Pengembangan Program Pembelajaran Anatomi dan Fisiologi Tubuh Manusia Berbasis Multi Representasi untuk Meningkatkan Kemampuan Representasi dan Interelasinya dengan Keterampilan Generik Sains Calon Guru Biologi

ABSTRAK

Konsep materi Anatomi dan Fisiologi Tubuh Manusia bersifat abstrak, kompleks, dan dikomunikasikan dalam multi representasi, sehingga untuk menguasainya diperlukan kemampuan representasi. Penelitian ini bertujuan untuk menghasilkan program pembelajaran Anatomi dan Fisiologi Tubuh Manusia yang mampu mengembangkan kemampuan representasi mahasiswa. Penelitian menggunakan rancangan *Research and Development model ADDIE* dengan lima tahap yaitu studi pendahuluan, perancangan, pengembangan, implementasi, dan evaluasi. Berdasarkan hasil observasi, angket, wawancara, tes preferensi representasi pada studi pendahuluan disimpulkan perlunya pengembangan kemampuan representasi mahasiswa melalui program pembelajaran Anatomi dan Fisiologi Tubuh Manusia berbasis multi representasi. Program pembelajaran terdiri atas enam fase pembelajaran yaitu: (1) pengetahuan awal representasi visual, (2) penyajian fenomena, (3) identifikasi konsep kunci, (4) eksplorasi, (5) konstruksi dan (6) presentasi dan reviu. Pada tahap perancangan dihasilkan rancangan program perkuliahan, lembar kegiatan mahasiswa (LKM) dan instrumen penelitian (angket, wawancara, rubrik penilaian kemampuan representasi HTM, VTL dan HTD, soal tes esai, soal Pilihan ganda). Pada tahap pengembangan dilakukan dua kali uji coba program pada 25 mahasiswa tahun ajar 2013-2014 (uji coba 1) dan 30 mahasiswa tahun ajar 2014-2015(uji coba 2) yang mengambil mata kuliah Anatomi dan Fisiologi Tubuh Manusia. Efektivitas program dilihat berdasarkan persentase kategori N-gain 75% Pada tahap implementasi dilakukan pengukuran dampak program menggunakan desain penelitian *quasy experiment Non- equivalent Control Group*. Keberhasilan program diukur secara kuantitatif dari keterlaksanaan setiap fase pembelajaran dan perkembangan kemampuan representasi. Program yang dihasilkan memiliki empat karakteristik yaitu: (1) memiliki enam fase pembelajaran, (2) ke-enam fase pembelajaran dikemas dalam siklus pembelajaran, (3) setiap siklus terdiri atas gabungan dua pokok bahasan Sistem tubuh manusia, (4) kompetensi yang dikembangkan adalah *horizontal translation accross moda* (HTM), *vertical translation accross level* (VTL) dan *horizontal translation accross domain* (HTD). Hasil implementasi menunjukkan: (1) program perkuliahan Anatomi dan Fisiologi Tubuh Manusia berbasis multi representasi berhasil mengembangkan kemampuan representasi mahasiswa calon guru biologi pada aspek VTL dan HTM, (2) terdapat korelasi positif antara kemampuan representasi tehadap penguasaan konsep (3) keterampilan generik sains dan penguasaan konsep berkontribusi terhadap perkembangan kemampuan representasi. Pada tahap evaluasi disimpulkan bahwa program pembelajaran Anatomi dan Fisiologi Tubuh Manusia memiliki kelayakan untuk diimplementasikan.

Kata kunci. Kemampuan representasi, *Horizontal Translation accross Moda*, *Vertcal Translation accross level* (VTL), *Horizontal Translation accross domain* (HTD), Keterampilan Generik Sains.

Development of Multiple Representation- based Instruction of Human Anatomy and Physiology to Develop Representational Competence and its Interrelation with Science Generic Skill of Preservice Biology Teacher

ABSTRACT

The content of Human Anatomy and Physiology are abstract, and contain a high complexity. The concept is communicated in a variety of representations. It requires representational competence to master the representated concepts. This research aims to produce program of Human Anatomy and Physiology that enable to develop the ability of students ' representation. The study was carried out using *Research and Development ADDIE model* design that consisted of five stages namely preliminary study (Analisys), Designing, Developing, and Implementaion and Evaluation. Based on Preliminary Study it was concluded that the student representation competency of Human Anatomy and Physiology need to be developed. The instruction program based on multiple representation consist of six phases, namely (1) pre literacy visual representation instruction phases, (2) phenomenon presentation, (3) key identification, (4) Exploration, (5) construction of representatif, (6) presentation and review. In the planning stages produced a draft of intrstuction program, student activity sheets and research instrument (question form, interview, assessment rubric HTM, VTL, HTD representation competence, essay est and multiple choice test). In the developing stages the program was tried twice to 25 student (first trial) year of 2013-2014 and 30 student (second trial) of year 2014-2015 Biology Education who enrolled in Human Anatomy and Physiology course. In the implementation stages the impact of the program was assessed using Quasy experimental-nonequivalent Control Group Design to 30 student who enrolled in Human Anatomy and Physiology course in year 2015-2016. The effectiveness program was asseseed quantitavely. The program has four characteristics that are (1) have six lesson phases (2) the lesson phases composing a lesson cyclus, (3) a cyclus concist of two human anatomi and physyiology system topics, (4) the representational competence developed were horizontal translation accross moda (HTM), vertical translation accross level (VTL) and horizontal translation accross domain (HTD). The implementation stage results indicated that the intructional program succeeded in enhancing student representation competence of VTL and HTM and in increasing concept master. There is positively correlation between representation competence concept mastering and there is negatively correlation between representation competence and science generic skills. There is positively corelation of concept mastering and science generic skill give contribusion in developing representation competence. Result of the evaluation stage concluded that the Human Anatomy and Physiology multi representational -based program is good feasibility to be implemented.

Key words. Representation Competence, Science Generic Skill, Interrelation, Human Anatomy and Physiology.