

ABSTRAK

PENGEMBANGAN *e-LKPD* BERBASIS PROYEK PEMANFAATAN LIMBAH TANDAN KOSONG KELAPA SAWIT UNTUK MELATIH KETERAMPILAN BERPIKIR KRITIS DAN *ENTREPRENEURIAL SKILL S*

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Penelitian ini bertujuan untuk mengembangkan *e-LKPD* berbasis proyek pemanfaatan limbah tandan kosong kelapa sawit yang terintegrasi *STEM Project Based Learning* (STEM-PjBL) pendekatan *Socio Scientific Issues* (SSI) dan pada materi energi terbarukan guna meningkatkan keterampilan berpikir kritis dan *entrepreneurial skill* peserta didik SMK. Penelitian ini dilatarbelakangi oleh rendahnya keterampilan berpikir kritis dan *entrepreneurial skill* peserta didik serta keterbatasan bahan ajar berbasis proyek terintegrasi STEM-PjBL yang kontekstual. Penelitian menggunakan metode *Research and Development* (R&D) dengan model ADDIE. Hasil penelitian menunjukkan bahwa *e-LKPD* memiliki tingkat kevalidan sangat tinggi, dengan persentase validasi ahli sebesar 93,75% (isi) dan 95,83% (konstruk). Kepraktisan produk berada pada kategori sangat praktis, dengan persentase 88,78% pada uji skala terbatas, 91,42% pada uji skala luas, serta respon guru sebesar 96,15%. Keefektifan produk ditunjukkan oleh nilai *N-Gain* kategori sedang–tinggi serta perbedaan signifikan antara kelas eksperimen dan kontrol ($\text{sig.} < 0,05$) dengan effect size berkategori besar. *Novelty* penelitian ini terletak pada integrasi STEM-PjBL dengan pendekatan SSI dalam *e-LKPD* berbasis potensi lokal limbah sawit untuk penguatan keterampilan berpikir kritis dan *entrepreneurial skill* peserta didik.

Kata kunci: *e-LKPD*, STEM-PjBL, *Socio Scientific Issues*, berpikir kritis, *entrepreneurial skill*.

ABSTRACT

DEVELOPMENT OF *e*-LKPD BASED ON THE PROJECT OF UTILIZATION OF EMPTY PALM OIL FRUIT WASTE TO TRAIN CRITICAL THINKING AND *ENTREPRENEURIAL SKILL S*

By

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This study aims to develop an *e*-LKPD based on an integrated STEM Project Based Learning (STEM-PjBL) project utilizing empty oil palm bunches using the Socio-Scientific Issues (SSI) approach and renewable energy materials to improve critical thinking skills and *entrepreneurial skill s* of high school students. This study is motivated by the low critical thinking skills and *entrepreneurial skill s* of students and the limitations of contextual STEM-PjBL integrated project-based teaching materials. The study uses the Research and Development (R&D) method with the ADDIE model. The results show that the *e*-LKPD has a very high level of validity, with expert validation percentages of 93.75% (content) and 95.83% (construct). The practicality of the product is in the very practical category, with a percentage of 88.78% in limited-scale tests, 91.42% in large-scale tests, and teacher responses of 96.15%. The effectiveness of the product is indicated by the medium-high *N-Gain* value and a significant difference between the experimental and control classes (sig. < 0.05) with a large effect size. The novelty of this research lies in the integration of STEM-PjBL with the SSI approach in *e*-LKPD based on the local potential of palm oil waste to strengthen students' critical thinking and *entrepreneurial skill s*.

Keywords: *e*-LKPD, STEM-PjBL, Socio-Scientific Issues, critical thinking, *entrepreneurial skill s*.