

**PENGARUH MODEL PEMBELAJARAN *COLLABORATIVE*
CREATIVITY BERBANTUAN PHET *SIMULATION* TERHADAP
KEMAMPUAN BERPIKIR KRITIS SISWA SMA**

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ABSTRAK

Penelitian ini melatarbelakangi pentingnya kemampuan berpikir kritis sebagai salah satu kompetensi abad ke-21 yang harus dimiliki siswa dalam pembelajaran Fisika. Namun, keterbatasan media laboratorium konvensional sering kali membuat pemahaman konsep dan stimulasi berpikir kritis siswa menjadi kurang optimal. Penelitian ini bertujuan untuk mengetahui efektivitas model pembelajaran *Collaborative Creativity* berbantuan media simulasi *Physics Education Technology* (PhET) terhadap kemampuan berpikir kritis siswa pada mata pelajaran Fisika. Metode penelitian yang digunakan adalah kuasi eksperimen (*quasi-experimental design*). Populasi dalam penelitian ini melibatkan seluruh siswa kelas XI di SMA Negeri 3 Amlapura, dengan sampel sebanyak 68 siswa yang dipilih menggunakan teknik *cluster random sampling*. Sampel terbagi ke dalam dua kelompok, yaitu kelas eksperimen (33 siswa) yang diterapkan model *Collaborative Creativity* berbantuan PhET dan kelas kontrol (35 siswa) yang diterapkan model *Discovery Learning*. Data kemampuan berpikir kritis dikumpulkan melalui instrumen tes *posttest* dan dianalisis menggunakan Analisis Kovarian (ANAKOVA) dengan taraf signifikansi $\alpha = 0,05$. Hasil analisis menunjukkan nilai signifikansi sebesar 0,001, yang berarti terdapat perbedaan kemampuan berpikir kritis yang signifikan antara kedua kelas setelah mengontrol variabel kovariat. Model ANACOVA yang digunakan memiliki koefisien determinasi (*R Squared*) sebesar 0,789 yang menunjukkan bahwa 78,9% variasi kemampuan berpikir kritis siswa dipengaruhi oleh model pembelajaran, sedangkan 21,1% dipengaruhi oleh faktor di luar model. Nilai *Estimated Marginal Mean* (rata-rata terkoreksi) menunjukkan bahwa kelas eksperimen memiliki rata-rata sebesar 30,844 (dengan standar deviasi 8,7) lebih tinggi dari kelas kontrol dengan nilai sebesar 20,633 (dengan standar deviasi 5,4). Dengan demikian, dapat disimpulkan bahwa model pembelajaran *Collaborative Creativity* berbantuan PhET *Simulation* secara signifikan lebih efektif dalam meningkatkan kemampuan berpikir kritis siswa dibandingkan dengan model *Discovery Learning*.

Kata Kunci: *Collaborative Creativity*, PhET Simulation, kemampuan berpikir kritis.

ABSTRACT

This study is grounded in the importance of critical thinking skills as one of the 21st-century competencies that students must possess in Physics learning. However, the limitations of conventional laboratory media often hinder students' conceptual understanding and the stimulation of their critical thinking skills. Therefore, this study aimed to determine the effectiveness of the Collaborative Creativity learning model assisted by Physics Education Technology (PhET) simulation media on students' critical thinking skills in Physics. This study employed a quasi-experimental design. The population consisted of all eleventh-grade students of SMA Negeri 3 Amlapura, with a sample of 68 students selected using the cluster random sampling technique. The sample was divided into two groups: an experimental class consisting of 33 students, who were taught using the Collaborative Creativity learning model assisted by PhET, and a control class consisting of 35 students, who were taught using the Discovery Learning model. Data on students' critical thinking skills were collected through a posttest instrument and analyzed using Analysis of Covariance (ANCOVA) at a significance level of 0,05. The results of the analysis showed a significance value of 0,001, indicating that there was a significant difference in critical thinking skills between the two classes after controlling for the covariate variable. The ANCOVA model used had an R Squared value of 0.789, indicating that 78.9% of the variance in students' critical thinking skills could be explained by the research model, while the remaining 21.1% was influenced by factors outside the model. The Estimated Marginal Means (adjusted means) indicated that the experimental group obtained a higher adjusted mean score of 30.844 than the control group, which obtained an adjusted mean score of 20.633. Therefore, it can be concluded that the Collaborative Creativity learning model assisted by PhET simulations was significantly more effective in improving students' critical thinking skills than the Discovery Learning model.

Keywords: Collaborative Creativity, PhET Simulation, critical thinking skills.