

Strengthening Basic Electrical Competence Using Simulator Software

Devit Etika Sari, Aditya Alpha Theodore

Sekolah Tinggi Agama Islam Miftahul ula Nganjuk

SMK Negeri 2 Surabaya

devitetikasri@gmail.com, Aditya317@gmail.com

Accepted: 3 Januari 2021	Reviewed: 5 Januari, 2021	Published: 20 Februari 2021
-----------------------------	------------------------------	--------------------------------

Abstract: The purpose of this study is to enable students' learning outcomes in the subjects of electronic fundamentals by using simulation software. The type of research conducted is class action research conducted in several cycles and stages including, Pretest, treatment and Post test. The subjects of this study were electrical engineering students with a total of 36 students. This is the predictor of success in this study when in the classroom 85% or more of the number of students obtained an average score of 75. Based on the research obtained pre test results 30.5% above average value of 75%. after several cycle treatment and post test results get a score of 82.9 % students who get a score above KKM 75. With the graduation result of students above KKM grades increased from the initial 30.5% to 82.9%, there was a 54% increase in student grades above KKM. With this analysis, researchers proved that software simulator media used can increase the interest in learning theory of learning and learning outcomes of students in class XII TTTL 3 at SMK N 2 Surabaya.

Keyword: Software Simulator, Learning results, Electrical Competence

INTRODUCTION

Teachers have a duty and responsibility to improve the quality and quality of national education in accordance with the purpose of national education, namely to develop the potential of learners to become human beings who believe and trust in God Almighty, noble, healthy, knowledgeable, capable, creative, independent, and become democratic and responsible citizens¹.

One of the public services provided by a teacher is to carry out learning in accordance with Permendikbud No. 15 of 2018² on The Fulfillment of Teacher Workload conducted by Educators, namely planning learning or guidance, carrying out quality learning or guidance, assessing and evaluating the results of learning or guidance, as well as carrying out learning or improvement and enrichment.

¹ Helen Newnham, "When Is a Teacher or School Liable in Negligence?," *Australian Journal of Teacher Education* (2000).

² Bahgie Mahtonami, "ANALISIS IMPLEMENTASI KEBIJAKAN PERMENDIKBUD NOMOR 28 TAHUN 2016 TENTANG SISTEM PENJAMINAN MUTU PENDIDIKAN DASAR DAN MENENGAH DI KOTA MEDAN (Studi Kasus Di Dinas Pendidikan Provinsi Sumatera Utara Dan SMK Swasta)" (UNIMED, 2018).

SMK Negeri 2 Surabaya has a Vision to Be an Educational Institution of Technology and Industry Training that can serve and meet the needs of the Industrial World entering the global era. The mission of Establishing human resources *berimtaq* to provide services to the community, the Business World and the Industrial World, through Technology and Industrial Training Education with National Certification Standards, oriented to sustainable achievements and environmental sustainability.

But along with the development of learning there are a variety of problems whose solutions are considered important in the development of today's times. But based on the experience of the author as a productive teacher SMK, nowadays there are many problems about the achievements of vocational school students, such as the lack of interest in students receiving teaching materials in the form of theory so as to result in a lack of confidence in the presentation and work on the theory of semester and other school exams. According to the facts encountered by the authors, shows that the average score of the National Test of Productive Theory in 2018 there was a decrease in the average value of the National Examination specifically for Productive Problems of students of class XII TITL SMK Negeri 2 Surabaya compared to the Results of the 2017 Exam. This can be seen from the fact that the student often lacks something recorded when obtaining teaching materials, even the appearance of lack of confidence in responding to oral questions when the student is presenting. Whereas the vision of SMK Negeri 2 Surabaya is "To be an Educational Institution of Technology and Industry Training that can serve and meet the needs of the Industrial World entering the global era." where the competence that is up to date and creativity of innovation is currently very developed rapidly, so that students must have a strong Basic Electrical Competence in order to develop the science that has so that new innovations emerge by experimenting or testing.

Based on the background exposure, the author raised the issue of Weak Basic Electrical Competence in grade XII TITL students. One of the implementation of Strengthening The Competence of students, especially class XII by providing / treatment the students, especially for the basic. Like a building, basic theory must be strongly responded to and we can be held accountable³. If the learner really understands the basic theory then the learner can develop according to his interests and creativity, whereas if there are students who lack interest in terms of reading theory and practice, can be by using simulator software where the learner can practice basic electrical installation wherever the class is. The use of simulation software can also stimulate students in the use of computers and laptops⁴.

