IMPLEMENTASI PENDEKATAN *OPEN-ENDED* DALAM PEMBELAJARAN MATEMATIKA UNTUK MENINGKATKAN KEMAMPUAN PEMAHAMAN DAN KOMUNIKASI MATEMATIS SERTA KEMANDIRIAN BELAJAR SISWA SMK

DISERTASI

Diajukan untuk memenuhi persyaratan memperoleh gelar doktor dalam bidang pendidikan matematika

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FAKULTAS PENDIDIKAN MATEMATIKA DAN ILMU PENGETAHUAN ALAM

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PENGESAHAN

IMPLEMENTASI PENDEKATAN *OPEN-ENDED* DALAM PEMBELAJARAN MATEMATIKA UNTUK MENINGKATKAN KEMAMPUAN PEMAHAMAN DAN KOMUNIKASI MATEMATIS SERTA KEMANDIRIAN BELAJAR SISWA SMK

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ABSTRAK

Rusdian Rifa'i (2025). Implementasi Pendekatan *Open-Ended* dalam Pembelajaran Matematika untuk Meningkatkan Kemampuan Pemahaman dan Komunikasi Matematis serta Kemandirian Belajar Siswa SMK

Siswa membutuhkan kemampuan pemahaman, komunikasi matematis, dan kemandirian belajar yang memadai dalam pembelajaran matematika. Namun, ketiga aspek tersebut masih belum optimal pada siswa SMK. Untuk mengatasi hal ini, diperlukan pendekatan alternatif, salah satunya adalah pendekatan *open-ended*. Penelitian ini bertujuan untuk mengkaji implementasi pendekatan *open-ended* pada materi barisan dan deret guna meningkatkan pemahaman matematis, komunikasi matematis, dan kemandirian belajar siswa SMK. Berbeda dengan pendekatan langsung yang berpusat pada guru dan latihan terstruktur, pendekatan *open-ended* mendorong siswa untuk mengeksplorasi berbagai solusi secara mandiri. Penelitian menggunakan metode quasi eksperimen dengan desain *pretest-posttest control group*. Populasi penelitian adalah siswa kelas XI pada salah satu SMK di Kabupaten Pandeglang, Provinsi Banten, dengan sampel 72 siswa dari dua kelas yang dipilih secara *purposive sampling* yaitu kelas XI TKJ 1 dan TKJ 2. Data dikumpulkan melalui tes uraian, kuesioner, wawancara, dan observasi, kemudian dianalisis dengan uji normalitas, homogenitas varians, dan perbedaan rerata. Hasil penelitian menunjukkan bahwa: 1) pendekatan *open-ended* lebih efektif daripada pendekatan langsung dalam meningkatkan pemahaman matematis siswa.; 2) siswa dengan KAM sedang dan rendah menunjukkan peningkatan pemahaman matematis lebih signifikan dibanding KAM tinggi melalui pendekatan *open-ended*; 3) pendekatan *open-ended* meningkatkan komunikasi matematis siswa lebih signifikan daripada pendekatan langsung; 4) siswa KAM sedang dan rendah mengalami peningkatan komunikasi matematis lebih baik dengan *open-ended* dibanding KAM tinggi; 5) pendekatan *open-ended* meningkatkan kemandirian belajar siswa lebih signifikan daripada pendekatan langsung; 6) siswa KAM sedang-rendah menunjukkan peningkatan kemandirian belajar lebih tinggi dengan open-ended dibanding KAM tinggi; dan 7) tidak ada interaksi signifikan antara pembelajaran dan KAM terhadap pemahaman atau komunikasi matematis, namun ada interaksi pada kemandirian belajar. Temuan ini memperlihatkan efektivitas pendekatan *open-ended* dalam pembelajaran matematika pada materi barisan dan deret di SMK, terutama dalam mengembangkan kemampuan eksplorasi solusi.

Kata kunci: Kemampuan Pemahaman Matematis, Kemampuan Komunikasi Matematis, Kemandirian Belajar, Pendekatan *Open-Ended,* Sekolah Menengah Kejuruan

ABSTRACT

Rusdian Rifa'i (2025). Implementation of Open-Ended Approach in Mathematics Learning to Improve Mathematical Understanding and Communication Skills and Self-Regulated Learning of Vocational High School Students

Students need adequate understanding, mathematical communication, and self-regulated learning skills in learning mathematics. However, these three aspects are still not optimal in vocational students. To overcome this, an alternative approach is needed, one of which is the open-ended approach. This study aims to examine the implementation of the open-ended approach to the material of rows and sequences to improve mathematical understanding, mathematical communication, and self-regulated learning of vocational students. Unlike the teacher-centered direct approach and structured exercises, the open-ended approach encourages students to explore various solutions independently. The study employed a quasi-experimental method with a pretest-posttest control group design. The population comprised 11th-grade students from an SMK in Pandeglang District, Banten Province. A sample of 72 students was selected through purposive sampling, consisting of two classes (11th-grade TKJ 1 and TKJ 2). Data were collected using essay tests, questionnaires, interviews, and classroom observations. Subsequently, the data were analyzed through normality tests, homogeneity of variance tests, and mean difference tests. The results of the study indicate that: 1) the open-ended approach is more effective than the direct approach in improving students' mathematical understanding; 2) students with moderate and low KAM show a more significant increase in mathematical understanding than those with high KAM through the open-ended approach; 3) the open-ended approach improves students' mathematical communication more significantly than the direct approach; 4) students with moderate and low KAM experience better improvement in mathematical communication with the open-ended approach than those with high KAM; 5) the open-ended approach significantly improved students' self-regulated learning more than the direct approach; 6) students with moderate to low KAM showed higher improvement in self-regulated learning with the open-ended approach than those with high KAM; and 7) there was no significant interaction between learning and KAM on mathematical understanding or communication, but there was interaction on self-regulated learning. These findings demonstrate the effectiveness of the open-ended approach in mathematics learning on sequences and series in vocational high schools, particularly in developing solution exploration skills.

Keywords: Mathematical Understanding Ability, Mathematical Communication Ability, Self-Regulated Learning, Open-Ended Approach, Vocational High School

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DAFTAR LAMPIRAN

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