

## ABSTRAK

Pemahaman konsep dan keaktifan peserta didik dalam pembelajaran matematika perlu dikembangkan melalui media dan metode pembelajaran yang inovatif. LKPD matematika berbasis *STEAM* merupakan salah satu alternatif untuk menyampaikan konsep dan melatih keaktifan peserta didik. Tujuan dari penelitian ini adalah: (1) Mendeskripsikan proses pengembangan LKPD matematika berbasis *STEAM* pada materi bangun datar segiempat yang valid dan praktis bagi peserta didik kelas VII. (2) Mengetahui tingkat keefektifan LKPD matematika berbasis *STEAM* pada materi bangun datar segiempat dalam meningkatkan pemahaman konsep dan keaktifan peserta didik.

Penelitian ini merupakan penelitian *Research and Development* (R&D) dengan model *ADDIE* (*Analyze, Design, Development, Implementation, dan Evaluation*). Subjek penelitian ini adalah peserta didik kelas VII SMP Pamardi Yuwana Bhakti. Data dikumpulkan menggunakan tes, wawancara, kuesioner, dan observasi. Data tersebut kemudian dianalisis dengan teknik deskriptif kuantitatif untuk menghitung tingkat kevalidan, kepraktisan, dan keefektifan. Keefektifan dari segi pemahaman konsep ditinjau dari nilai N-Gain dan ketuntasan belajar, sedangkan keaktifan dianalisis melalui kuesioner.

Hasil penelitian ini yaitu (1) Pengembangan LKPD dilakukan melalui lima tahap *ADDIE*. Pada tahap *analyze*, dilakukan analisis kebutuhan melalui wawancara, observasi, kuesioner, dan analisis kurikulum. Tahap *design* mencakup penyusunan kerangka, desain LKPD, serta perancangan instrumen penilaian. Pada tahap *development*, LKPD dikembangkan sesuai desain yang mencakup ilustrasi, aktivitas, proyek, dan soal tes. Kemudian divalidasi oleh ahli materi dengan hasil 99% (sangat valid) dan ahli desain dengan hasil 84,9% (sangat valid). Pada tahap *implementation*, LKPD diujicobakan di tiga kelas VII dan memperoleh kepraktisan dari guru sebesar 98% (sangat praktis) dan 76,16% (cukup praktis) dari peserta didik. Pada tahap *evaluation*, peneliti melakukan revisi berdasarkan masukan dari dosen, guru, dan peserta didik terkait desain, materi, aktivitas, dan tes. (2) LKPD dinyatakan cukup efektif dalam meningkatkan pemahaman konsep dengan hasil N-Gain yang bervariasi di setiap kelas, serta keaktifan peserta didik dalam pembelajaran dengan persentase keaktifan 75,30% (baik). Temuan ini menunjukkan bahwa LKPD berbasis *STEAM* berpotensi untuk digunakan dalam pembelajaran matematika di kelas VII, khususnya materi bangun datar segi empat, meskipun diperlukan perbaikan lebih lanjut pada aspek isi dan penyajiannya.

**Kata kunci:** *ADDIE, LKPD, kevalidan, keefektifan, bangun datar segi empat*

## ABSTRACT

*Conceptual understanding and student engagement in mathematics learning need to be developed through innovative media and learning methods. STEAM-based mathematics student worksheets are one alternative for delivering concepts and encouraging student engagement. The objectives of this study are: (1) To describe the development process of a STEAM-based mathematics worksheet on the topic of quadrilateral that is valid and practical for seventh-grade students, and (2) To determine the effectiveness level of the STEAM-based mathematics worksheet on the topic of quadrilateral in improving students' conceptual understanding and engagement.*

*This research is a R&D study using the ADDIE model. The research subjects were seventh-grade students at SMP Pamardi Yuwana Bhakti. Data were collected through tests, interviews, questionnaires, and observations. The data were analyzed using quantitative descriptive techniques to measure the levels of validity, practicality, and effectiveness. Effectiveness in terms of conceptual understanding was assessed through N-Gain scores and learning mastery, while engagement was analyzed using questionnaires.*

*The results of this study are as follows: (1) The development of the worksheet was carried out through the 5 stages of the ADDIE model. In the analyze stage, a needs analysis was conducted through interviews, observations, questionnaires, and curriculum analysis. The design stage included the preparation of the framework, design, and the development of assessment instruments. In the development stage, the worksheet was developed according to the design, which included illustrations, activities, projects, and test items. It was then validated by a content expert with a result of 99% (very valid) and a design expert with a result of 84.9% (very valid). In the implementation stage, the worksheet was tested in three VII-grade classes and obtained a practicality score of 98% (very practical) from the teacher and 76.16% (fairly practical) from the students. In the evaluation stage, the researcher made revisions based on feedback from lecturers, teachers, and students regarding the design, content, activities, and tests. (2) The worksheet was found to be fairly effective in improving conceptual understanding, with N-Gain scores varying across classes, and in promoting student engagement, with an engagement percentage of 75.30% (good). These findings indicate that the STEAM-based worksheet has the potential to be used in VII-grade mathematics learning, particularly on the topic of quadrilaterals, although further improvements are needed in terms of content and presentation.*

**Keywords:** ADDIE, student worksheet, validity, effectiveness, quadrilaterals.