

**PENGEMBANGAN MODUL PEMBELAJARAN *CAM* UNTUK MATA
PELAJARAN TEKNIK PEMESINAN *CNC* DAN *CAM*
SMK NEGERI 1 MAGELANG**

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ABSTRAK

Penelitian ini bertujuan untuk: (1) mengembangkan bahan ajar pembelajaran *CAM* untuk mata pelajaran *CNC* dan *CAM* SMK Negeri 1 Magelang, (2) mengetahui kelayakan modul pembelajaran *CAM* berdasarkan penilaian ahli materi, dan praktisi pembelajaran *CNC* dan, (3) mengetahui penilaian siswa terhadap bahan ajar berupa modul pembelajaran *CAM*.

Penelitian ini merupakan jenis penelitian pengembangan (*research and development*) dengan model 4D (*Define, Design, Development* dan *Dissemination*). Penelitian ini dilaksanakan pada 2 Desember 2020 sampai dengan 7 Januari 2020 di SMK Negeri 1 Magelang. Subjek penelitian ini adalah siswa kelas XII Pemesinan SMK Negeri 1 Magelang dengan jumlah 38 orang siswa. Teknik pengumpulan data pada penelitian ini menggunakan (1) observasi, (2) wawancara dan (3) angket. Teknik analisis data yang dilakukan menggunakan analisis deskriptif dengan uji kelayakan dari ahli materi, praktisi pembelajaran *CNC* dan responden (siswa).

Hasil penelitian ini adalah: (1) modul pembelajaran *CAM* dikembangkan melalui empat tahap yaitu: a) *Define* (analisis kebutuhan) meliputi observasi kelas, wawancara, dan studi pustaka, b) *Design* (desain) meliputi rancangan konten dan tampilan modul, c) *Development* (pengembangan) meliputi proses validasi dan revisi dari ahli materi dan praktisi pembelajaran *CNC*, dan d) *Dissemination* (penyebarluasan) melalui tiga tahap yakni uji coba satu-satu, uji coba kelompok kecil, dan uji coba lapangan, (2) hasil penilaian kelayakan oleh ahli materi mendapatkan persentase sebesar 84,17% yang termasuk kategori "Sangat Layak". Penilaian kelayakan oleh praktisi pembelajaran *CNC* mendapatkan persentase sebesar 85,83% yang termasuk kategori "Sangat Layak", (3) penilaian siswa kelas XII pemesinan diperoleh persentase sebesar 85,28% yang termasuk kategori "Sangat Layak".

Kata Kunci: Modul Pembelajaran, *CNC* dan *CAM*, Teknik Pemesinan, 4D

DEVELOPMENT OF CAM LEARNING MODULE FOR CNC AND CAM AT MAGELANG VOCATIONAL HIGH SCHOOL

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ABSTRACT

This study aims to: (1) develop CAM teaching learning materials for CNC and CAM subjects of SMK Negeri 1 Magelang, (2) find out the feasibility of the CAM learning module based on the assessment of material experts, and CNC learning practitioners and, (3) find out student assessments of teaching materials in the form of CAM learning modules.

This research is a type of research and development with 4D model (Define, Design, Development and Dissemination). This research was conducted on 2 December 2020 until 7 January 2020 at SMK Negeri 1 Magelang. The subjects of this study were students of class 12th Engineering Vocational High School Magelang with a total of 38 students. Data collection techniques in this study using (1) observation. (2) interview and (3) questionnaire. Data analysis techniques were performed using descriptive analysis with the feasibility test from material experts, CNC learning practitioners and respondents (students).

The results of this study are: (1) CAM learning modules are developed through four stages, namely: a) Define (needs analysis) including classroom observations, interviews, and literature studies, b) Design (design) includes content design and display modules, c) Development (development) includes the validation and revision process of material experts and CNC learning practitioners, and d) Dissemination through three stages, namely one-on-one trials, small group trials, and field trials, (2) the results of the feasibility assessment by material experts get a percentage of 84.17% which is included in the category "Very Eligible". Eligibility assessment by CNC learning practitioners get a percentage of 85.83% which belongs to the category of "Very Eligible", (3) assessment of students in class XII machineries obtained a percentage of 85.28% which belongs to the category of "Very Eligible".

Keywords: *Learning module, CNC and CAM, Mechanical Engineering, 4D*