Basic Electrical Competence Strengthening activities in grade XII TITL students have previously been conducted in school in the form of oral question and answer activities every day before entering the core material. With this Simulation Software is expected to provide more

³ Andrew J. Martin, "Enhancing Student Motivation and Engagement: The Effects of a Multidimensional Intervention," *Contemporary Educational Psychology* (2008); Eric P. Bettinger and Rachel B. Baker, "The Effects of Student Coaching: An Evaluation of a Randomized Experiment in Student Advising," *Educational Evaluation and Policy Analysis* (2014).

⁴ Jaume Barcelo, *Fundamentals of Traffic Simulation, Simulation*, 2010.

innovation in learning activities to understand theory and practice in schools⁵ so that later will optimize the competence and confidence of students of Class XII TITL SMK Negeri 2 Surabaya. The responsibility of SMK Negeri 2 Surabaya which has the number of students as many as 2,581 students in the 2019/2020 school year and specifically 100 students of class XII TITL so that they are ready to compete in the world of work and continue academics.

Basic electronic learning results after observation reached 65, and this value is still far from the Minimum Completion Criteria that has been set at 75. Based on the interview conducted on students of class XII TITL 3 at SMK Negeri 2 Surabaya obtained information that many students do not understand the basic concept of Electronics. In addition, the low interest in learning students about electronic theory in the classroom makes students less confident in competing in the field of competence. So with these shortcomings researchers innovate by applying "**Strengthening Basic Electrical Competence Using Simulator Software In Grade XII TITL Students At SMK Negeri 2 Surabaya**".

Methods

Based on the background above, the author implements innovations namely Strengthening Basic Electrical Competence Using Simulator Software In Grade XII TITL Students At SMK Negeri 2 Surabaya by compiling the following implementation methods:

1. Conduct consultations with mentors or principals related to research designs that have been made
2. Conduct consultation with Coach regarding research design that has been made
3. Conduct coordination with fellow teachers or senior teachers in the school related to the concept of research to be carried out
4. Identify and classify problems of low interest in theory learning.
5. Preparing Instrument (Simulation Software and Job sheet) (Adjustment to average equipment specifications and student abilities)
6. Application of Research in the form of Instrument Treatment (Simulation Software) to students at the Beginning and End (Concept Introduction, Pretest - Posttest)
7. Application of Research in the form of Instrument Treatment (Simulation Software) to students on the study of theory in the classroom
8. Data processing (Correction of Pretest, Posttest, and daily tasks)
9. Conduct evaluation of the implementation of research programs
10. Consulting with mentors on research results
11. Systematically prepare research reports

RESULT AND DISCUSSION

Teachers are one of the important elements in education, where teachers play a very vital role in the implementation of formal education in particular. In order to create a good education, teachers must meet the qualification standards set by the government, as well as master pedagogic, professionalism, personality, and social competencies as stipulated in Decree No. 16 of 2017 on

⁵ Anke Drappa and Jochen Ludewig, "Simulation in Software Engineering Training," in *Proceedings - International Conference on Software Engineering*, 2000; Kathleen Scalise et al., "Student Learning in Science Simulations: Design Features That Promote Learning Gains," *Journal of Research in Science Teaching* (2011).

Standards of Academic Qualification and Teacher Competence. In addition to these demands, teachers are further obliged to carry out their duties and functions as implementers of such education.

If a teacher has adhered to the provisions of a varied task, it is expected that the teacher can realize an effective and enjoyable learning atmosphere. The duties of the teacher are:

1. Teacher as conservator
2. Teacher as successor
3. Teacher as transformer (translator)
4. Teacher as planner
5. Teacher as learning process manager
6. Teacher as director (guide)
7. Teacher as organizer
8. Teacher as communicator
9. Teachers as facilitators
10. Teacher as motivator
11. Teacher as evaluator

Based on the exposure of teacher duties above the researchers began the research in order to improve competence and provide learning innovations to students. And this research was conducted in class XII TTTL 3 which amounted to 36 male students, Student XII TTTL 3 has a relatively high thinking ability, but from the other hand has some disadvantages, among others:

1. Lack of confident character in class XII
2. Weak Understanding of Basic Electrical Competence in class XII
3. Low average theoretical test value compared to Class XII TTTL practice test
4. Low interest in theoretical learning in the classroom
5. The difference between the highest and lowest student grades in the class

Before conducting the research using Software Simulator, researchers first conducted tests to find out the initial ability of students to know the success rate of researchers by applying Software Simulator To Improve Student Learning Outcomes In The Subject of Electronic Fundamentals In Grade XII TTTL 3 Students at SMK Negeri 2 Surabaya In Odd Semester 2019/2020. The pretest results are as follows:

Tabel. Data Rekapitulasi Pre - Test

Criteria	Number of students	Percentage
Complete ≥ 75	11	30,5 %
uncomplete ≤ 75	25	69,5 %
Amount	36	100 %

From the results of the data recapitulation table above states that class XII TTTL 3 SMK Negeri 2 Surabaya is still very weak and as many as 75% of students still get a score below KKM which is 75.

