

**INVESTIGATING STUDENTS' SUSTAINABILITY ACTION AND
CREATIVITY THROUGH ESD-BASED STEM LEARNING ON THE
CLIMATE HERO PROJECT**

RESEARCH PAPER

Submitted as Requirement to Obtain Degree of *Sarjana Pendidikan* in
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Investigating Students' Sustainability Action and Creativity Through ESD-Based STEM Learning on The Climate Hero Project

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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 written in this research paper entitled “**Investigating Students’ Sustainability Action and Creativity Through ESD-Based STEM Learning on The Climate Hero Project**” has been composed personally by myself, except where otherwise stated by reference or acknowledgement. The theories, findings 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 apply 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 authenticity of this research paper, hence I am willing to be responsible and accept academic sanctions corresponding to the rules.

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ABSTRACT

Climate change is an urgent global challenge that demands immediate response and action. This study aims to investigate the effect of students' involvement in the Climate Hero project through ESD-based STEM learning towards sustainability action and students' creativity. Two groups are observed throughout the quasi-experiment method of research: the experimental group (49 students in 7th grade) and the control group (41 students in 7th grade). The research design used is the pretest-posttest non-equivalent control group design. The instruments used are the sustainability action questionnaire which has been adopted from the Environmental Citizenship Questionnaire (ECQ) and ESD learning goals and the Creativity Product Analysis Matrix (CPAM) rubric. The data analysis used is Independent Sample t-Test and simple average calculation. The result shows there is a significant difference in sustainability action between the experiment and the control class (sig-2-tailed or P-value $(0.032) < \alpha (0.05)$). This indicates that the involvement of students through the ESD-based STEM learning in the Climate Hero project has a significant effect on students' sustainability actions although not all indicators improved. Furthermore, ESD-based STEM learning on the Climate Hero project demonstrates a promising potential to develop students' creativity. However, the average creativity results (60%) in this study appear to be less significant than the previous research. ESD-based STEM learning on the Climate Hero project can be implemented to enhance students' sustainability actions. Meanwhile, to enhance students' creativity, it may be necessary to extend the duration of the project and carefully consider group distribution to better support creative development.

Keywords: Climate Change, Climate Hero Project, ESD-based STEM learning, Students' Creativity, Sustainability Action

MENYELIDIKI AKSI KEBERLANJUTAN DAN KREATIVITAS SISWA MELALUI PEMBELAJARAN STEM BERBASIS ESD PADA PROYEK PAHLAWAN IKLIM

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ABSTRAK

Perubahan iklim merupakan tantangan global yang mendesak yang menuntut respon dan aksi yang segera. Penelitian ini bertujuan untuk menyelidiki pengaruh keterlibatan siswa dalam proyek *Climate Hero* melalui pembelajaran *ESD-based STEM learning* terhadap aksi keberlanjutan dan kreativitas siswa. Dua kelompok diamati dalam penelitian dengan metode kuasi-eksperimen yaitu kelompok eksperimen (49 siswa kelas 7) dan kelompok kontrol (41 siswa kelas 7). Desain penelitian yang digunakan adalah *pretest-posttest non-equivalent control group design*. Instrumen yang digunakan adalah kuesioner aksi keberlanjutan yang diadopsi dari *Environmental Citizenship Questionnaire* (ECQ) dan *ESD learning goals*. Kreativitas siswa diperoleh dari rubrik *Creativity Product Analysis Matrix* (CPAM). Analisis data yang digunakan dalam penelitian ini adalah *Independent Sample t-Test* dan kalkulasi rata-rata sederhana. Hasil penelitian menunjukkan bahwa terdapat perbedaan yang signifikan pada tindakan keberlanjutan antara kelas eksperimen dan kelas kontrol setelah proses pembelajaran (*Sig-2 tailed* atau *P-value* $(0,032) < \alpha (0,05)$). Hal ini menunjukkan bahwa keterlibatan siswa melalui *ESD-based STEM learning* pada proyek *Climate Hero* memiliki pengaruh yang signifikan terhadap aksi keberlanjutan siswa, meskipun tidak semua indikator mengalami peningkatan. Selain itu, *ESD-based STEM learning* dalam proyek *Climate Hero* menunjukkan potensi yang menjanjikan untuk mengembangkan kreativitas siswa. Namun, ketika dibandingkan hasil kreativitas rata-rata (60%) yang diamati dalam penelitian ini dengan penelitian sebelumnya, dampaknya terlihat kurang signifikan. Pembelajaran *ESD-based STEM learning* pada proyek *Climate Hero* dapat diimplementasikan untuk meningkatkan aksi keberlanjutan siswa. Sementara itu, untuk meningkatkan kreativitas siswa, perlu dipertimbangkan untuk menambahkan durasi pengerjaan proyek dan mempertimbangkan dengan cermat distribusi kelompok untuk lebih mendukung pengembangan kreativitas siswa.

Kata Kunci: Aksi Keberlanjutan, *ESD-based STEM learning*, Perubahan Iklim, Proyek *Climate Hero*

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PREFACE

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Bandung, August 2024

Author

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