

ABSTRAK

Dewi, N.R (2017). Meningkatkan Kemampuan Berpikir Matematis Tingkat Tinggi dan *Self-Efficacy* Mahasiswa melalui *Brain-Based Learning* Berbantuan Web.

Kemampuan berpikir matematis tingkat tinggi dan *self-efficacy* sangat penting bagi perkembangan pengetahuan mahasiswa. Namun kemampuan mahasiswa dalam hal itu masih tergolong rendah, sehingga perlu dikembangkan. *Brain-Based Learning* Berbantuan Web adalah salah satu pembelajaran yang diduga dapat meningkatkan kemampuan berpikir matematis tingkat tinggi dan *self-efficacy* mahasiswa. Tujuan utama dari penelitian ini adalah untuk menganalisis secara komprehensif pencapaian dan peningkatan kemampuan berpikir matematis tingkat tinggi dan *self-efficacy* mahasiswa sebagai akibat dari penerapan *Brain-Based Learning* Berbantuan Web dan pembelajaran konvensional. Metode penelitian yang digunakan adalah metode campuran (*mixed method*) dengan model penggabungan KUANTITATIF dan kualitatif. Penelitian ini menggunakan *concurrent embedded design* sebagai desain penelitian. Populasi dalam penelitian ini adalah seluruh mahasiswa Jurusan Matematika salah satu perguruan tinggi di Semarang Jawa Tengah, sedangkan sampelnya adalah para mahasiswa yang sedang menempuh Mata Kuliah Kalkulus Integral, baik yang berasal dari Program Studi Matematika maupun Program Studi Pendidikan Matematika. Sampel diambil dari masing-masing program studi secara acak sehingga didapatkan dua kelompok, satu kelompok eksperimen yang mendapatkan *Brain-Based Learning* Berbantuan Web dan satu kelompok yang mendapatkan pembelajaran konvensional. Penelitian ini menggunakan beberapa instrumen, yaitu Tes Kemampuan Awal Matematis, Tes Kemampuan Berpikir Matematis Tingkat Tinggi, Skala *Self-Efficacy* Lembar Observasi, dan Pedoman Wawancara. Analisis data dilakukan dengan menggunakan Uji-t, Uji-t', Uji Mann-Whitney U dan Uji ANOVA Dua Jalur. Kesimpulan yang didapat dari penelitian ini adalah (1) pencapaian dan peningkatan kemampuan berpikir matematis tingkat tinggi dan *self-efficacy* mahasiswa yang mendapatkan *Brain-Based Learning* Berbantuan Web Lebih baik daripada mahasiswa yang mendapatkan pembelajaran konvensional; (2) Tidak terdapat interaksi antara pembelajaran (*Brain-Based Learning* Berbantuan Web dan Pembelajaran Konvensional) dan kemampuan awal matematis (tinggi, sedang, rendah) terhadap pencapaian dan peningkatan kemampuan berpikir matematis tingkat tinggi mahasiswa; (3) Terdapat interaksi antara pembelajaran (*Brain-Based Learning* Berbantuan Web dan Pembelajaran Konvensional) dan jenis program studi (Pendidikan Matematika dan Matematika) terhadap pencapaian dan peningkatan kemampuan berpikir matematis tingkat tinggi mahasiswa; (4) Tidak terdapat interaksi antara pembelajaran (*Brain-Based Learning* Berbantuan Web dan Pembelajaran Konvensional) dan kemampuan awal matematis (tinggi, sedang, rendah) terhadap pencapaian dan peningkatan *self-efficacy* mahasiswa; (5) Tidak terdapat interaksi antara pembelajaran (*Brain-Based Learning* Berbantuan Web dan Pembelajaran Konvensional) dan jenis program studi (Pendidikan Matematika dan Matematika) terhadap pencapaian dan peningkatan *self-efficacy* mahasiswa; (6) Terdapat asosiasi yang rendah antara kemampuan berpikir matematis tingkat tinggi dan *self-efficacy* mahasiswa; (7) Terdapat korelasi yang rendah antara kemampuan berpikir matematis tingkat tinggi dan *self-efficacy* mahasiswa;

Kata kunci: *Brain-Based Learning* Berbantuan Web, Kemampuan Berpikir Matematis Tingkat Tinggi, *Self-Efficacy*

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ABSTRACT

Dewi, N.R (2017). Enhancing Students' Mathematical Higher-Order Thinking Ability and Their Self-Efficacy through Web-assisted Brain-based Learning.

Mathematical higher-order thinking ability and self-efficacy are important for students' knowledge development. However, the students' ability of that regard is still poor, so it needs to be developed. Web-assisted brain-based learning is an alternative model of teaching and learning which can be expected to enhance students' mathematical higher-order thinking ability and their self-efficacy. The main purpose of this research is to analyze comprehensively the achievement and enhancement of the students' mathematical higher-order thinking ability and self-efficacy as the result of the implementation of web-assisted brain-based learning and conventional learning. This research used mixed method by combining quantitative and qualitative methods under concurrent embedded design. The population of this research consisted of all students in the mathematics department of one of universities in Central Java. The sample was groups of students in the Study Program of Mathematics and Mathematics Education who enrolled in Integral Calculus course. From these two study programs, two sample groups (experiment group and control group) were selected randomly. An experiment group was taught by using web-assisted brain-based learning, while the other group (control group) was taught by using conventional learning. This research used various instruments: Test of Mathematical Prior Knowledge, Test of Mathematical Higher-Order Thinking Ability, Self-Efficacy Scale, Observation Sheets and Interview Guide. The data were analyzed by using t -test, t' -test, Mann-Whitney U test, and two-way ANOVA. From this research, it can be concluded that: (1) The achievement and enhancement of the students' mathematical higher-order thinking ability and their self-efficacy who were taught by using web-assisted brain-based learning are better than the achievement and enhancement of those who were taught by using conventional learning; (2) There is no interaction between types of learning (web-assisted brain-based learning and conventional learning) and mathematical prior knowledge (high, intermediate, low) toward the achievement and enhancement of the students' mathematical higher-order thinking ability; (3) There is interaction between types of learning (web-assisted brain-based learning and conventional learning) and types of study program (mathematics and mathematics education) toward the achievement and enhancement of the students' mathematical higher-order thinking ability; (4) There is no interaction between types of learning (web-assisted brain-based learning and conventional learning) and mathematical prior knowledge (high, intermediate, low) toward the achievement and enhancement of the students' self-efficacy; (5) There is no interaction between types of learning (web-assisted brain-based learning and conventional learning) and types of study program (mathematics and mathematics education) toward the achievement and enhancement of the students' self-efficacy; (6) There is low association between the students' mathematical higher-order

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thinking ability and their self-efficacy; (7) There is low correlation between the students' mathematical higher-order thinking ability and their self-efficacy.

Keywords : web-assisted brain-based learning, mathematical higher-order thinking ability, self-efficacy

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