

ABSTRAK

Dhimas Kukuh Putra Amanda. 2026. *Pengembangan Instrumen Four Tier Diagnostic Newton's Law Test (4T-DNLT) Untuk Mengidentifikasi Miskonsepsi Siswa Pada Konsep Hukum Newton*. Skripsi. Program Studi Pendidikan Fisika. Fakultas Keguruan dan Ilmu Pendidikan. Universitas PGRI Madiun. Pembimbing (I) Dr. Jeffry Handhika, S.Si., M.Pd., M.Si., (II) Dr. Erawan Kurniadi, S.Si., M.Pd.,

Penelitian ini bertujuan untuk mengembangkan instrumen *Four-Tier Diagnostic Newton's Law Test (4T-DNLT)* guna mengidentifikasi miskonsepsi siswa pada konsep Hukum Newton, sekaligus mengetahui tingkat validitas, reliabilitas, dan profil miskonsepsi yang dihasilkan. Penelitian ini merupakan penelitian pengembangan (*Research and Development*) yang menggunakan model 4D, yaitu *Define, Design, Develop, dan Disseminate*. Instrumen dikembangkan dalam bentuk 20 butir soal pilihan ganda format empat tingkat, meliputi jawaban konsep, tingkat keyakinan jawaban, alasan jawaban, dan tingkat keyakinan alasan. Uji coba dilaksanakan pada 30 siswa kelas XI-8 SMA Negeri 4 Madiun yang dipilih melalui teknik *purposive sampling*. Data dikumpulkan melalui wawancara, angket, tes, dan dokumentasi, kemudian dianalisis menggunakan *Content Validity Ratio (CVR)* dan *Content Validity Index (CVI)* untuk menguji validitas isi, serta *Model Rasch* berbantuan perangkat lunak *Ministep* untuk menguji validitas empiris dan reliabilitas instrumen. Hasil penelitian menunjukkan bahwa instrumen 4T-DNLT memiliki validitas isi yang sangat layak dengan nilai CVI sebesar 0,95, serta validitas empiris yang baik dengan 38 dari 40 butir soal dinyatakan diterima. Reliabilitas item berada pada kategori istimewa, yaitu 0,83 pada tier 1 dan 0,85 pada tier 3, meskipun reliabilitas person dan nilai *Cronbach's Alpha* masih tergolong lemah pada kedua tier tersebut. Hasil identifikasi profil konsepsi siswa menunjukkan persentase Miskonsepsi (MC) sebesar 40,00%, *Lack of Knowledge (LK)* sebesar 34,67%, dan Paham Konsep (PK) sebesar 25,33%, dengan tingkat miskonsepsi tertinggi ditemukan pada konsep Hukum III Newton mengenai aksi-reaksi, yaitu sebesar 50,00%. Berdasarkan temuan tersebut, dapat disimpulkan bahwa instrumen 4T-DNLT valid dan layak digunakan untuk mengidentifikasi miskonsepsi siswa pada materi Hukum Newton, sehingga dapat menjadi alat bantu diagnostik bagi guru dalam merancang pembelajaran remedial yang lebih tepat sasaran.

Kata Kunci: instrumen diagnostik empat tingkat, miskonsepsi, Hukum Newton, validitas dan reliabilitas.

ABSTRACT

Dhimas Kukuh Putra Amanda. 2026. Development of the Four-Tier Diagnostic Newton's Law Test (4T-DNLT) Instrument to Identify Students' Misconceptions on the Concept of Newton's Laws. Undergraduate Thesis. Physics Education Study Program. Faculty of Teacher Training and Education. Universitas PGRI Madiun. Advisors: (I) Dr. Jeffry Handhika, S.Si., M.Pd., M.Si., (II) Dr. Erawan Kurniadi, S.Si., M.Pd.,

This study aims to develop a Four-Tier Diagnostic Newton's Law Test (4T-DNLT) instrument to identify students' misconceptions on the concept of Newton's Laws, as well as to determine its validity, reliability, and the resulting misconception profile. This research is a Research and Development (R&D) study employing the 4D model, consisting of Define, Design, Develop, and Disseminate. The instrument was developed in the form of 20 four-tier multiple-choice items, each comprising an answer to the concept, a confidence level in the answer, a reason for the answer, and a confidence level in the reason. The trial was conducted on 30 students of class XI-8 at SMA Negeri 4 Madiun, selected through purposive sampling. Data were collected through interviews, questionnaires, tests, and documentation, and were then analyzed using the Content Validity Ratio (CVR) and Content Validity Index (CVI) to assess content validity, as well as the Rasch Model with the assistance of Ministep software to assess empirical validity and instrument reliability. The results showed that the 4T-DNLT instrument had excellent content validity, with a CVI value of 0.95, as well as good empirical validity, with 38 of 40 items declared acceptable. Item reliability fell into the excellent category, at 0.83 for tier 1 and 0.85 for tier 3, although person reliability and Cronbach's Alpha values remained relatively weak for both tiers. The identification of students' conception profiles revealed a Misconception (MC) rate of 40.00%, Lack of Knowledge (LK) of 34.67%, and Sound Understanding (PK) of 25.33%, with the highest rate of misconception found in the concept of Newton's Third Law regarding action-reaction, at 50.00%. Based on these findings, it can be concluded that the 4T-DNLT instrument is valid and appropriate for identifying students' misconceptions on Newton's Laws material, and can therefore serve as a diagnostic tool for teachers in designing more targeted remedial instruction.

Keywords: four-tier diagnostic instrument, misconceptions, Newton's Laws, validity and reliability