information, and students being actively involved in planning, implementing, and evaluating learning, along with self-assessment and peer assessment (Stronge, 2018). Conventional learning models usually cause students to be passive and limited to listening and recording important information (Etemadfar et al., 2020).

Learning motivation is essential to increasing students' desire to learn (Meece, 2023). In SMKN 1 Tomohon, learning outcome problems may be caused by factors such as the learning methods used, a lack of student discipline, and a lack of facilities. Internal and external factors, such as a lack of self-confidence, discipline, and adequate facilities, can influence this.

Based on the observation's results, the researcher intends to improve learning outcomes by applying appropriate instructional methods. Instructional methods are the way teachers carry out their duties and achieve learning objectives (Sivarajah et al., 2019). Several learning methods are commonly used in schools, such as lectures, discussions, demonstrations, discoveries, and contextual learning.

Researchers want to improve the study results by applying the contextual learning method (contextual teaching and learning, CTL). CTL is a comprehensive educational approach that aims to help students understand the subject matter better because the learning material is reinforced by its relationship to students' daily lives, both socially, culturally and personally (Dewi & Primayana, 2019). This allows students to acquire more adaptive knowledge and skills that can be applied in various situations.

Learning outcomes include values, understanding, attitudes, appreciation, skills, and behavioral patterns. Learning is a person's effort to achieve relatively stable behavioral changes (Tolman, 2023). The explanation above illustrates that the transformation in individuals who learn, including transformations in their knowledge, causes learning outcomes and behavior, often measured through tests.

There are various views from experts on the true nature of learning outcomes.

Learning outcomes are the learning process results measured by evaluation tools such as structured written, oral, and practical tests. Changes in a person's behavior after learning, such as increased knowledge and understanding, can indicate learning outcomes. However, mental progress can also be seen from changes in behavior. Students' and teachers' perspectives show increased understanding and mental performance after the learning process (Behzadnia et al., 2018).

Current learning methods have a critical role in determining whether the learning process is successful or not. One of the learning approaches that has proven effective and can improve pedagogical competence in teaching is contextual teaching and learning (CTL). CTL is a learning method that allows students to actively seek, manage, and find learning experiences relevant to their real lives, which are more specific and relevant to their daily lives (Chi Hyun et al., 2020).

An electrical lighting installation is an electrical system specifically used for lighting. It provides lighting. The lighting installation circuit consists of several electrical components connected from the power source to the lighting equipment placed in a particular location or room (Rahmat et al., 2024; Short, 2018)

Electrical installation refers to electrical lines and devices that conduct electric current inside and outside a building. In designing an electrical installation system, attention must be paid to the safety of humans, other living things, and property from the dangers and damage that the use of electrical installations may cause. Electrical installations must also operate correctly and according to user needs. On the other hand, lighting configuration is a series of electrical components placed in a specific location or room and connected to lighting equipment. This system is designed to provide lighting, and in order to function safely and effectively, lighting installations must meet standards in the selection of safety devices and electrical conductors (Neidle, 2016; Tuwongkesong et al., 2020).

The electrical system intended to channel electrical power to lighting equipment is called an electrical lighting installation. The lighting installation circuit comprises various electrical parts connected to lighting equipment in a particular place or space. Electrical installations consist of electrical lines and equipment installed inside and outside the building to channel electric current (Adiarta, 2021; Hayusman, 2020). In designing an electrical installation system, pay attention to the safety of humans, other living things, and property from the

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dangers and damage that the use of electrical installations may cause. In addition, to ensure that the electrical installation functions correctly and follows regulations, its intended use condition must be optimal.

## II. METHOD

This study applies the action research method in the classroom (action research). The analysis was conducted for about six months, from March to August 2023, at SMKN 1 Tomohon, in class XII Electrical Power Installation Engineering (in Indonesian, known as the abbreviation TITL).

This research model uses action research developed by Kemmis and Taggart. This model follows a spiral pattern from one cycle to the next, with steps as in Figure 1 (Kemmis et al., 2014).

