

**STEM-BASED ROBOTICS ACTIVITIES TO MEASURE STUDENTS'
CREATIVE THINKING SKILLS AT THE SECONDARY SCHOOLS**

MINI-THESIS

submitted to fulfill part of the requirements to obtain a Bachelor's degree in the
field of Electrical Engineering Education



written by

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A thesis submitted to fulfill one of the requirements for obtaining a Bachelor's
degree in Electrical Engineering Education in the Electrical Engineering
Education Undergraduate Study Program

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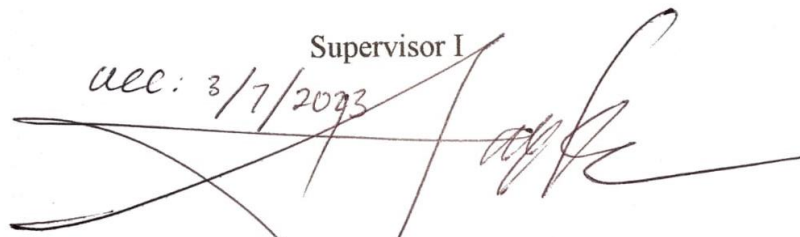
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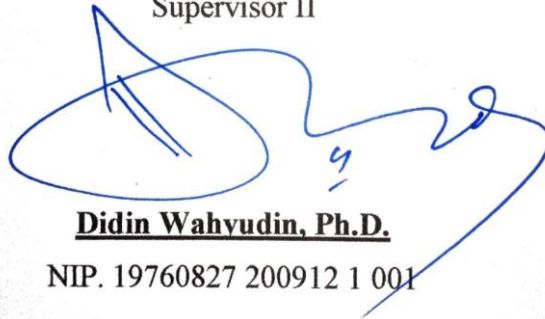
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STATEMENT SHEET

I hereby declare that this thesis with the title “**STEM-BASED ROBOTICS ACTIVITIES TO MEASURE STUDENTS’ CREATIVE THINKING SKILLS AT THE SECONDARY SCHOOLS**” and all its contents are my original work. I do not plagiarize or quote in ways that are not following the scientific ethics that govern the scientific community. For this statement, I am willing to incur the risk/sanction if it is discovered in the future that there has been a violation of scientific ethics or that other parties have made claims about the legitimacy of my work.

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The writer realizes that there are still many things that could be improved in writing this thesis. Therefore, the writer is very open to criticism and suggestions from various parties for improving this thesis in the future. The writer also realizes that the smoothness of writing this thesis must be balanced with multiple parties' help, motivation, and guidance. On this occasion, the writer wishes to express gratitude to those who have assisted in preparing this thesis to ensure its successful completion. The writer expresses his deepest gratitude to

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ABSTRACT**STEM-BASED ROBOTICS ACTIVITIES TO MEASURE STUDENTS'
CREATIVE THINKING SKILLS AT THE SECONDARY SCHOOLS****Bella Tri Juliana****1906139**

Abstract: STEM (Science, Technology, Engineering, and Mathematics) is a way to promote the implementation of a more meaningful learning process and stimulate students to engage in real-world experiences. STEM education aims to develop 21st-century skills for every individual, one of which is creative thinking. This study aims to determine how the STEM approach is applied to Robotics learning in measuring students' creative thinking skills at the secondary education level. A total of 90 students divided into 30 groups from junior high school, senior high school, and vocational high schools from 6 schools in West Java became participants in this study. This study examines how students' creative thinking skills produce developed product design ideas, including students' creative thinking performance and student responses regarding STEM learning. The data were processed and analyzed using a quantitative descriptive statistical approach. The results show that in the assessment of creative thinking abilities, the junior high school and senior high school students are included in the proficient category. In contrast, the vocational high school students are included in the advanced category. If viewed from the performance of creative thinking, the junior and senior high school student groups are included in the good category, while the vocational student group is in the excellent category. In the ability to think creatively, evaluating/improving ideas has the highest value. Meanwhile, in the criterion of creative thinking, fluency has a higher average than other aspects, and originality has the lowest score for each level. In addition, students' responses to STEM learning showed good results, marked by the percentage obtained of 73.14%. It shows that applying STEM in Robotics learning makes students interested in STEM and can also train students' creative thinking skills. This research is expected to be a reference for educators regarding STEM learning and other researchers interested in similar topics.

Keywords: STEM, Creative thinking, School, Education

ABSTRAK

KEGIATAN ROBOTIKA BERBASIS STEM DALAM MENGUKUR KEMAMPUAN BERPIKIR KREATIF SISWA SEKOLAH MENENGAH

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Abstrak: STEM (*Science, Technology, Engineering, dan Mathematics*) menjadi cara untuk mempromosikan implementasi proses pembelajaran yang lebih bermakna dan merangsang siswa untuk terlibat dalam pengalaman dunia nyata. Tujuan dari pendidikan STEM adalah untuk mengembangkan keterampilan abad 21 bagi setiap individu, salah satunya adalah berpikir kreatif. Penelitian ini bertujuan untuk mengetahui bagaimana pendekatan STEM diterapkan pada pembelajaran Robotika dalam mengukur kemampuan berpikir kreatif siswa di tingkat pendidikan menengah, yaitu SMP, SMA, dan SMK. Sebanyak 90 siswa yang terbagi menjadi 30 kelompok dari tingkat SMP, SMA, dan SMK yang berasal dari 6 sekolah di Jawa Barat menjadi partisipan dalam penelitian ini. Penelitian ini meninjau bagaimana kemampuan berpikir siswa dalam menghasilkan ide desain produk yang dikembangkan, termasuk kinerja berpikir kreatif siswa dan tanggapan siswa mengenai pembelajaran STEM. Data diolah dan dianalisis menggunakan pendekatan statistik deskriptif kuantitatif. Hasil menunjukkan bahwa dalam penilaian kemampuan berpikir kreatif, kelompok siswa SMP dan SMA termasuk ke dalam kategori maju, sedangkan kelompok siswa SMK termasuk ke dalam kategori terampil. Jika ditinjau dari kinerja berpikir kreatif, kelompok siswa SMP dan SMA termasuk ke dalam kategori baik, sedangkan kelompok siswa SMK termasuk ke dalam kategori sangat baik. Dalam kemampuan berpikir kreatif, kategori mengevaluasi/ memperbaiki ide memiliki nilai paling unggul. Sedangkan dalam kriteria berpikir kreatif, *fluency* memiliki rerata lebih tinggi dibanding aspek lainnya dan *originality* memiliki nilai paling rendah untuk setiap tingkatan. Selain itu, tanggapan siswa terhadap pembelajaran STEM menunjukkan hasil yang baik, ditandai dengan persentase yang diperoleh sebesar 73,14%. Hal tersebut menunjukkan bahwa penerapan STEM dalam pembelajaran Robotika tidak hanya membuat siswa tertarik dengan STEM tetapi juga dapat melatih kemampuan berpikir kreatif siswa. Penelitian ini diharapkan dapat menjadi referensi bagi pendidik mengenai pembelajaran STEM maupun peneliti lain yang tertarik dengan topik yang serupa.

Kata kunci: STEM, Kemampuan berpikir kreatif, Sekolah, Pendidikan

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