IMPROVING STUDENT CREATIVITY AND CONCEPT MASTERY ABOUT THE HUMAN CIRCULATORY SYSTEM USING ELECTRICAL CIRCUITS IN A STEM PROJECT

RESEARCH PAPER

Submitted as Requirement to Obtain Degree of *Sarjana Pendidikan* in
International Program on Science Education (IPSE) Study Program

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THESIS AUTHENTICITY SHEET
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APPROVAL SHEET

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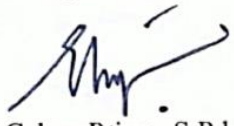

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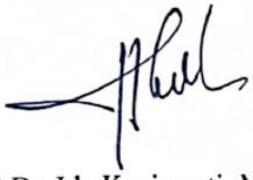

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DECLARATION

I hereby declare that the thesis entitled " IMPROVING STUDENT CREATIVITY AND CONCEPT MASTERY ABOUT THE HUMAN CIRCULATORY SYSTEM USING ELECTRICAL CIRCUITS IN A STEM PROJECT" with all its contents is my own work. In this research there is no plagiarism of other people's work and I do not quote and plagiarize in ways that are not in accordance with applicable scientific ethics. Based on this statement, I am ready to bear sanctions if a violation of scientific ethics is found against the authenticity of my work.

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PREFACE

Praise be to Allah SWT for His grace and guidance that has bestowed blessings on the author so that he can complete this research as part of the academic demands in pursuing a Bachelor's degree in Natural Science Education Study Program, Faculty of Mathematics and Natural Sciences Education, Universitas Pendidikan Indonesia. This thesis entitled " Electrical Circuit Project-Based STEM Learning On Human Circulatory System To Improve Students' Concept Mastery And Creativity " was prepared as a result of research that has been carried out under the guidance and direction of several parties, for which the author sincerely expresses his gratitude.

The author realizes that this thesis has many shortcomings, for that constructive suggestions and criticism the author hopes for future improvements, the author also hopes that this thesis can be a source that can inspire and reference for further research.

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ABSTRACT

Indonesia is ranked 150 out of 160 countries in the category of student creativity and scored low in science understanding. Several studies provide information on the existence of low levels of creativity in students. This fact aligns with the research results that found that student creativity is unsatisfactory (Fan & Cai, 2022; Yusnaeni et al., 2017). The results of previous research show that the understanding of junior high school students has a low value, which is 24% to understand the elements in a science topic.According to the data, Indonesia must be better positioned to realize the importance of science materials. This study focused on analyzing students' concept mastery and students' creativity by implementing electrical circuit project-based STEM learning on human circulatory system subjects. This study uses a pre-experimental research design. The sampling technique used is a random sampling technique to decide the sample. The population of this study is grade 8 students from one boarding school in Kabupaten Bandung Barat, West Java, Indonesia. There are 34 students. The instrument used is 28 questions of an objective test based on Bloom's taxonomy, which measures students' concept mastery. The Creativity Product Analysis Matrix (CPAM) rubric measures students' creativity. This study finds significant differences before and after implementing STEM learning regarding students' concept mastery and creativity. This study found a 0.63 N-gain score, which is categorized as medium. The results of students' creativity get an average score of 77%, which is categorized as high. There is only a designing stage of STEM learning that contributes positively to improving students' creativity, which is 0.000, which is classified as very significant. Based on the findings, the researcher suggests that electrical circuit project-based STEM learning can improve students' concept mastery and students' creativity on the human circulatory system topics.

Keywords: Concept mastery, Creativity, Electrical circuit, STEM learning,

MENINGKATKAN KREATIVITAS DAN PENGUASAAN KONSEP SISWA TENTANG SISTEM PEREDARAN DARAH MANUSIA MENGGUNAKAN RANGKAIAN LISTRIK MELALUI PROYEK STEM

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ABSTRAK

Indonesia berada di peringkat 150 dari 160 negara dalam kategori kreativitas siswa dan mendapat skor rendah dalam pemahaman sains. Beberapa penelitian memberikan informasi tentang adanya tingkat kreativitas yang rendah pada siswa. Fakta ini sejalan dengan hasil penelitian yang menemukan bahwa kreativitas siswa belum memuaskan (Fan & Cai, 2022; Yusnaeni et al., 2017). Hasil penelitian sebelumnya menunjukkan bahwa pemahaman siswa SMP memiliki nilai yang rendah, yaitu sebesar 24% untuk memahami elemen-elemen dalam suatu topik IPA. Berdasarkan data tersebut, Indonesia harus berada pada posisi yang lebih baik untuk menyadari pentingnya materi sains. Penelitian ini difokuskan untuk menganalisis penguasaan konsep siswa dan kreativitas siswa dengan menerapkan pembelajaran STEM berbasis proyek rangkaian listrik pada materi sistem peredaran darah manusia. Penelitian ini menggunakan desain penelitian pra-eksperimen. Teknik pengambilan sampel yang digunakan adalah teknik random sampling untuk menentukan sampel. Populasi dari penelitian ini adalah siswa kelas 8 dari salah satu sekolah asrama di Kabupaten Bandung Barat, Jawa Barat, Indonesia. Jumlahnya sebanyak 34 siswa. Instrumen yang digunakan adalah 28 soal tes objektif berdasarkan taksonomi Bloom yang mengukur penguasaan konsep siswa. Rubrik CPAM (*Creativity Product Analysis Matrix*) mengukur kreativitas siswa. Penelitian ini menemukan perbedaan yang signifikan sebelum dan sesudah penerapan pembelajaran STEM mengenai penguasaan konsep dan kreativitas siswa. Penelitian ini menemukan nilai N-gain sebesar 0,63 yang termasuk dalam kategori sedang. Hasil kreativitas siswa mendapatkan skor rata-rata 77% yang dikategorikan tinggi. Hanya tahap *designing* dalam pembelajaran STEM yang berkontribusi positif terhadap peningkatan kreativitas siswa, yaitu sebesar 0,000 yang tergolong sangat signifikan. Berdasarkan hasil penelitian, peneliti menyarankan bahwa pembelajaran STEM learning berbasis proyek rangkaian listrik dapat meningkatkan penguasaan konsep dan kreativitas siswa pada topik sistem peredaran darah manusia.

Kata Kunci: Kreatifitas, Penguasaan konsep, Pembelajaran STEM, Rangkaian listrik

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