ABSTRAK

Penelitian ini bertujuan (1) mendeskripsikan langkah-langkah pengembangan modul ajar berbasis *Experiential Learning* berbantuan Gimkit pada materi fungsi kuadrat untuk peserta didik SMK, (2) mengetahui kelayakan modul ajar ditinjau dari aspek kevalidan dan kepraktisan, serta (3) mengetahui efektivitas modul ajar dalam meningkatkan kemampuan pemodelan matematis peserta didik. Jenis penelitian yang digunakan adalah Penelitian dan Pengembangan (*Research and Development*) dengan model ADDIE (*Analysis, Design, Development, Implementation, Evaluation*). Subjek penelitian adalah peserta didik kelas X di SMK Negeri 5 Yogyakarta. Pengumpulan data dilakukan melalui wawancara guru mata pelajaran dan wakil kepala sekolah bidang kurikulum, angket kebutuhan peserta didik, lembar validasi ahli, angket respons guru dan peserta didik, lembar observasi keterlaksanaan pembelajaran, serta *pre-test* dan *post-test* kemampuan pemodelan matematis. Data dianalisis secara deskriptif kuantitatif menggunakan persentase kelayakan dan perhitungan *N-Gain*, serta deskriptif kualitatif untuk data wawancara. Hasil penelitian menunjukkan tiga hal, yaitu (1) Modul dikembangkan melalui lima tahap ADDIE: tahap analisis mengidentifikasi rendahnya kemampuan pemodelan matematis dan kebutuhan pembelajaran berbasis pengalaman; tahap perancangan menyusun kerangka modul berdasarkan siklus Kolb (CE–RO–AC–AE) beserta integrasi kuis interaktif Gimkit; tahap pengembangan menghasilkan prototipe modul yang divalidasi dan direvisi; tahap implementasi menerapkan modul di kelas; dan tahap evaluasi menganalisis hasil sebagai dasar revisi akhir. (2) Modul dinyatakan sangat valid berdasarkan rata-rata penilaian dua validator sebesar 87,50%, serta sangat praktis berdasarkan angket respons peserta didik sebesar 88,65%, respons guru sebesar 88%, dan observasi keterlaksanaan pembelajaran sebesar 94,79%. (3) Modul terbukti efektif meningkatkan kemampuan pemodelan matematis, ditunjukkan oleh peningkatan rata-rata nilai *pre-test* dari 43,22 menjadi 99,33 pada *post-test*, dengan rata-rata *N-Gain* sebesar 0,99 berkategori tinggi, dan seluruh peserta didik (100%) berada pada kategori *N-Gain* tinggi.

Kata kunci: modul ajar, *Experiential Learning*, Gimkit, pemodelan matematis, fungsi kuadrat, ADDIE

ABSTRACT

This study aimed to (1) describe the development procedures of an Experiential Learning-based teaching module assisted by Gimkit on quadratic functions for vocational high school students, (2) determine the feasibility of the teaching module in terms of validity and practicality, and (3) determine the effectiveness of the teaching module in improving students' mathematical modeling skills. This research employed the Research and Development (R&D) method using the ADDIE model, which consists of Analysis, Design, Development, Implementation, and Evaluation stages. The research subjects were tenth-grade students at SMK Negeri 5 Yogyakarta. Data were collected through interviews with mathematics teachers and the vice principal for curriculum affairs, student needs questionnaires, expert validation sheets, teacher and student response questionnaires, learning implementation observation sheets, and pre-tests and post-tests of mathematical modeling skills. The data were analyzed using quantitative descriptive techniques through feasibility percentages and N-Gain calculations, as well as qualitative descriptive analysis for interview data. The results of the study revealed three main findings. (1) The teaching module was developed through the five stages of the ADDIE model. The analysis stage identified students' low mathematical modeling skills and the need for experience-based learning. The design stage involved developing the module framework based on Kolb's Experiential Learning cycle (CE–RO–AC–AE) and integrating interactive Gimkit quizzes. The development stage produced a prototype module that was validated and revised. The implementation stage involved applying the module in classroom learning, while the evaluation stage analyzed the results as the basis for final revisions. (2) The module was categorized as highly valid, obtaining an average validation score of 87.50% from two validators, and highly practical, as indicated by student response questionnaires (88.65%), teacher response questionnaires (88%), and learning implementation observations (94.79%). (3) The module was proven effective in improving students' mathematical modeling skills, as indicated by the increase in the average pre-test score from 43.22 to 99.33 on the post-test. The average N-Gain score was 0.99, which falls into the high category, and all students (100%) achieved a high N-Gain category.

Keywords: *Experiential Learning, Gimkit, teaching module, mathematical modeling skills, quadratic functions*