

## ABSTRAK

### PENGEMBANGAN ALAT PERAGA KONVERSI ENERGI MEKANIK KE ENERGI LISTRIK MENGGUNAKAN ENERGI POTENSIAL PEGAS UNTUK MELATIHKAN KETERAMPILAN PROSES SAINS SISWA SMA

Oleh

**Indah Ayu Wirastiti**

Penelitian ini bertujuan untuk mengembangkan alat peraga konversi energi mekanik menjadi energi listrik dengan memanfaatkan energi potensial pegas untuk melatih keterampilan proses sains siswa SMA. Alat peraga ini dirancang agar valid, praktis, dan layak digunakan dalam proses pembelajaran pada materi perubahan energi. Metode penelitian yang digunakan adalah *Design and Development Research* (DDR), yang terdiri dari empat tahap, yaitu *analysis*, *design*, *development*, dan *evaluation*. Proses pengembangan dilakukan melalui beberapa tahapan sebelum produk dapat digunakan dalam pembelajaran. Tahap pengembangan tersebut terdiri dari tahap pembuatan *prototype* alat peraga konversi, uji kelayakan alat, uji kevalidan alat, serta uji kepraktisan alat. Pada tahap pengujian alat, didapatkan hasil yang menunjukkan bahwa alat peraga konversi energi memenuhi hukum kekekalan energi dimana energi output lebih kecil dari energi input dikarenakan ada energi yang hilang dalam proses konversi. Uji kevalidan yang dilakukan oleh 3 ahli memperoleh skor rata-rata sebesar 3,34 yang tergolong dalam kategori sangat valid. Sedangkan uji kepraktisan yang dilakukan melalui observasi dan angket respon pengguna menghasilkan nilai masing-masing sebesar 86,13% dan 89%, keduanya termasuk dalam kategori sangat baik. Berdasarkan hasil yang diperoleh dari proses pengembangan dan uji kelayakan, dapat disimpulkan bahwa alat peraga konversi energi potensial pegas ke energi listrik yang dikembangkan sangat layak digunakan dalam pembelajaran fisika materi perubahan energi untuk melatih keterampilan proses sains siswa SMA.

**Kata kunci:** Alat peraga, konversi energi, energi potensial pegas, energi listrik, kemampuan proses sains

## **ABSTRACT**

### **DEVELOPMENT OF A TEACHING AID FOR CONVERTING MECHANICAL ENERGY INTO ELECTRICAL ENERGY USING SPRING POTENTIAL ENERGY TO TRAIN HIGH SCHOOL STUDENTS' SCIENCE PROCESS SKILLS**

**By**

**Indah Ayu Wirastiti**

This study aims to develop a teaching aid for converting mechanical energy into electrical energy by utilizing the potential energy of springs to train high school students' science process skills. This demonstration tool is designed to be valid, practical, and suitable for use in the learning process on energy change material. The research method used is Design and Development Research (DDR), which consists of four stages, namely analysis, design, development, and evaluation. The development process was carried out through several stages before the product could be used in learning. These stages included the creation of a prototype of the conversion demonstration tool, testing the tool's feasibility, testing the tool's validity, and testing the tool's practicality. During the tool testing stage, the results showed that the energy conversion demonstration tool complied with the law of conservation of energy, where the output energy was smaller than the input energy because some energy was lost during the conversion process. The validity test conducted by three experts yielded an average score of 3.34, which falls into the highly valid category. Meanwhile, the practicality test conducted through observation and user response questionnaires yielded scores of 86.13% and 89%, respectively, both of which fall into the very good category. Based on the results obtained from the development process and feasibility testing, it can be concluded that the educational tool for converting potential spring energy into electrical energy developed is highly suitable for use in physics education on energy transformation to develop students' scientific process skills at the high school level.

**Keywords:** Educational tool, energy conversion, potential spring energy, electrical energy, scientific process skills