

## ABSTRAK

**Hamidatun Nisa, NIM. 8196142001. Pengembangan Instrumen Asesmen Kemampuan Berpikir Kritis Siswa Berbasis *Multiple Representasi* pada Materi Stoikiometri.** Tesis. Medan Program Studi pendidikan Kimia, Pascasarjana Universitas Negeri Medan, 2021.

Penelitian ini bertujuan untuk mengetahui hasil analisis kebutuhan instrumen dan analisis konsep materi stoikiometri berbasis *multiple representasi* yang digunakan untuk mengukur kemampuan berpikir kritis siswa; hasil uji kelayakan instrumen asesmen berdasarkan indeks Aiken's validitas ahli; hasil uji coba pada tingkat kesukaran soal, reliabilitas, daya pembeda dan pengecoh menggunakan pemodelan *Rasch*; tingkat kemampuan berpikir kritis siswa yang diukur dengan instrumen asesmen kemampuan berpikir kritis; dan respon siswa terhadap instrumen asesmen yang dikembangkan. Model pengembangan yang digunakan pada penelitian ini terdiri dari tahap *define, design, develop, dan disseminate*. Subjek uji coba penelitian terdiri atas 25 orang peserta didik. Instrumen asesmen diimplementasikan pada 34 orang peserta didik di kelas X SMAS Harapan 1 Medan. Desain uji coba terdiri dari uji validasi isi oleh para ahli dan dianalisis dengan formula indeks Aiken's. Data dari hasil percobaan dianalisis dengan *Rasch* model. Berdasarkan hasil analisis kebutuhan dan hasil analisis materi ditemukan bahwa peserta didik belum terbiasa mengerjakan soal berpikir kritis pada tingkatan C4 – C6 dan tahap analisis materi terdapat 13 Kompetensi Dasar (KD) yang terkait dengan materi pokok pada indikator soal yaitu 12 soal C4, 10 soal C5, dan 3 soal C6. Serta 12 soal submikroskopis, 6 soal makroskopis, 5 soal matematis, dan 2 soal simbolik. Hasil uji validasi isi oleh para ahli berdasarkan indeks Aiken's diperoleh hasil 0,81 dengan kriteria tinggi dan hasil validasi materi oleh guru sebesar 0,78 dengan kriteria sedang. Hasil uji coba berdasarkan tingkat kesukaran soal dengan kriteria sedang, reliabilitas tes dengan *Alpha Cronbatch* sebesar 0,75 dengan kriteria baik, daya pembeda sebesar 76 % dengan kriteria baik, dan pengecoh sebesar 60 % berfungsi dengan baik. Berdasarkan hasil implementasi, tingkat kemampuan berpikir kritis siswa dengan e-modul yang diberikan sebelum penelitian dikategorikan cukup baik. Sebanyak 20,58 % siswa memiliki kemampuan tinggi, 52,94 % siswa memiliki kemampuan sedang, 26,48 % siswa memiliki kemampuan rendah dengan rata-rata nilai skala *logit* sebesar -1,00 - +3,26. Hasil analisis respon siswa terhadap instrumen asesmen kemampuan berpikir kritis berbasis *multiple representasi* diperoleh 74,23 % dengan kategori baik. Dengan demikian, produk instrumen asesmen pada materi stoikiometri yang dikembangkan valid dan memenuhi persyaratan kualitas soal yang baik serta dapat digunakan untuk mengukur kemampuan berpikir kritis peserta didik.

**Kata Kunci:** kemampuan berpikir kritis, *multiple representasi*, model 4-D, *rasch* model, stoikiometri

## ABSTRACT

**Hamidatun Nisa, NIM. 8196142001. Development of Students' Critical Thinking Ability Assessment Instruments Based on Multiple Representations on Stoichiometry Material.** Thesis. Medan Chemistry Education Study Program, Medan State University Postgraduate, 2021.

This study aims to determine the results of the analysis of instrument requirements and the analysis of multiple representation-based stoichiometric material concepts used to measure students' critical thinking skills; the results of the feasibility test of the assessment instrument based on the Aiken's index of expert validity; test results on the level of problem difficulty, reliability, discriminatory power and distractibility using Rasch modeling; the level of students' critical thinking skills as measured by the critical thinking ability assessment instrument; and student responses to the assessment instrument developed. The development model used in this research consists of define, design, develop, and disseminate stages. The subject of the research trial consisted of 25 students. The assessment instrument was implemented on 34 students of class X SMAS Harapan 1 Medan. The trial design consisted of content validation tests by experts and analyzed using Aiken's index formula. Data from the experimental results were analyzed using the Rasch model. Based on the results of the needs analysis and the results of material analysis, it was found that students were not accustomed to working on critical thinking questions at levels C4 - C6 and the material analysis stage contained 13 Basic Competencies (KD) related to the main material on the indicator questions, namely 12 questions C4, 10 questions C5 , and 3 questions C6. As well as 12 submicroscopic questions, 6 macroscopic questions, 5 mathematical questions, and 2 symbolic questions. The results of the content validation test by experts based on the Aiken's index obtained results of 0.81 with high criteria and the results of material validation by teachers of 0.78 with medium criteria. The test results are based on the level of difficulty of the questions with moderate criteria, the reliability of the test with Alpha Cronbatch is 0.75 with good criteria, 76% discriminatory power with good criteria, and 60% distractors function well. Based on the implementation results, the level of students' critical thinking skills with the e-module given before the study was categorized as quite good. A total of 20.58 % of students have high abilities, 52.94% of students have moderate abilities, 26.48% of students have low abilities with an average logit scale value of -1.00 - +3.26. The results of the analysis of student responses to the assessment instrument for critical thinking skills based on multiple representations obtained 74.23% with good categories. Thus, the product of the assessment instrument on the stoichiometric material developed is valid and meets the requirements for good quality questions and can be used to measure students' critical thinking skills.

**Keywords:** critical thinking ability, multiple representation, 4-D model, Rasch model, stoichiometry.