After conducting the study using Software Simulator, researchers must conduct tests to determine the success rate of researchers by applying Simulator Software To Improve Student

Learning Outcomes In The Basics of Electronics In Grade XII TITL 3 Students at SMK Negeri 2 Surabaya In Odd Semester 2019/2020. The pretest results are as follows:

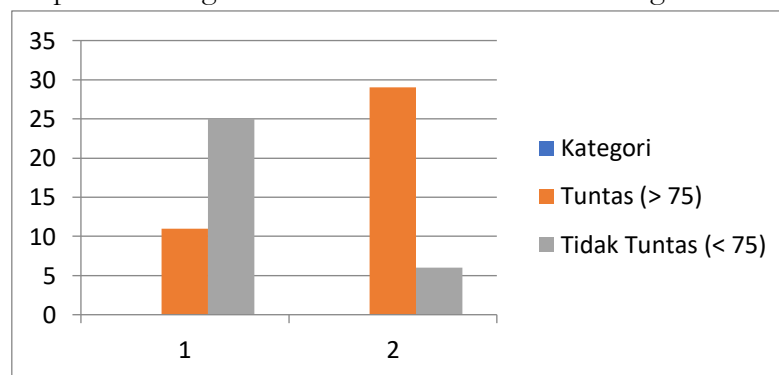
Tabel. Data Rekapitulasi Post - Test

Categories	Students	Percentage (%)
Complete (≥ 75)	29	82,9 %
Uncomplete (≤ 75)	6	17,1 %
Amount	35	100 %

Based on the table above, it can be known that the number of completed students as many as 29 students while the unfinished as many as 6 students with the total number of students is 35 students. Student Grade Graduation above KKM Grade increased from the initial 28.57% to 82.9%. There was a 54% increase in student scores above KKM. With this analysis, researchers proved that software simulator media used can increase the interest in learning theory of learning and learning outcomes of students in class XII TITL 3 at SMK N 2 Surabaya.

The results of research on student learning outcomes on the application of Strengthening Basic Electrical Competence using Software Simulator, obtained that there is an effective improvement in student learning outcomes that can be seen in the chart below:

Graphs1 . Changes in The Value of Student Learning Outcomes



From the graph above it is clear that after the implementation of the teaching model using Software Simulator students experienced a change in learning as evidenced by the increasing number of completion of students who initially only 11 students to 29 students who completed the score above KKM namely >75 .

Conclusion

Based on the results of the study entitled The Use of Basic Electrical Competence Using Simulator Software In Students Class XII In SMK Negeri 2 Surabaya the results obtained the following conclusions:

1. The use of Simulator Software for the use of Basic Electrical Competence in SMK Negeri 2 Surabaya can improve the learning outcomes of students.
2. The use of Simulator Software for the use of Basic Electrical Competence in SMK Negeri 2 Surabaya can increase activities in the classroom to be more interesting and active.

References

- Barcelo, Jaume. *Fundamentals of Traffic Simulation*. *Simulation*, 2010.
- Bettinger, Eric P., and Rachel B. Baker. "The Effects of Student Coaching: An Evaluation of a Randomized Experiment in Student Advising." *Educational Evaluation and Policy Analysis* (2014).
- Drappa, Anke, and Jochen Ludewig. "Simulation in Software Engineering Training." In *Proceedings - International Conference on Software Engineering*, 2000.
- Mahtonami, Bahgie. "ANALISIS IMPLEMENTASI KEBIJAKAN PERMENDIKBUD NOMOR 28 TAHUN 2016 TENTANG SISTEM PENJAMINAN MUTU PENDIDIKAN DASAR DAN MENENGAH DI KOTA MEDAN (Studi Kasus Di Dinas Pendidikan Provinsi Sumatera Utara Dan SMK Swasta)." UNIMED, 2018.
- Martin, Andrew J. "Enhancing Student Motivation and Engagement: The Effects of a Multidimensional Intervention." *Contemporary Educational Psychology* (2008).
- Newnham, Helen. "When Is a Teacher or School Liable in Negligence?" *Australian Journal of Teacher Education* (2000).
- Scalise, Kathleen, Michael Timms, Anita Moorjani, Lakisha Clark, Karen Holtermann, and P. Shawn Irvin. "Student Learning in Science Simulations: Design Features That Promote Learning Gains." *Journal of Research in Science Teaching* (2011).