## ABSTRACT

Ranny. 2021. Development of Stoichiometry E-Module Based on Structured Inquiry with Three Levels of Chemical Representation Interconnection to Improve Student Mental Models. Thesis. Chemical Education Master Program. Faculty of Math and Science. Padang State University.

Stoichiometry material was an abstract and interrelated concept that makes students have difficulty learning it. One of the teaching materials that can help in the learning process was e-modules. This study aims to produce a structured inquiry-based stoichiometry e-module that was valid, practical and effective. This research method was research and development (R&D) and the Plomp development model. The research subjects consisted of 120 students and 2 chemistry teachers from Middle Schools in Padang City. The research instrument used was a validity questionnaire, practicality and test questions. The e-module was validated by 5 validators. The results of the analysis show that e-module has a very high level of validity (v = 0.86) and very high practicality (v = 0.89) based on teacher responses and high (v = 0.77) based on student response questionnaires. The results of the t-test on the hypothesis of learning outcomes at 2 schools had a significance value of .030 and .005 and the mental models of students at 2 schools had a significance value of .011 and .000 where a small value of 0.05 indicated that the learning outcomes and mental models of students increased significantly significant. Thus, it can be concluded that the structured inquiry-based stoichiometry e-module developed has very high validity and practicality and was effectively used in the chemistry learning process in high school.



Keywords: e-module, structured inquiry, three levels of chemical representation, mental models, stoichiometry

## ABSTRAK

Ranny. 2021. Pengembangan E-Modul Stoikiometri Berbasis Inkuiri Terstruktur dengan Penekanan pada Interkoneksi Tiga Level Representasi Kimia untuk Meningkatkan Model Mental Siswa. Tesis. Program Studi Magister Pendidikan Kimia. Fakultas Matematika dan Ilmu Pengetahuan Alam. Universitas Negeri Padang.

Materi stoikiometri merupakan konsep yang abstrak dan saling berkaitan sehingga membuat siswa mengalami kesulitan dalam mempelajarinya. Salah satu bahan ajar yang dapat membantu dalam proses pembelajaran adalah e-modul. Penelitian ini bertujuan untuk menghasilkan e-modul stoikiometri berbasis inkuiri terstruktur yang valid, praktis dan efektiv. Metode penelitian ini adalah *Researh and development (R&D)* dan model pengembangan Plomp. Subjek penelitian terdiri dari 120 siswa dan 2 orang guru kimia yang berasal dari Sekolah Menengah di Kota Padang. Instrument penelitian yang digunakan yaitu angket validitas, praktikalitas dan soal tes. E-modul divalidasi oleh 5 orang validator. Hasil analisis menunjukkan e-modul memiliki tingkat validitas sangat tinggi (v = 0,86) dan praktikalitas sangat tinggi (v = 0,89) berdasarkan respon guru dan tinggi (v = 0,77) berdasarkan angket respon siswa. Hasil Uji-t terhadap hipotesis hasil belajar pada 2 sekolah nilai signifikansinya sebesar .030 dan .005 dan model mental siswa pada 2 sekolah nilai signifikansinya sebesar .011 dan .000 dimana nilai kecil dari 0,05 menunjukkan hasil belajar dan model mental siswa meningkat secara signifikan. Dengan demikian, dapat disimpulkan bahwa e-modul stoikiometri berbasis inkuiri terstruktur yang dikembangkan memiliki validitas dan praktikalitas sangat tinggi serta efektif digunakan dalam proses pembelajaran kimia di SMA.



Kata Kunci: e-modul, inkuiri terstruktur, tiga level representasi kimia, model mental, stoikiometri