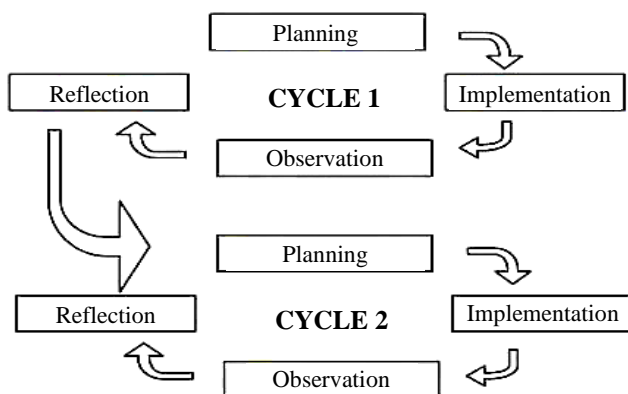


Figure 1. Classroom action research procedures

### 1. Planning

- Reviewing the material and indicators of essential electricity learning.
- Preparing lesson plans according to indicators through the recitation method.
- Providing resources relevant to the subject matter to support learning activities.
- Preparing evaluation tools, such as worksheets and student assessments.
- Creating observation sheets to track how teachers and students interact during learning.

### 2. Implementation

The study carried out the planned actions to learn using the recitation method. This classroom action study activity was carried out in two cycles, with two face-to-face meetings (Mamahit et al., 2024).

### 3. Observation

Observation activities took place when learning activities using the recitation method began.

Teachers observed the learning activities of teachers and students in this case.

### 4. Reflection

Reflection activities were carried out after the learning activities were completed. The data obtained were discussed based on the learning outcomes and the observer's notes to find strengths and weaknesses. As for the weaknesses, solutions were sought for improvement in the next cycle stage.

## III. RESULTS AND DISCUSSIONS

### A. Results

This study was conducted at SMKN 1 Tomohon, especially in class XII TITL, using a contextual teaching and learning model (CTL) designed to improve student learning outcomes. It was done in the classroom. This study involved two cycles and lasted for approximately six months. In each cycle or meeting, a test was held for learning outcomes. The duration of each meeting was two times 40 minutes.

### 1. Cycle 1

The four stages consist of the first cycle: planning, implementation, observation, and reflection:

#### a. Planning

- Planning the learning process to ensure its implementation is in accordance with expectations and a guide for teachers in delivering learning.
- Preparing learning, including preparing content to be delivered to students.
- Providing learning resources to be used when teaching.
- Producing student observation sheets to monitor the conditions and development of the learning process in the classroom when implementing specific learning methods.

#### b. Implementation

At this stage, implementation in the classroom is carried out by applying the theory and preparation that has been prepared previously, with the hope of using the contextual learning model effectively. Actions taken in the first cycle follow the planned learning scenario, including conveying learning objectives and preparing students to adapt to the learning model used during the education process.

The first cycle is implemented by learning the competency standard, understanding how to install single-phase lighting according to the General Guidelines for Electrical Installations (abbreviated as

PUIL in Indonesian), and determining the position of components in lighting installations.

### 1) Learning Meeting 1

#### a) Initial activities

- i. The teacher arranges the learning spaces, greets the students, and checks their attendance.
- ii. The teacher has prepared the material to be studied.
- iii. The teacher explains the skills needed during the learning process to the students.
- iv. The teacher motivates Each student to follow the learning process with discipline.

#### b) Core activities

- i. The teacher groups the students into heterogeneous groups, each with five students.
- ii. The teacher will present the material and explain the parts of the electrical lighting installation so that students can understand the lesson.
- iii. Students discuss and explore information about the components of the electrical lighting installation.
- iv. The teacher allows students to ask questions about their learned topics.
- v. Each group is asked to show what they have discussed, while others are asked to comment on their group presentations.
- vi. The teacher appreciates the work of each group by giving appreciation.

