

PENGARUH MODEL PEMBELAJARAN *PROJECT BASED LEARNING* (PjBL) BERBASIS STEAM BERBANTUAN *SCAFFOLDING* ADAPTIF TERHADAP PENGUASAAN KONSEP KIMIA DAN KETERAMPILAN BERPIKIR KRITIS SISWA SMA

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ABSTRAK

Penelitian ini bertujuan menjelaskan dan mendeskripsikan perbedaan penguasaan konsep dan keterampilan berpikir kritis siswa yang diajarkan menggunakan model pembelajaran *Project-Based Learning* (PjBL) berbasis STEAM berbantuan *scaffolding* adaptif. Jenis dan rancangan penelitian ini adalah kuasi eksperimen dengan rancangan *pretest-posttest with control group design*. Populasi penelitian adalah siswa kelas XI MIPA di SMA Negeri 2 Singaraja, Bali. Sampel penelitian terdiri atas empat kelas, yaitu XI A, XI B, XI D, dan XI E. Kelompok kontrol dan eksperimen ditentukan menggunakan teknik *cluster random sampling*. Pengumpulan data dilakukan melalui metode tes dan non-tes. Tes diperoleh dari hasil penguasaan konsep dan keterampilan berpikir kritis siswa, sedangkan data non-tes diperoleh melalui angket untuk mengetahui tanggapan siswa terhadap model pembelajaran yang digunakan. Data analisis menggunakan statistika deskriptif dan inferensial. Untuk analisis statistika inferensial digunakan *Multivariate Analysis of Covariance* (Mancova). Hasil penelitian menunjukkan bahwa terdapat perbedaan yang signifikan terhadap penguasaan konsep dan keterampilan berpikir kritis antara siswa yang diajarkan dengan model pembelajaran *Project-Based Learning* (PjBL) berbasis STEAM berbantuan *scaffolding* adaptif dengan model pembelajaran berbasis proyek. Kelompok eksperimen memperoleh skor lebih tinggi dalam penguasaan konsep, berpikir kritis, dan pendapat siswa secara berurutan dengan masing-masing skor rata-ratanya sebesar 85,24; 84,70; dan 73,77. Sementara itu, kelompok kontrol memperoleh skor rata-rata sebesar 55,05; 47,09; dan 68,91.

Kata Kunci: *project-based learning*, steam, *scaffolding* adaptif, penguasaan konsep, keterampilan berpikir kritis

THE EFFECT OF THE STEAM-BASED *PROJECT BASED LEARNING* (PjBL) LEARNING MODEL ASSISTED BY ADAPTIVE *SCAFFOLDING* ON THE MASTERY OF CHEMICAL CONCEPTS AND CRITICAL THINKING SKILLS OF HIGH SCHOOL STUDENTS

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ABSTRACT

This study aims to explain and describe the differences in concept mastery and critical thinking skills of students taught using the STEAM-based Project-Based Learning (PjBL) model assisted by adaptive scaffolding. The type and design of this study is a quasi-experiment with a pretest-posttest with control group design. The research population is students in grade XI of MIPA at SMA Negeri 2 Singaraja, Bali. The research sample consists of four classes, namely XI A, XI B, XI D, and XI E. The control and experimental groups were determined using cluster random sampling techniques. Data collection was conducted through tests and non-tests. Tests were obtained from the results of students' conceptual mastery and critical thinking skills, while non-test data was obtained through a questionnaire to determine students' responses to the learning model used. Data analysis used descriptive and inferential statistics. For inferential statistical analysis, Multivariate Analysis of Covariance (MANCOVA) was used. The results of the study showed that there was a significant difference in concept mastery and critical thinking skills between students taught using the Project-Based Learning (PjBL) model based on STEAM with adaptive scaffolding and the project-based learning model. The experimental group achieved higher scores in concept mastery, critical thinking, and student opinions, with average scores of 85.24, 84.70, and 73.77, respectively. Meanwhile, the control group obtained average scores of 55.05, 47.09, and 68.91.

Keywords: project based learning, steam, adaptive scaffolding, concept mastery, critical thinking skills