Pengembangan Pembelajaran Biologi Sel melalui Pendekatan *Drawing Based Modelling* untuk Menstimulasi Kemampuan Representasi Mikroskopis Dan Penalaran Ilmiah Mahasiswa

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Abstrak

Penelitian ini dilatarbelakangi oleh adanya kebutuhan kemampuan representasi mikroskopis dan penalaran ilmiah untuk mempelajari konsep-konsep mikroskopis dan abstrak pada materi Biologi Sel. Penelitian ini bertujuan untuk mengembangkan pembelajaran Biologi Sel melalui pendekatan *Drawing-Based Modelling* untuk menstimulasi kemampuan representasi mikroskopis dan penalaran ilmiah mahasiswa. Metode penelitian yang digunakan adalah *Research and Development* (R&D) dengan model 4D (*define, design, develop, disseminate*). Tahapan penelitian dilakukan sebanyak empat tahapan, tahap pertama analisis kebutuhan, tahap kedua perencanaan, tahap ketiga pengembangan, yaitu melakukan uji coba 1 dan 2, dan tahap keempat melakukan tahapan implementasi. Subyek penelitian pada uji coba 1 sebanyak 31 orang mahasiswa yang sudah mengambil mata kuliah Biologi Sel, sedangkan pada uji coba 2 sebanyak 64 orang mahasiswa calon guru biologi, serta implementasi sebanyak 81 orang mahasiswa calon guru biologi pada salah satu perguruan tinggi di Provinsi Bengkulu. Instrumen utama yang digunakan berupa rubrik penilaian kemampuan representasi mikroskopis dan tes soal untuk penalaran ilmiah untuk mengetahui keberfungsian pendekatan *drawing based modelling* yang digunakan. Selain itu, instrumen berupa lembar observasi, catatan lapangan, angket dan lembar wawancara untuk menjaring data keterlaksanaan program pembelajaran. Hasil penelitian menunjukkan bahwa karakteristik program perkuliahan Biologi Sel hasil pengembangan melalui *drawing based modelling* berupa *expressive, experiment, evaluative,* dan *exploratory,* pendekatan *drawing based modelling* dapat menstimulasi kemampuan representasi mikroskopis, penalaran ilmiah mahasiswa pada materi Biologi Sel, dengan kategori baik. Hasil implementasi menunjukkan adanya hubungan yang sangat kuat antar variabel, yaitu antara pendekatan *drawing based modelling,* kemampuan representasi mikroskopis dan penalaran ilmiah mahasiswa pada Biologi sel.

Kata Kunci: *Representasi mikroskopis, penalaran ilmiah, pendekatan drawing based modelling, Biologi Sel.*

Development Cell Biology Learning through Drawing Based Modelling Approach to Stimulate Students' Microscopic Representation and Scientific Reasoning Ability

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Abstract

This research is based on the need for microscopic representation capabilities and scientific reasoning to study microscopic and abstract concepts in cell biology subject. This study aims to develop cell biology learning through *Drawing-Based Modeling* approach to stimulate students' microscopic representation and scientific reasoning ability. The research method used in this study was *Research and Development (R & D)* with a 4D model (*define, design, develop, disseminate)*. The study was carried out in four stages of activities. In the first stage a needs analysis was carried out. In the second stage a planning was made. The third stage was done by conducting development through carrying out trials 1 and 2. In the last stage was implementation phase. In trial 1 there were 31 students involved as research subjects. They were students who had taken cell biology course. Whereas, in the second trial the researcher involved 64 prospective biology teacher students. A t the implementation stage, 81 prospective biology teacher students from a university in Bengkulu province were involved as subjects of the research. The main instruments used were rubric assessment of microscopic representation ability and test questions for scientific reasoning to find out the function of the *drawing based modeling* approach that was used. In addition, instruments in form of observation sheets, field notes, questionnaires and interview sheets were also used to collect data on the implementation of learning programs. The results of the research show that the characteristics of cell biology lecture program through drawing based modeling that were expressive, experimental, evaluative, and exploratory, could stimulate students' ability on microscopic representation and scientific reasoning in cell biology materials in *good* category. The results of implementation phase show that there is a very strong relationship among variables, *drawing based modeling* approach, ability of microscopic representation and scientific reasoning in cell biology subject.

Kata Kunci: *Microscopic representation, scientific reasoning, drawing based modeling approaches, Cell Biology.*