#### c) Final activities

- i. The teacher summarizes and provides feedback on the activities that have been carried out.
- ii. The teacher informs the activities at the next meeting.

### 2) Learning Meeting 2

#### a) Initial activities

- i. The teacher prepares the classroom to start the teaching and learning process, greets students, and takes their attendance.
- ii. The teacher prepares the learning aids that have been prepared.
- iii. The teacher informs students about the competencies or goals that must be achieved during the learning activities.
- iv. The teacher encourages all students to participate in learning activities with discipline.

#### b) Core activities

- i. The teacher re-discusses the topic of the first meeting.

- ii. The teacher informs the students of the rules for implementing the evaluation.
- iii. The teacher gives students assignment papers and answer sheets to work on independently.
- iv. The teacher asks students to fill in personal information on the answer sheets.
- v. After the questions are completed, students collect their work.

#### c) Final activities

- i. The teacher evaluates, reflects, provides responses, and delivers conclusions and comments on what has been done.
- ii. The teacher informs the activities at the next meeting.

### c. Cycle 1 Observation

This study observed the interaction between the learning process used by teachers and students contextual and teaching (CTL) in the first cycle. However, obstacles such as students playing on cellphones, passive students, and reluctance to collaborate could affect the test results. Cycle 1 has not gone well and needs adjustments according to the CTL learning plan. The following table shows the students' achievements in the first cycle trial.

**Table 1.** Student learning outcomes in cycle 1

No	Students	Score	Completion	
			Complete	Not
1	Adryan M. Rumengan	80	√	
2	Allessandro.C. Gosal	65		√
3	Angel C. Runtuwene	50		√
4	Chevas. V. Y. Runtu	83	√	
5	Claudio Kevin Dien	65		√
6	Claudio. Y. Talangi	60		√
7	Elsi Syela Wongkar	57		√
8	Fanuel. T. Ngala	81	√	
9	Febrian Raintung	75	√	
10	Frini Febiola Kaligis	80	√	
11	Gerry. L. M. Rares	57		√
12	Gilbert Alwim Dien	73		√
13	Gilbert Wiliam Lasut	80	√	
14	Glen Angero Torek	55	√	
15	Hiskia.B. Moningka	85	√	
16	Hosea Marvio Ering	55		√
17	Jason Geraldi F Lumowa	80	√	
18	Jonathan G. Kojongian	57		√
19	Jovan. Y. Wewengkang	65		√
20	Juniver Daniel Palit	56		√
21	Krisma G. Rumondor	83	√	
22	Leonardo Brilly Ering	57		√
23	Malvino Fadly A. Pongoh	76	√	
24	Rafael Kopalit	66		√
25	Richard Hevandi Suot	75	√	
26	Rosarion F. Wahani	69		√
27	Savitska S. Runtu	76	√	
28	Sesilia Awrelia Ering	50		√
29	Sesilia Julia Patochau	80	√	



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30	Velly Aprilio Pongoh	60	√
<b>Total</b>		<b>2,051</b>	<b>14</b>
<b>Average</b>		<b>64.09</b>	<b>46.66</b>
			<b>53.33</b>

### d. Reflection

**Table 2.** Recapitulation of student learning outcomes in cycle 1

No	Test 1 Results	Achievement
1	Highest Score	85
2	Lowest Score	50
3	Average Score	64.09
4	Number of students who completed	14
5	Number of students who did not complete	16
6	Percentage of learning completion	46.66

Table 2's recapitulation shows student learning results in the first cycle using the CTL learning approach. These results indicate that obstacles in the learning process cause student scores to be lacking in the first cycle, resulting in a level of student learning below standard.

Looking at students' results in the first cycle of action, it was found that some students needed help understanding the mechanism of the intended activity, which caused several obstacles in its implementation. In the next action cycle, teachers need to add and correct the deficiencies that have been found so that the learning objectives using this method can be seen.

The researchers planned changes to improve the shortcomings in the first cycle and achieve optimal results in the second cycle. They changed how long students were given to speak, improved materials delivery, and created more exciting learning media.

