

ABSTRACT

Nurhasanah. 2020. Development of Structured Inquiry Based Chemical Equilibrium Modules Using Three Levels of Representation and The Effect on Mental Model of Class XI High School Students. Thesis. Magister Program of Chemistry Education. Faculty of Math and Science. Padang State University.

Chemical equilibrium is an important material for understanding acid base and solubility concept. Based literature and interviews, this material is still considered difficult by student. The learning process that has not presented material with three level representation and interconnects it. Students ability to interconnect the three levels of representation will help students have a good understanding, so that a complete mental model is formed. The aims to develop chemical equilibrium module based structured inquiry with three level representation in terms of validity, practicality and efectivity. The method used Research and Development through the use of Plomp model. The module was validated by 5 validators. Practicality module was tested by 2 chemistry teachers and 69 students from two of senior high school in Padang. Validity and practicality data were analysed by using the Kappa Cohen formula. The results show that the module had very high degree of both validity ($k = 0.82$) and practicality ($k = 0.91$ for teacher response and $k = 0.88$ for student response). The results of the t-test on the learning outcome hypothesis and the chemical equilibrium mental model showed that the learning outcomes and mental models of the experimental class were significantly higher than the control classes in both schools. To sum up, it can be concluded that structured inquiry-based reaction behavior modules developed had very high validity and practicality and effectively used in the chemistry learning process in Senior High School.

Keywords: Modules, Structured Inquiry, Three Level Representations, Mental Models, Chemical Equilibrium

ABSTRAK

Nurhasanah. 2020. Pengembangan Modul Kesetimbangan Kimia Berbasis Inkuiri Terstruktur Menggunakan Tiga Level Representasi dan Pengaruhnya Terhadap Model Mental Siswa Kelas XI SMA. Tesis. Program Studi Magister Pendidikan Kimia. Fakultas Matematika dan Ilmu Pengetahuan Alam. Universitas Negeri Padang.

Kesetimbangan kimia merupakan materi yang sangat penting untuk memahami materi asam basa dan kelarutan. Berdasarkan literatur dan hasil wawancara materi kesetimbangan kimia masih dianggap sulit oleh siswa. Proses pembelajaran belum sepenuhnya menyajikan tiga level representasi dan menginterkoneksi ketiga level tersebut. Kemampuan siswa dalam menginterkoneksi ketiga level representasi dapat membantu siswa memiliki pemahaman yang baik sehingga membentuk model mental yang utuh. Penelitian ini bertujuan untuk mengembangkan modul kesetimbangan kimia berbasis inkuiri terstruktur menggunakan tiga level representasi yang valid, praktis dan efektif. Metode penelitian yang digunakan adalah penelitian pengembangan model Plomp. Modul divalidasi oleh 5 orang validator. Praktikalitas modul diujikan kepada 2 orang guru kimia dan 69 siswa. Hasil validitas dan praktikalitas dianalisis menggunakan rumus kappa cohen. Hasil analisis menunjukkan modul memiliki tingkat validitas sangat tinggi ($k = 0,82$) dan praktikalitas sangat tinggi ($k = 0,91$ berdasarkan respon guru dan $k = 0,88$ berdasarkan angket respon siswa). Hasil Uji-t terhadap hipotesis hasil belajar dan model mental kesetimbangan kimia menunjukkan bahwa hasil belajar dan model mental kelas eksperimen lebih tinggi secara signifikan dibandingkan kelas kontrol di kedua sekolah. Dengan demikian, dapat disimpulkan bahwa modul laku reaksi berbasis inkuiri terstruktur yang dikembangkan memiliki validitas dan praktikalitas sangat tinggi serta efektif digunakan dalam proses pembelajaran kimia di SMA.

Kata Kunci: Modul, Inkuiri Terstruktur, Tiga Level Representasi, Model Mental, Kesetimbangan Kimia