DESAIN DIDAKTIS PERMUTASI DAN KOMBINASI MENGGUNAKAN BAHAN AJAR DIGITAL UNTUK MENGOPTIMALKAN KEMAMPUAN PEMECAHAN MASALAH SISWA SMK

DISERTASI

Diajukan untuk memenuhi sebagian syarat untuk memperoleh gelar
Doktor Pendidikan Matematika

Oleh:

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PERNYATAAN TENTANG KEASLIAN DISERTASI DAN PERNYATAAN BEBAS PLAGIARISME

Dengan ini saya menyatakan bahwa disertasi dengan judul "Desain Didaktis Permutasi Dan Kombinasi dalam Bentuk Bahan Ajar Digital Untuk Mengoptimalkan Kemampuan Pemecahan Masalah Siswa SMK" ini beserta seluruh isinya adalah benar-benar karya saya sendiri. Saya tidak melakukan penjiplakan atau pengutipan dengan cara yang tidak sesuai dengan etika ilmu yang berlaku dalam masyarakat keilmuan. Atas pernyataan ini, saya siap menanggug resiko/sanksi apabila di kemudian hari ditemukan adanya pelanggaran etika keilmuan atau ada klaim dari pihak lain terhadap keaslian karya saya ini.

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ABSTRAK

Tri Nopriana (1906390). Desain Didaktis Permutasi Dan Kombinasi menggunakan Bahan Ajar Digital untuk Mengoptimalkan Kemampuan Pemecahan Masalah Siswa SMK

Dalam pembelajaran matematika di SMK, banyak siswa masih mengalami hambatan dalam menggunakan konsep permutasi dan kombinasi sebagai strategi pemecahan masalah. Hal ini terjadi karena siswa cenderung menghafal rumus tanpa memahami bagaimana konsep permutasi dan kombinasi dibangun. Diperlukan sebuah desain berupa situasi didaktis yang disusun berdasarkan hambatan belajar dan lintasan belajar agar siswa dapat mengoptimalkan kemampuan pemecahan masalah pada materi permutasi dan kombinasi. Penelitian ini bertujuan mengoptimalkan kemampuan pemecahan masalah siswa SMK melalui penyusunan desain didaktis menggunakan bahan ajar digital (BAD) dengan memperhatikan hambatan belajar dan lintasan belajar. Penelitian ini menggunakan pendekatan *didactical design research* (DDR) dengan tahapan analisis prospektif, metapedadidaktik, dan retrospektif. Partisipan dalam penelitian ini adalah 36 siswa kelas XII di sebuah SMK Negeri di Kota Cirebon. Hasil penelitian ini meliputi identifikasi hambatan belajar yang dialami siswa serta rancangan lintasan belajar hipotesis (LBH) sebagai dasar penyusunan desain didaktis. Selanjutnya, hasil penelitian berupa desain didaktis untuk mengoptimalkan kemampuan pemecahan masalah siswa yang disajikan menggunakan BAD. Hasil implementasi desain didaktis dalam BAD menunjukkan bahwa siswa mampu melewati setiap situasi didaktis yang disajikan, membangun pengetahuan tentang rumus permutasi dan kombinasi, serta menyelesaikan tes kemampuan pemecahan masalah. Desain didaktis dalam BAD dinilai efektif mengoptimalkan kemampuan pemecahan masalah siswa, karena sebagian besar siswa mencapai nilai di atas kriteria ketuntasan minimal (KKM). Revisi desain didaktis meliputi penambahan pertanyaan pemantik, perubahan pemilihan masalah pada situasi aksi, dan penjelasan pada situasi formulasi. Penelitian ini berkontribusi dalam menciptakan desain didaktis untuk mengoptimalkan kemampuan pemecahan masalah siswa SMK. Desain BAD yang disusun dapat diakses melalui web dengan kuota internet dan perangkat minimal, sehingga dapat dipelajari oleh siswa SMK kapan saja dan di mana saja.

Kata Kunci: Bahan Ajar Digital, Desain Didaktis, Kombinasi, Permutasi, dan Siswa SMK.

ABSTRACT

Tri Nopriana (1906390). Didactic Design of Permutations and Combinations in Digital Teaching Materials to Optimize the Problem-Solving Abilities of Vocational School Students

In vocational high school mathematics learning, many students still face obstacles in using the concepts of permutations and combinations as problem-solving strategies. This occurs because students tend to memorize formulas without understanding how the concepts of permutations and combinations are constructed. A didactic design, based on learning obstacles and learning trajectories, is needed to optimize students' problem-solving abilities in permutations and combinations. This study aims to optimize vocational high school students' problem-solving abilities by developing a didactic design in the form of digital teaching materials (DTM), considering learning obstacles and learning trajectories. The study employs the Didactical Design Research (DDR) approach, which includes prospective analysis, metapedadidactic, and retrospective stages. The participants in this study are 36 twelfth-grade students from a state vocational high school in Cirebon City. The results of this study include the identification of students' learning obstacles and the design of a hypothetical learning trajectory (HLT) as a basis for developing the didactic design. Subsequently, the research results include a didactic design aimed at optimizing students' problem-solving abilities, presented in the form of DTM. The implementation of the didactic design in DTM shows that students can navigate each didactic situation presented, build knowledge about permutation and combination formulas, and complete problem-solving ability tests. The didactic design in DTM is considered effective in optimizing students' problem-solving abilities, as most students achieve scores above the minimum mastery criteria (MMC). Revisions to the didactic design include adding prompting questions, changing problem selection in action situations, and providing explanations in formulation situations. This study contributes to the creation of didactic designs aimed at optimizing vocational high school students' problem-solving abilities. The developed DTM can be accessed via the web with minimal internet quota and devices, allowing vocational high school students to study anytime and anywhere.

Keywords: Digital Teaching Materials, Didactic Design, Combinations, Permutations, and Vocational High School Students.

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