

ABSTRAK

Eva Dwi Rahayu. 2026. *Efektivitas Problem Based Learning (PBL) Dan Predict, Observe, Explain (POE) Melalui Eksperimen Terhadap Kemampuan Pemecahan Masalah Fisika Siswa Di SMA Negeri 1 Nglames*. Skripsi. Program Studi Pendidikan Fisika, Fakultas Keguruan dan Ilmu Pendidikan, Universitas PGRI Madiun. Pembimbing: (I) Dra. Purwandari, M.M., M.Pd., (II) Farida Huriawati, S.Si., M.Si.

Pembelajaran fisika di SMA Negeri 1 Nglames telah berpusat pada siswa, namun belum optimal dalam melatih kemampuan pemecahan masalah serta masih jarang melaksanakan praktikum akibat keterbatasan waktu. Penelitian kuasi eksperimen ini bertujuan menguji pengaruh model PBL dan POE berbantuan eksperimen virtual PhET terhadap peningkatan kemampuan pemecahan masalah fisika siswa pada materi Suhu dan Kalor, serta menentukan model yang lebih efektif. Sampel dipilih menggunakan *cluster random sampling*, terdiri dari Kelas Eksperimen 1 (model PBL) dan Kelas Eksperimen 2 (model POE). Data dikumpulkan melalui tes uraian HOTS berdasarkan indikator Heller. Hasil uji *paired sample t-test* menunjukkan nilai signifikansi 0,000 untuk kedua kelompok, membuktikan kedua model berpengaruh signifikan. Skor rata-rata *N-gain* kelas PBL sebesar 0,594 dan kelas POE sebesar 0,598 (kategori sedang). Uji *Mann-Whitney U* menghasilkan signifikansi 0,677 ($p > 0,05$), sehingga disimpulkan tidak terdapat perbedaan efektivitas yang signifikan antara kedua model. Analisis indikator Heller menunjukkan model POE unggul dalam aspek merencana dan mengevaluasi solusi, sedangkan model PBL kokoh pada analisis orientasi masalah autentik.

Kata Kunci: *Problem Based Learning, Predict Observe Explain*, Pemecahan Masalah, Eksperimen Virtual, Suhu dan Kalor.

ABSTRACT

EVA DWI RAHAYU. 2026. Effectiveness of Problem Based Learning (PBL) and Predict, Observe, Explain (POE) Through Experiments on Students' Physics Problem-Solving Skills at SMA Negeri 1 Nglames. Undergraduate Thesis. Physics Education Study Program, Faculty of Teacher Training and Education, Universitas PGRI Madiun. Advisors: (I) Dra. Purwandari, M.M., M.Pd., (II) Farida Huriawati, S.Si., M.Si.

The physics learning process at SMA Negeri 1 Nglames is student-centered; however, it remains suboptimal in fostering problem-solving skills, and experiments are rarely conducted due to time constraints. This quasi-experimental study aimed to investigate the effectiveness of PBL and POE models assisted by PhET virtual experiments on improving students' physics problem-solving skills on Temperature and Heat, and to determine which model is more effective. The sample was selected using cluster random sampling, consisting of Experimental Class 1 (PBL model) and Experimental Class 2 (POE model). Data were collected through a HOTS written test based on Heller's indicators. The paired sample t-test results showed a significance value of 0.000 for both groups, proving that both models significantly improved students' skills. The average N-gain score was 0.594 for the PBL class and 0.598 for the POE class (medium improvement). The Mann-Whitney U Test yielded a significance value of 0.677 ($p > 0.05$), concluding no significant difference in effectiveness between the models. Heller's indicator analysis indicates that the POE model excels in planning and evaluating aspects, while the PBL model strongly sharpens authentic problem analysis.

Keywords: Problem Based Learning, Predict Observe Explain, Problem Solving, Virtual Experiment, Temperature and Heat.