

## Abstrak

Penelitian pengembangan adalah suatu penelitian yang menghasilkan produk baru atau perbaikan produk yang sudah ada. Jenis penelitian ini yaitu pengembangan dengan menggunakan metode pengembangan ADDIE (*Analysis, Design, Development, Implementation, Evaluation*). Berdasarkan hasil uji coba alat praktikum dinamika fluida dengan menggunakan sensor *flow* dan ultrasonic, nilai error pada data hasil kecepatan air saat turun sebesar  $\Delta v = 0,0001$  dan kesalahan relatifnya sebesar 5,6%. Nilai error pada kecepatan air yang keluar pada lubang satu ( $v_{2.1}$ ) sebesar  $\Delta v = 0,01$  dan kesalahan relatifnya sebesar 0,59%. Nilai error pada kecepatan air yang keluar pada lubang dua ( $v_{2.2}$ ) sebesar  $\Delta v = 0,02$  dan kesalahan relatifnya sebesar 2,4%. Penelitian ini dilakukan di Laboratorium Pendidikan Fisika Universitas Muhammadiyah Metro. Subjek uji coba lapangan adalah mahasiswa Pendidikan Fisika UM Metro semester 4. Berdasarkan hasil validasi ahli media dinyatakan sangat layak dengan presentase kelayakan 83,89%. Berdasarkan hasil validasi ahli materi dinyatakan sangat layak dengan presentase kelayakan 88,89%. Berdasarkan hasil uji coba lapangan melalui respon mahasiswa dinyatakan sangat layak dengan presentase kelayakan 93,93%. Dari hasil validasi ahli dan uji coba lapangan yang dilakukan oleh mahasiswa Pendidikan Fisika Universitas Muhammadiyah Metro semester 4, dapat disimpulkan bahwa alat praktikum dinamika fluida dengan menggunakan sensor *flow* dan ultrasonic dinyatakan sangat layak dengan presentase 90,54%. Pengembangan lebih lanjut terhadap alat praktikum dinamika fluida dengan menggunakan sensor *flow* dan ultrasonic diharapkan mampu menggunakan sensor ultrasonic yang tahan terhadap air atau *waterproof*; dilengkapi dengan alat pendeteksi volume air yang tertampung pada tabung serta dapat mendeteksi volume air yang keluar; penambahan tombol agar berfungsi tunggal; tabung yang digunakan harus lebih besar.

**Kata kunci:** Alat praktikum; dinamika fluida; sensor

## **Abstract**

*Research and Development is a study that produces new products or improvements to existing products. This type of research is development using the ADDIE development method (Analysis, Design, Development, Implementation, Evaluation). Based on the test results of the practice tool, the error value in the result data of the water velocity when it drops is  $\Delta v = 0.0001$  and the relative error is 5.6%. The error value at the speed of water coming out of hole one ( $v_{2.1}$ ) is  $\Delta v = 0.01$  and the relative error is 0.59%. The error value at the speed of water coming out of hole two ( $v_{2.2}$ ) is  $\Delta v = 0.02$  and the relative error is 2.4%. This research was conducted at the Physics Education Laboratory, Muhammadiyah University of Metro. The subject of the field trial was the 4th-semester students of Physics Education, Muhammadiyah University of Metro. The object of the field trial was a fluid dynamics practicum tool using flow and ultrasonic sensors. The type of data in this research is quantitative and qualitative data. The data collection instruments were in the form of validation questionnaires for media experts, material experts, and field trials. The data analysis technique used is data triangulation, by combining the results of media validation, material validation, and field trial results. Based on the results of the media expert's validation, it was declared very feasible with a feasibility percentage of 83.89%. Based on the results of the material expert's validation, it is declared very feasible with a feasibility percentage of 88.89%. Based on the results of field trials through student responses, it was stated very feasible with a feasibility percentage of 93.93%. From the results of expert validation and field trials conducted by students of the 4th semester of Physics Education, Muhammadiyah Metro University, it can be concluded that fluid dynamics practicum tools using flow and ultrasonic sensors are declared very feasible with a percentage of 90.54%. Further development of fluid dynamics practicum tools using flow and ultrasonic sensors is expected to be able to use water resistant or waterproof ultrasonic sensors; equipped with a detecting device for the volume of water accommodated in the tube and able to detect the volume of water that comes out; addition of buttons for single function; the tube used must be bigger.*

**Keywords:** *Practicum tools; practicum tools; sensors*