

# **DESAIN DIDAKTIS MATERI ATURAN SINUS DAN KOSINUS**

**TESIS**

diajukan untuk memenuhi sebagian syarat memperoleh gelar Magister Pendidikan  
Program Studi Pendidikan Matematika



oleh

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## **DESAIN DIDAKTIS MATERI ATURAN SINUS DAN KOSINUS**

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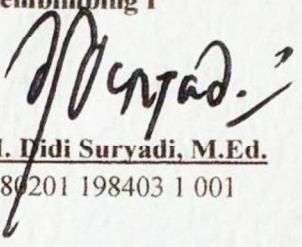
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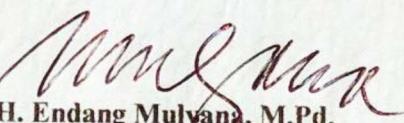
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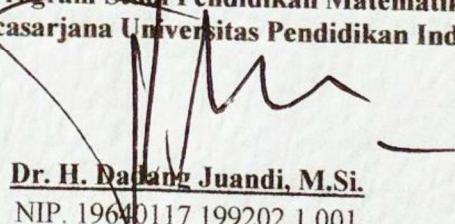
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## ABSTRAK

**Agung Anggoro (1707160). Desain Didaktis Materi Aturan Sinus dan Kosinus.**

Penelitian ini bertujuan menghasilkan desain didaktis untuk materi aturan sinus dan kosinus untuk meminimalisir hambatan belajar (*learning obstacle*) yang teridentifikasi. Penelitian ini merupakan penelitian desain didaktis. Penyusunan desain didaktis mempertimbangkan hambatan belajar, pembelajaran pada materi sebelumnya, dan ketersediaan waktu efektif. Desain didaktis diimplementasikan pada 33 siswa kelas X salah satu Sekolah Menengah Atas di Bandung Raya. Berdasarkan hasil kajian pustaka dan tes diagnostik, ditemukan adanya hambatan epistemologis berupa terbatasnya pengetahuan dan pengalaman siswa dalam menyelesaikan masalah tentang segitiga, hambatan didaktis berupa hanya mengandalkan hafalan dalam penyelesaian soal, dan potensi hambatan didaktis yang bersumber dari buku referensi dalam menyajikan definisi tinggi segitiga. Desain didaktis yang dirancang terdiri atas 5 kegiatan untuk memfasilitasi 3 tahapan pembelajaran, yaitu memahami tinggi segitiga, penemuan kembali aturan sinus dan kosinus, dan penerapan aturan sinus dan kosinus. Dalam implementasi desain didaktis ditemukan beberapa kesulitan siswa. Pertama, kesulitan dalam menyusun definisi formal dari tinggi segitiga. Namun, kesulitan ini tidak menghambat siswa dalam melakukan eksplorasi dengan memanfaatkan tinggi segitiga karena siswa telah memahami tinggi segitiga secara visual. Kedua, kesulitan siswa dalam menerapkan konsep perbandingan trigonometri sudut berelasi pada kegiatan penemuan kembali aturan sinus untuk kasus segitiga tumpul. Hal ini diduga disebabkan karena pembelajaran materi perbandingan trigonometri sudut berelasi hanya terbatas pada konteks koordinat Kartesius. Ketiga, masih terdapat siswa yang memperlakukan segitiga non siku-siku sebagai segitiga siku-siku dalam menyelesaikan masalah tentang segitiga. Hal ini merupakan indikasi hambatan epistemologis yang masih muncul. Selain itu, dalam implementasi desain didaktis yang telah dirancang ditemukan pula beberapa respons yang belum terprediksi. Berdasarkan hasil analisis implementasi pada desain didaktis yang dirancang, dilakukan revisi desain didaktis dengan mempertimbangkan munculnya respons-respons yang belum terprediksi, efisiensi waktu, dan upaya penguatan pemahaman.

**Kata kunci:** desain didaktis, aturan sinus, aturan kosinus, hambatan belajar

## ABSTRACT

**Agung Anggoro (1707160). Didactical Design for Topics of Sine and Cosine Rule.**

This study aims to produce a didactical design for the topic of sine and cosine rule to minimize the identified learning obstacles. This research is a didactical design research. The development of didactical design considers learning obstacles, learning process in previous material, and effective time availability. Didactical design was implemented in 33 tenth-grade students of a Senior High Schools in Greater Bandung. Based on the results of literature review and diagnostic test, an epistemological obstacle was found in the form of limited knowledge and experience of students in solving problems about triangles, didactical obstacle in the form of relying solely on memorizing formulas in solving a problem, and potential didactical obstacle sourced from students' reference books in material presentation about the definition of an altitudes on a triangle. Didactical design that is designed consists of 5 activities to facilitate 3 stages of learning, there were understanding the altitude of a triangle, reinvention of the sine and cosine rules, and the applications of sine and cosine rules. In the implementation of didactical design, several students' difficulties were encountered. First, difficulty in formulating formal definitions of the altitude on a triangle. However, this difficulty was not preventing students from exploring by utilizing the altitude of a triangle because students have visually understood the concept of altitude of a triangle. Second, students' difficulties in applying the concept of trigonometry ratios on related angle in the activity of the sine rules reinvention for the case of obtuse triangle. This is thought to be due to the learning of trigonometry ratios on related angle only limited to the context of Cartesian coordinates. Third, there were students who treat non-right triangles as right triangles in solving problems about triangles. This was an indication of epistemological obstacles that still arise. In addition, in the implementation of the didactical designs that have been designed also found some responses that have not been predicted. Based on the results of the implementation analysis on the didactical design that was designed, a revised didactical design was carried out by considering the emergence of unpredicted responses, time efficiency, and efforts to strengthen students' understanding.

**Keywords:** didactical design, sine rule, cosine rule, learning obstacle

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