## 2. Cycle 2

The actions of this second cycle are carried out in four stages, as occurred in cycle 2:

### a. Planning

Currently, the researcher examines the shortcomings and successes of Cycle 1 to improve them and maintain success. The researcher then takes the following actions:

- 1) Compiling a written test.
  - 2) Compiling a research format.
  - 3) Making an observation sheet on the implementation of learning for teachers.
- b. Implementation

This stage still uses the CTL learning model. The second action cycle is carried out according to the

previously designed learning scenario, namely by conveying learning objectives and preparing students to adjust to the learning model applied during the teaching process.

Based on the results of the first cycle, some students did not achieve the expected academic results. However, the teacher made a few changes in cycle 2 so that students could get maximum results.

### 1) Learning Meeting 3

#### a) Initial activities

- i. The teacher prepares the class for learning, greets students, and checks their attendance.
- ii. The teacher prepares the instructional resources that have been provided.
- iii. Students receive an explanation from the teacher about the learning assignment.
- iv. The teacher encourages all students to follow the teaching and learning activities orderly.

#### b) Core activities

- i. The teacher divides students into heterogeneous groups, each with five students.
- ii. The teacher provides more detailed material about the components of electrical lighting installations so that students can understand what is being learned.
- iii. Students are given time to discuss more deeply to explore information about the components of electrical lighting installations, while the teacher provides more guidance for each group of students to speak so that students can freely ask questions about material that is not understood.
- iv. The teacher gives each group a discussion sheet to be worked on together with their respective group members.
- v. The teacher directs each group to present the results of their discussion, and other groups are asked to respond to the first group's presentation.
- vi. The teacher appreciates each group's work after reflecting on what they have learned.

#### c) Final activities

- i. The teacher makes conclusions and provides comments on the activities that have been carried out.
- ii. The teacher informs the activities at the next meeting.

### 2) Learning Meeting 4

#### a) Initial activities

- i. After welcoming students, checking their attendance, and preparing the classroom for the learning process, the teacher carries out other tasks.



- ii. The learning media provided by the teacher are used.
- iii. The teacher explains the competencies that need to be achieved during the learning activities.
- iv. The teacher encourages all students to follow the learning activities to achieve the best results.

b) Core activities

- i. The teacher repeats the topic of the first meeting.
- ii. The teacher informs students about how to conduct an evaluation.
- iii. The teacher gives students questions and answer sheets to work on themselves and asks them to fill in personal information on the answer sheets.
- iv. After the questions are completed, the teacher collects their products.

c) Final activities

In the final activity, the instructor works with students to assess, think, and respond to responses. The teacher also concludes and provides feedback on the activities that have been carried out.

c. Observation

At this point, the researcher records the changes made during the learning process. Students' tactics and activities are observed. Although most students are still less involved in the second cycle, the number of active students increases. However, some students have yet to show appreciation to friends who are good at doing assignments. The teacher overcomes difficulties by guiding students, communicating well, and working effectively with group members. The teacher also inspires students to learn. Observation data shows that students in cycle 2 achieve better results using the model than those in cycle 1. contextual learning. Students become involved, ready, and active in the learning process.

Table 3. Student learning outcomes in cycle 2

No	Students	Score	Completed	
			Complete	Not
1	Adryan M. Rumengan	95	√	
2	Allessandro No C. Gosal	87	√	
3	Angel C. Runtuwene	80	√	
4	Chevas V. Y. Runtu	87	√	
5	Claudio Kevin Dien	85	√	
6	Claudio Y. Talangi	94	√	
7	Elsi Syela Wongkar	85	√	
8	Fanuel T. Ngala	90	√	
9	Fenrian Raintung	86	√	
10	Frini Febiola Kaligis	88	√	
11	Gerry L. M. Rares	69		√
12	Gilbert Alwin Dien	89	√	
13	Gilbert Wiliam Lasut	95	√	
14	Glen Angero Torek	83	√	
15	Hiskia B. Moningka	95	√	
16	Hosea Marvio Ering	78	√	

