

**ENGINEERING DESIGN SKILLS DAN PENGUASAAN KONSEP SISWA  
PADA MATERI REKAYASA TANAM MELALUI PEMBELAJARAN  
STEM**

*Tesis*

diajukan untuk memenuhi sebagian syarat memperoleh gelar  
Magister Pendidikan Biologi



Disusun oleh:

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UNIVERSITAS PENDIDIKAN INDONESIA  
2020**

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PEMBELAJARAN STEM

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Universitas Pendidikan Indonesia, 2020

Tesis diajukan untuk memenuhi salah satu syarat memperoleh gelar Magister  
Pendidikan (M.Pd.) pada Program Studi Pendidikan Biologi

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Universitas Pendidikan Indonesia  
Januari 2020

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STEM**

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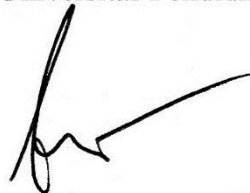
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## **Engineering Design Skills dan Penguasaan Konsep Siswa pada Materi Rekayasa Tanam melalui Pembelajaran STEM**

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### **ABSTRAK**

Untuk meningkatkan kualitas daya saing di abad 21, negara-negara maju telah menerapkan STEM dalam pembelajaran. STEM merupakan sebuah pendekatan yang mengintegrasikan empat disiplin ilmu science, technology, engineering, dan mathematic dalam sebuah pembelajaran terpadu berdasarkan penerapan pada kehidupan nyata. Tujuan penelitian ini diantaranya adalah menganalisis pencapaian *Engineering design skills* dan penguasaan konsep siswa pada materi rekayasa tanam melalui pembelajaran STEM. Pembelajaran Rekayasa Tanam berbasis STEM untuk meningkatkan *Engineering design skills* dan Penguasaan Konsep Siswa dalam menghasilkan ide, solusi atau desain yang baru untuk dimasa yang akan datang. Penelitian ini menggunakan metode kuantitatif dan desain penelitiannya adalah *quasi experimental nonrandom assignment* dimana sampel penelitian terdiri dari 20 siswa kelas STEM dan 20 siswa kelas non-STEM. Data penelitian dikumpulkan menggunakan task *engineering design skills* untuk mengukur bagaimana pencapaian siswa dalam *engineering design skills* yang dimiliki, dan mengukur sejauh mana penguasaan konsep yang dimiliki siswa dari pembelajaran rekayasa tanam berbasis STEM. Hasil penelitian ini menunjukkan adanya perbedaan pencapaian *engineering design skills* siswa terjadi karena adanya pengaruh atau dampak dari pembelajaran berbasis STEM dalam aktifitas pembelajarannya. Selain itu hasil studi juga menunjukkan adanya pengaruh pembelajaran berbasis STEM terhadap penguasaan konsep siswa. Rata-rata hasil analisis siswa memang nampak ada perbedaan namun perbedaan yang didapat masih termasuk ke dalam kategori rendah. Oleh karena itu, disimpulkan pembelajaran rekayasa tanam berbasis STEM dapat meningkatkan *engineering design skills* dan penguasaan konsep siswa namun harus dilakukan beberapa perbaikan pada aspek-aspek tertentu dan membutuhkan waktu yang panjang.

Kata kunci : Pembelajaran STEM, Engineering Design Skills, Penguasaan Konsep

# ENGINEERING DESIGN SKILLS AND MASTERING STUDENT CONCEPT IN PLANT ENGINEERING MATERIALS THROUGH STEM LEARNING

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## ABSTRACT

To improve the quality of competitiveness in the 21st century, developed countries have implemented STEM in learning. STEM is an approach that integrates the four disciplines of science, technology, engineering, and mathematics in an integrated learning based on application in real life. The purpose of this study is to analyze the achievement of Engineering design skills and mastery of students' concepts in planting engineering materials through STEM learning. STEM-based Engineering Learning to improve Engineering design skills and Mastery of Student Concepts in generating new ideas, solutions or designs for the future. This research uses quantitative methods and the research design is a quasi experimental nonrandom assignment where the research sample consists of 20 STEM class students and 20 non-STEM class students. The research data were collected using task engineering design skills to measure how students achieve their engineering design skills, and measure the extent of mastery of the concepts students have from learning STEM-based planting engineering. The results of this study indicate that there are differences in the achievement of engineering design skills of students due to the influence or impact of STEM-based learning in learning activities. In addition, the study results also show the influence of STEM-based learning on the mastery of student concepts. The average analysis result of students does seem to have differences but the differences obtained are still included in the low category. Therefore, it is concluded that STEM-based learning in planting engineering can improve engineering design skills and mastery of students' concepts, but some improvements must be made in certain aspects and require a long time.

**Keywords :** Concept mastery, Engineering skills, STEM-based learning

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## DAFTAR ISI

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