

ABSTRAK

EFEKTIVITAS PjBL-STEM PEMBUATAN BIOGAS DARI KOTORAN SAPI DALAM MENINGKATKAN KETERAMPILAN BERPIKIR SISTEM SISWA SMA

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Penelitian ini bertujuan untuk mendeskripsikan keefektifan Model PjBL-STEM pembuatan biogas dari kotoran sapi dalam meningkatkan keterampilan berpikir sistem siswa SMA. Metode dalam penelitian ini menggunakan *Weak experimental* dengan *one group presttest-posttest Design*. Populasi dalam penelitian ini adalah seluruh siswa XI. F SMA N 13 Bandar Lampung semester genap Tahun Ajar 2024/2025 berjumlah 142 siswa. Sampel penelitian ini adalah kelas XI. F 4 yang diambil dengan teknik *purposive sampling*. Instrumen yang digunakan yaitu soal pretes dan postes keterampilan berpikir sistem. Analisis data yang digunakan uji perbedaan dua rata-rata menggunakan uji *Dependent sample t-test*. Hasil penelitian menunjukkan nilai pretes dan postes siswa. Nilai rata-rata postes keterampilan berpikir sistem siswa kelas XI. F 4 lebih besar dibanding nilai rata-rata pretes. *n-gain* rata-rata keterampilan berpikir sistem siswa yang diperoleh kelas XI. F 4 sebesar 0,71 berkategori tinggi. Rata-rata persentase angket respon siswa yang diperoleh kelas XI F 4 sebesar 86,4% kategori sangat baik. Rata-rata persentase keterlaksanaan pembelajaran PjBL-STEM yang diperoleh kelas XI. F 4 sebesar 75,25% kriteria tinggi. Produk yang dihasilkan pada PjBL-STEM yaitu biogas dengan kategori baik. Berdasarkan uji perbedaan dua rata-rata menunjukkan bahwa model PjBL-STEM pembuatan biogas dari kotoran sapi efektif meningkatkan keterampilan berpikir sistem siswa.

Kata Kunci: Keterampilan berpikir sistem, kotoran sapi, PjBl-STEM

ABSTRACT

THE EFFECTIVENESS OF STEM-BASAD PROJECT BASED LEARNING (PjBL) ON BIOGAS PRODUCTION FROM COW MANURE IN ENHANCING HIGH SCHOOL STUDENTS' SYSTEMS THINKING SKILLS

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This study aims to describe the effectiveness of the PjBL-STEM model in producing biogas from cow manure to improve the system thinking skills of high school students. The research method used is a weak experimental design with a one-group pretest-posttest design. The population of this study consisted of all students in class XI.F at SMA N 13 Bandar Lampung in the even semester of the 2024/2025 academic year, totaling 142 students. The research sample was class XI. F4, selected using purposive sampling techniques. The instruments used were pretest and posttest questions on system thinking skills. The data were analyzed using the dependent sample t-test to examine the difference between the two means. The results showed that the posttest scores of students were higher than the pretest scores. The average normalized gain (n-gain) of system thinking skills in class XI. F4 was 0.71, which is categorized as high. The average percentage of students' responses obtained from questionnaires was 86.4%, categorized as very good. The average percentage of PjBL-STEM implementation in class XI. F4 was 75.25%, which falls under the high criteria. The product generated through the PjBL-STEM activity was biogas, which was categorized as good. Based on the results of the difference test between the two means, it can be concluded that the PjBL-STEM model for producing biogas from cow manure is effective in improving students' system thinking skills.

Keywords: System thinking skills, cow manure, PjBL-STEM.