ABSTRAK

Situmorang, Jenni J, 4203121074 (2024). Pengaruh Model *Problem Based Learning* Berbantuan PhET terhadap Hasil Belajar Siswa Kelas XI di SMAN 1 Parbuluan pada Materi Suhu dan Kalor.

Pembelajaran di SMA Negeri 1 Parbuluan masih menerapkan model pembelajaran konvensional yaitu dengan metode ceramah dan tanya jawab khususnya pada mata pelajaran fisika yang mengakibatkan siswa merasa jenuh dalam menerima pembelajaran sehingga akan berdampak pada hasil belajar siswa. Dalam mengatasi hal ini diperlukan suatu inovasi dalam kegiatan pembelajaran salah satunya dengan menerapkan model *Problem Based Learning* berbantuan PhET. Penelitian ini bertujuan untuk mengetahui pengaruh model *Problem Based Learning* berbantuan Phet terhadap hasil belajar fisika siswa pada konsep suhu dan kalor. Jenis penelitian ini adalah *quasi experiment design* dengan desain yaitu *pretets-posttest control group design* dengan teknik pengambilan sample yang digunakan pada penelitian ini ialah *cluster random sampling*, yang berdiri dari kelas eksperimen dan kelas kontrol dengan masing-masing kelas terdiri dari 36 siswa. Subjek penelitian yang digunakan dalam penelitian ini ialah kelas XI-1 sampai XI-4. Instrumen yang digunakan berupa tes belajar dalam bentuk pilihan berganda sebanyak 15 soal yang sudah divalidasi. Data yang diperoleh dari tes yaitu *pretest* dan *posttest* akan diuji normalitas dan homogenitasnya. Uji normalitas diuji menggunakan uji *Lilifors* dan homogenitas diuji menggunakan uji *Fisher*. Berdasarkan hasil penelitian diperoleh nilai rata-rata *pretest* pada kelas eksperimen adalah 30,525 dan nilai rata-rata *pretest* kelas kontrol adalah 29,778. Setelah dilakukan uji normalitas dan uji homogenitas, data nilai *pretest* dari kedua kelas dinyatakan berdistribusi normal dan homogen. Melalui pengujian statistik diperoleh hasil bahwa kemampuan awal kedua kelas adalah setara. Kemudian dilakukan perlakuan berbeda, kelas eksperimen dengan model *problem based learning* berbantuan PhET dan kelas kontrol dengan pembelajaran konvensional. Diperoleh nilai rata-rata *posttest* kelas eksperimen 78,489 dan nilai rata-rata *posttest* kelas kontrol 62,003. Hasil uji t satu pihak diperoleh nilai $t_{hitung} > t_{tabel} = 7,607 > 1,666$. Hasil ini menunjukkan adanya peningkatan hasil belajar yang signifikan setelah diberikan perlakuan

Kesimpulan penelitian ini menunjukkan bahwa perlakuan dengan menerapkan model *problem based leaning* berbantuan PhET dapat meningkatkan hasil belajar siswa secara signifikan dibandingkan dengan menggunakan model pembelajaran konvensional pada materi suhu dan kalor siswa kelas XI SMA Negeri 1 Parbuluan.

Kata-kata kunci: Problem Based Learning, PhET, Hasil Belajar, Suhu dan Kalor.

ABSTRACT

Situmorang, Jenni J, 4203121074 (2024). The Effect of Problem Based Learning Model Assisted by PhET on the Learning Outcomes of Class XI Students at SMAN 1 Parbuluan on Temperature and Heat Material.

Learning at SMA Negeri 1 Parbuluan still applies a conventional learning model, namely the lecture and question and answer method, especially in physics subjects which results in students feeling bored in receiving learning so that it will have an impact on student learning outcomes. In overcoming this, an innovation is needed in learning activities, one of which is by applying the Problem Based Learning model assisted by PhET. This study aims to determine the effect of Problem Based Learning model assisted by Phet on students' physics learning outcomes on the concept of temperature and heat. This type of research is a quasi experiment design with a design that is pretets-posttest control group design with the sampling technique used in this study is cluster random sampling, which stands from the experimental class and control class with each class consisting of 36 students. The research subjects used in this study were classes XI-1 to XI-4. The instrument used is a learning test in the form of multiple choice as many as 15 questions that have been validated. The data obtained from the test, namely pretest and posttest, will be tested for normality and homogeneity. Normality test was tested using Lilifors test and homogeneity was tested using Fisher test. Based on the results of the study, the average value of the pretest in the experimental class was 30.525 and the average value of the control class pretest was 29.778. After the normality test and homogeneity test, the pretest data from both classes were declared normally distributed and homogeneous. Through statistical testing, significant results were obtained that the initial abilities of the two classes were equal. Then different treatments were carried out, the experimental class with a problem-based learning model assisted by PhET and the control class with conventional learning. The average posttest value of the experimental class was 78.489 and the average posttest value of the control class was 62.003. The results of the one-party t test obtained the value of tcount> ttable = 7.607> 1.666. These results indicate a significant increase in learning outcomes after treatment.
The conclusion of this study shows that the treatment by applying the problem-based leaning model assisted by PhET can significantly improve student learning outcomes compared to using conventional learning models on temperature and heat material in class XI students of SMA Negeri 1 Parbuluan.

Key words: Problem Based Learning, PhET, Learning Outcomes, Temperature and Heat.