

Istighfarina Izzatul Laili. 2025. Pengembangan Instrumen *Four-Tier Test* Berbasis Web Untuk Miskonsepsi Pada Materi Hukum Newton. Skripsi, Program Studi Pendidikan Informatika, Fakultas Keguruan dan Ilmu Pendidikan, Universitas Trunojoyo Madura. Pembimbing: Dr. Sigit Dwi Saputro, S.Pd., M.Pd.

ABSTRAK

Penelitian ini bertujuan mengembangkan instrumen *Four-Tier Test* berbasis web untuk mendeteksi miskonsepsi siswa pada materi Hukum Newton. Pengembangan dilakukan menggunakan model waterfall yang mencakup tahapan *requirements, design, implementation, testing, dan maintenance*. Kelayakan instrumen diuji melalui validasi ahli materi, ahli media dengan pendekatan ISO 25010, serta uji coba pada siswa kelas XI SMA Negeri 2 Bangkalan. Hasil validasi ahli materi menunjukkan skor kelayakan 91% dan 93% dengan kategori sangat layak, sementara pengujian media memperoleh skor 100% untuk *functional suitability, portability* dan *performance efficiency*, serta 93% untuk *usability*. Uji validitas menunjukkan 7 dari 10 soal valid, dengan reliabilitas Alpha Cronbach 0,699 (reliabel). Uji coba kelompok kecil dan besar menghasilkan skor 99% dan 86%, yang termasuk dalam kategori sangat baik. Hasil ini menunjukkan bahwa instrumen dinilai mudah dipahami, menarik dan mampu memotivasi siswa meskipun terdapat saran untuk menambahkan fitur penjelasan jawaban dan menyederhanakan bahasa soal. Instrumen ini terbukti layak dan efektif untuk mendeteksi miskonsepsi, dengan potensi optimal melalui revisi berdasarkan saran siswa.

Kata kunci: *Four-Tier Test*, Miskonsepsi, Hukum Newton, *Waterfall*, ISO 25010

Istighfarina Izzatul Laili. 2025. Development of Web-Based Four-Tier Test Instrument for Misconceptions in Newton's Law Material. Thesis, Informatics Education Study Program, Faculty of Teacher Training and Education, Trunojoyo University, Madura. Advisor: Dr. Sigit Dwi Saputro, S.Pd., M.Pd.

ABSTRACT

This study aims to develop a web-based Four-Tier Test instrument to detect students' misconceptions on Newton's Laws. The development was carried out using a waterfall model that includes the stages of requirements, design, implementation, testing, and maintenance. The feasibility of the instrument was tested through validation by material experts, media experts with the ISO 25010 approach, and trials on grade XI students of SMA Negeri 2 Bangkalan. The results of the material expert validation showed a feasibility score of 91% and 93% with a very feasible category, while the media test obtained a score of 100% for functional suitability, portability and performance efficiency, and 93% for usability. The validity test showed 7 out of 10 valid questions, with a Cronbach Alpha reliability of 0.699 (reliable). Small and large group trials produced feasibility scores of 99% and 86%, which were included in the very good category. These results indicate that the instrument is considered easy to understand, interesting and able to motivate students even though there are suggestions to add answer explanation features and simplify the language of the questions. This instrument is proven to be feasible and effective in detecting misconceptions, with optimal potential through revisions based on student suggestions.

Keywords: *Four-Tier Test, Misconception, Newton's Law, Waterfall, ISO 25010*