INVESTIGATING THE EFFECT OF STEM-ESD BASED LEARNING ON RENEWABLE ENERGY PROJECT TOWARDS STUDENTS' SUSTAINABILITY ACTION AND CREATIVITY

RESEARCH PAPER

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Oleh
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Sebuah skripsi yang diajukan untuk memenuhi salah satu syarat memperoleh gelar Sarjana Pendidikan pada Fakultas Pendidikan Matematika dan Ilmu Pengetahuan Alam

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DECLARATION

I do hereby declare that every aspect was written in this research paper entitled "Investigating The Effect of STEM-ESD Based Learning on Renewable Energy Project Towards Students' Sustainability Action And Creativity" genuinely results from my original idea, efforts, and works. The theories, finding of experts, opinions, and others contained in this paper have been quoted or referenced based on scientific code from UPI and following scientific ethics that applies in scholars' society. This declaration is created truthfully and consciously. When an infringement towards scientific ethics subsequently is found or if there is a claim of any others towards the authentically of this research paper, hence I am willing to be responsible and accept academic sanctions correspond to the rules.

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ABSTRACT

Sustainability action and creativity are the core abilities that must be mastered to solve energy problems in order to achieve SDGs point 7 "Clean and Affordable Energy". STEM-ESD based learning comes as an alternative learning model to facilitate these two competencies. This research aims to investigate the effect of STEM-ESD based learning on renewable energy towards students' sustainability action and creativity. This study utilized quantitative research in the form of quasi-experimental research with pretest-posttest non-equivalent control group design. The sample for this study was sixty 8th-grade students in one of private school in Bogor. The instruments used in this research are ECQ-Questionnaire to assessed students' sustainability action and CPAM Rubric to evaluate students' creativity. Students' sustainability action data analyzed through independent sample t-test using SPSS software. Descriptive statistic were used to analyze the result of students' creativity that assessed only for an experimental class. Based on independent sample t-test result, there is significant difference in post-test result of student in experimental and control class for sustainability action. Additional descriptive statistic result shows experimental exhibited more positive trends in all sustainability action indicators. Meanwhile, creativity result of experimental class's students showed a score of 54 for novelty criteria, 84 for resolution criteria, and 75 for elaboration and synthesis criteria. These results are lower than the results in previous studies except for the resolution criterion. This indicates that STEM-ESD based learning has a positive effect on students' sustainability action, and a moderate effect on creativity with some adjustments to its application.

Keywords: Renewable Energy Project, STEM-ESD Based Learning, Students' Creativity, Students' Sustainability Action.

MENYELIDIKI EFEK PEMBELAJARAN STEM BERBASIS ESD PADA PROYEK ENERGI TERBARUKAN TERHADAP AKSI KEBERLANJUTAN DAN KREATIVITAS

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ABSTRAK

Aksi keberlanjutan dan kreativitas merupakan kemampuan inti yang harus dikuasai untuk menyelesaikan permasalahan energi dalam rangka mencapai SDGs poin 7 "Energi Bersih dan Terjangkau". Pembelajaran berbasis STEM-ESD hadir sebagai salah satu alternatif model pembelajaran untuk memfasilitasi kedua kompetensi tersebut. Penelitian ini bertujuan untuk menyelidiki pengaruh pembelajaran berbasis STEM-ESD pada proyek energi terbarukan terhadap aksi keberlanjutan dan kreativitas siswa. Penelitian ini menggunakan jenis penelitian kuantitatif dalam bentuk penelitian kuasi eksperimen dengan desain pretest-posttest non-equivalent control group. Sampel penelitian ini adalah 60 siswa kelas 8 di salah satu sekolah swasta di Bogor. Instrumen yang digunakan dalam penelitian ini adalah ECQ-Questionnaire untuk menilai aksi keberlanjutan siswa dan CPAM Rubric untuk mengevaluasi kreativitas siswa. Data aksi keberlanjutan siswa dianalisis melalui uji-t sampel independen menggunakan perangkat lunak SPSS. Statistik deskriptif digunakan untuk menganalisis hasil kreativitas siswa yang dinilai hanya untuk kelas eksperimen. Berdasarkan hasil independent sample t-test, terdapat perbedaan yang signifikan antara post-test siswa kelas eksperimen dan kelas kontrol untuk hasil aksi keberlanjutan. Hasil statistik deskriptif tambahan menunjukkan bahwa tren yang lebih positif terlihat di kelas eksperimen untuk semua indikator aksi keberlanjutan. Sementara itu, hasil kreativitas siswa kelas eksperimen menunjukkan skor 54 untuk kriteria kebaruan, 84 untuk kriteria resolusi, dan 75 untuk kriteria elaborasi dan sintesis. Hasil ini lebih rendah dari hasil penelitian sebelumnya kecuali untuk kriteria resolusi. Hal ini mengindikasikan bahwa pembelajaran berbasis STEM-ESD berpengaruh positif terhadap aksi keberlanjutan siswa, dan cukup berpengaruh terhadap kreativitas dengan beberapa penyesuaian pada penerapannya.

Kata Kunci: Aksi Keberlanjutan Siswa, Kreativitas Siswa, Pembelajaran Berbasis STEM-ESD, Proyek Energi Terbarukan.

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