17	Jason Gerald F Lumowa	87	√	
18	Jonathan G. Kojongian	88	√	
19	Jovan Y. Wewengkang	86	√	
20	Juniver Daniel Palit	95	√	
21	Krisma G. Rumondor	90	√	
22	Leonardo Brilly Ering	85	√	
23	Malvino Fadli A. Pongoh	88	√	
24	Ravael Kopalit	70		√
25	Richard Hevendi Suot	94	√	
26	Rosarion F. Wahani	89	√	
27	Savitska S. Runtu	88	√	
28	Sesilia Awrelia Ering	95	√	
29	Sesilia Julita Patochau	87	√	
30	Velly Aprilio Pongoh	86	√	
Total		2,614	28	2
Average		81.69	93.33	6.66

d. Reflection

The research showed that students showed significant differences when using the contextual teaching and learning model (CTL) in cycle 2. This is indicated by the fact that students have shown interest in the media used by the teacher and have shown greater involvement in the learning process using the CTL model. Students are more active in learning compared to the first cycle.

Student activity in teaching and learning activities has been better. Students have been able to work together. Table 4 shows a recapitulation of student learning outcomes in the second cycle, which shows the level of student understanding of the material taught by the teacher:

Table 4. Recapitulation of student learning outcomes in cycle 2

No	Test 2 Results	Achievement
1	Highest Score	95
2	Lowest Score	69
3	Average Score	81.69
4	Number of students who completed	28
5	Number of students who did not complete	2
6	Percentage of learning completion	93.33

Table 4 shows that implementing the research results during cycle 1 of learning significantly affects student success. Students still need to achieve the researcher's targeted completeness, and deficiencies include the researcher not providing excellent classroom facilities, which indicates that many students are less attentive and less enthusiastic.

The problems were improved with more supervision of all students during the learning process and more guidance for students with difficulties. The results of learning cycle 2 showed that both deficiencies and challenges could be overcome with effective strategies. The percentage of student

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completeness is 93.33, and an achievement value of 75 shows that students have achieved the required learning completeness. This indicates better student learning outcomes.

### B. Discussions

Classroom action research (CAR) at SMKN 1 Tomohon used the CTL model. CAR was conducted four times in two cycles. The number of students who passed the first cycle evaluation was 46.66%, or 14 students, with an average score of 64.09. The results were less than the researcher's goal: to increase the number of students who passed. The results of student learning in the first cycle were less effective because most students needed to become more familiar with the CTL method.

During cycle 2, the study's results showed that students were motivated to adapt to the CTL method and began to actively participate in the classroom. Of the 30 students surveyed, 28, or 93.33%, achieved the completion standard, and the other students failed to achieve the completion standard.

### IV. CONCLUSION

According to the study results, students in class XII TITL SMKN 1 Tomohon can improve their learning outcomes using a contextual education approach. This method allows students to play an active and less active role in developing imagination, forming group cohesion, and being open to developing their potential. The results of students who rose from cycle 1 to cycle 2 tests showed increased learning outcomes. As a result, a contextual learning approach has been created and is worthy of being used as a learning approach for the subject of Electrical Lighting Installation.

Several recommendations are made for SMKN 1 Tomohon teachers to consider the elements that influence students' interest in learning and the quality of their learning outcomes. Teachers should allow students to find and learn systematically, critically, logically, and analytically. This is done so that students can draw their conclusions with confidence. In addition, teachers are expected to be able to choose an effective and efficient approach to motivate students when teaching that follows the unique characteristics of SMK students. Thus, students' desire to learn will grow and be well maintained to support optimal learning outcomes. Students are expected to be more confident, more interested in learning to express their opinions, more actively involved in class discussions, more courageous in defending their opinions if they are correct, and more courageous in asking or telling the teacher what

causes learning difficulties. Students must go straight to class after the break and start learning independently.

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