Stimulating Students' Understanding and Argumentation Using Drawing Based Modeling on The Concept of Ecosystem

Abstract

The ecosystem is a fundamental ecological concept, there were processes involved as the system dynamic. Recently the study of Ecosystem concepts is learning to reason about ecosystem dynamic. Drawing based modeling as learning approach allows students to reason based on the models which is created by the students based on drawing and run into the simulation it help the students explain the scientific phenomena. The aim of this study was to explore students' understanding and argumentation on the concept of ecosystem using drawing based modeling. The study was conducted quasi experimental using the matching-only posttest group design. The samples consist of 64 senior high school students of the 10^{th} grade from Subang-West Java. They are placed into two groups; consist of 32 students in the experiment class which implemented drawing based modeling and 32 students in the control class which implemented diagram of food web. Data was collected through objective test, students' worksheet and argumentation test. All the lesson activities are video recording. The activity involves individual task and group task. In group task they were involved in discussion activity. Statistical analysis used to analyze students' understanding and modified rubrics used to analyze students 'argumentation. The result showed there was significant difference between the experiment class and the control class ($p < 0,05$). Students' argumentation in experiment class and control class which engage group argumentation showed there was improvement level and coherence of arguments than students' argumentation which engage individual argumentation. The level and coherence of arguments based on argumentation test showed that the students in experiment class tend to able to more complete and coherent argumentation than the students in control class. While in general both groups were predominantly at Level 2.

Keywords: *drawing based modeling, students' understanding, students' argumentation, ecosystem concept.*

Stimulasi Pemahaman Konsep dan Argumentasi Siswa Menggunakan *Drawing Based Modeling* (Pemodelan Berbasis Gambar) pada Konsep Ekosistem

Abstrak

Ekosistem merupakan materi yang fundamental dalam konsep ekologi, banyak proses-proses yang melibatkan sistem dinamis dalam ekosistem. Akhir-akhir ini pembelajaran tentang materi ekosistem adalah penalaran tentang sistem dinamis tersebut. *Drawing based modeling* merupakan pendekatan pembelajaran yang memungkinkan siswa menggambar model kemudian mensimulasikan model tersebut dengan menggunakan program komputer daring yang bernama SimSketch. Tujuan dari penelitian ini adalah untuk menggali pemahaman konsep dan argumentasi siswa pada konsep ekosistem. Metode penelitian menggunakan quasi-eksperimen dengan desain posttest. Sampel terdiri atas 64 orang siswa kelas X di salah satu sekolah negeri di Kabupaten Subang. Sampel dibagi menjadi dua kelompok, kelompok eksperimen terdiri atas 32 orang menggunakan drawing based modeling, sedangkan 32 orang termasuk kelas kontrol menggunakan diagram jaring-jaring makanan. Pengumpulan data dilakukan melalui tes objektif, lembar kegiatan siswa (LKS), dan tes argumentasi tertulis. Seluruh aktivitas siswa direkam, kegiatan pembelajaran melibatkan tugas individu dan kelompok, pada saat mengerjakan tugas kelompok siswa melakukan kegiatan diskusi. Analisis data pemahaman konsep siswa diolah secara statistik sedangkan argumentasi siswa menggunakan rubrik. Hasil menunjukkan bahwa ada perbedaan yang signifikan antara kelas eksperimen dan kelas kontrol ($p < 0,05$). Siswa dikelas eksperimen maupun kelas kontrol memperlihatkan adanya peningkatan kemampuan berargumen dalam kelompok dibanding individu. Berdasarkan hasil analisis argumen siswa di kelas eksperimen lebih baik dalam berargumentasi dibandingkan siswa di kelas kontrol, meskipun secara umum kemampuan berargumen siswa masih dominan pada Level 2.

Kata kunci: *drawing based modeling, pemahaman konsep siswa, argumentasi siswa, konsep ekosistem.*