ABSTRAK

Japiten Banjarnahor NIM. 065020410.2008 : *Pengaruh Model Pembelajaran Dan* Kemampuan Berpikir Matematis Terhadap Hasil Belajar Fisika Mahasiswa Program S1 Jurusan Pendidikan Fisika FMIPA UNIMED Medan. Tesis. Program Pasca sarjana Universitas Negeri Medan, 2008

Penelitian ini bertujuan untuk mengetahui : (1) perbedaan antara hasil belajar Fisika mahasiswa dengan mempergunakan model pembelajaran konstruktivisme melalui penerapan pembelajaran timbal-balik dan mahasiswa yang diajar dengan menggunakan model pembelajaran konvensional, (2) perbedaan hasil belajar antara mahasiswa yang memiliki kemampuan berpikir matematis yang tinggi dan rendah dan (3) interaksi antara model pembelajaran dan kemampuan berpikir matematis dalam mempengaruhi hasil belajar Fisika Mahasiswa.

Penelitian ini dilakukan pada mahasiswa Jurusan Pendidikan Fisika Fakultas Matematika dan Ilmu Pengetahuan Alam UNIMED Medan. Populasi penelitian ini adalah 180 mahasiswa semester IV Program S1 Reguler Tahun Akademik 2007/2008 dan berdasarkan teknik sampling acak, 52 mahasiswa terpilih sebagai sampel. Metode penelitian adalah quasi eksperimen dengan desain 2x2 factorial. Sampel dibagi kedalam dua kelompok dan disebar ke dalam dua kelas perlakuan.

Instrumen penelitian terdiri dari dua tes yaitu kemampuan berpikir matematis dan hasil belajar Fisika mahasiswa. Data dianalisis dengan dua jalur Analisis Varians (ANAVA). Hasil analisis menunjukkan bahwa : (1) ada perbedaan yang signifikan antara hasil belajar Fisika mahasiswa dengan model pembelajaran konstruktivisme melalui aplikasi timbal-balik dengan model pembelajaran konvensional, yaitu Fhitung > Ftabel (16,69 > 7,21), pada taraf signifikan α = 0,01, (2) ada perbedaan yang signifikan antara hasil belajar fisika mahasiswa yang berkemampuan matematis tinggi dengan hasil belajar mahasiswa yang berkemampuan matematis rendah yaitu $F_{hitung} > F_{tabel}$ (6,13 > 4,05), pada taraf signifikan α = 0,005, (3) ada interaksi antara model pembelajaran dengan kemampuan berpikir matematis dalam mempengaruhi hasil belajar fisika mahasiswa yaitu Fhitung > FTabel (53,34 > 7,21), pada taraf signifikan α = 0,01.

Secara keseluruhan, berdasarkan metode uji Tuckey dapat disimpulkan bahwa penerapan model pembelajaran konstruktivisme dapat meningkatkan hasil belajar Fisika mahasiswa dibandingkan dengan model pembelajaran konvensional. Bagi mahasiswa dengan kemampuan berpikir matematis rendah, lebih cocok menggunakan model pembelajaran konvensional sedangkan bagi mahasiswa dengan kemampuan berpikir matematis tinggi, model pembelajaran konstruktivisme melalui penerapan pembelajaran timbal-balik dapat digunakan.

Berdasarkan hasil penelitian, beberapa kesimpulan, implikasi dan saran dibuat berkaitan dengan proses pembelajaran Ilmu Pengetahuan Alam pada umumnya dan Fisika pada khususnya. Diharapkan agar hasil penelitian ini dapat berguna dalam pengembangan strategi pembelajaran di Indonesia, saat ini dan dimasa yang akan datang.

ABSTRACT

Japiten Banjarnahor NIM. 065020410. 2008 : The Effect of Instructional model and The ability to think mathematically toward students learning Achievement of Physics, Graduate Program, Physics Education Department, Faculty of mathematics and Natural Sciences, State University of Medan. A Thesis. Postgraduate Program, State University of Medan.2008.

The objectives of this research were to discover : (1) the difference between students learning achievement Physics using constructivism instructional model and conventional instruction model, (2) the difference of students learning achievement with high and low ability in thinking mathematically, and (3) the interaction between instructional models and the ability in thinking mathematically in affecting students learning achievement Physics.

This study was conducted to students of Physics Educated Department, Faculty of Mathematics and Natural Sciences, State University of Medan. The population was 180 students of Semester IV Reguler Graduate Program Acadenic Year 2007/2008 and based on random sampling technique 52 students were chosen as the sample. The research method used was quasi experiment with factorial 2 x 2 design. The sample was divided into two control classes.

The research instrument consisted of two tests namely the ability to think mathematically and students learning achievement in Physics. The data were analysed using two way Analysis of Variance (ANAVA).

The results of the data analyes show that : (1) there was a significant difference between students learning achievement in Physics with constructivism instructional model through the application of both sides instruction with students learning achievement in Physiscs using conventional instructional model with $F_{count} > F_{table} = 16.69 > 7.21$ at the significance level $\alpha = 0.01$, (2) there was a significant difference between students learning achievement in Physics with high and low ability to think mathematically with $F_{count} > F_{table} = 6.13 > 4.05$ at the significance level $\alpha = 0.05$, and (3) there was an interaction between instructional models with ability to think mathematically in affecting students learning achievement in Physics with $F_{count} > F_{table} = 53.34 > 7.21$ at the significant level $\alpha = 0.01$.

Overall, based on Tuckey method, it was concluded that the application of Constructivism Instructional models could improve the srudents learning achievement in Physics comapred with conventional instructional model for students with low ability to think mathematically, it was more suitable to use conventional instructional model where as for students with high ability to think mathematically, the constructivism instructional model through the application both sides instruction be used.

Based on the research foundings, some conclusions, implications, and recommendations are made in connection with the instructional process of natural sciences in general and physics in particular. It is hoped that the results of this study can be useful in the development of instructional strategy in Indonsesia, at preent and in the future.