ABSTRAK

Penelitian ini bertujuan untuk mengembangkan dan menguji kelayakan desain pembelajaran *Flipped classroom* berbasis proyek dalam meningkatkan kemampuan berpikir tingkat tinggi (*Higher Order Thinking Skills*/HOTS) dan kreativitas peserta didik pada materi energi terbarukan. Penelitian ini menggunakan metode *Research and Development* (R&D) dengan model pengembangan ADDIE, yang dilaksanakan pada peserta didik kelas X SMA Pondok Schooling Darul Ilmi Bandung pada semester genap tahun pelajaran 2024/2025. Desain pembelajaran divalidasi oleh ahli materi, pedagogi, dan guru mata pelajaran fisika sebagai praktisi lapangan, serta diuji melalui implementasi terbatas. Instrumen penelitian meliputi lembar validasi ahli, tes HOTS berdasarkan taksonomi Bloom revisi (C4–C6), dan *Student Product Assessment Form* (SPAF). Hasil penelitian menunjukkan bahwa desain pembelajaran berada dalam kategori sangat layak dengan nilai modul ajar 0.96, lembar kerja peserta didik 0,84 dan instrumen kemampuan berpikir tingkat tinggi 1,00. Secara kuantitatif, skor HOTS peserta didik meningkat dari rata-rata 39,08 menjadi 78,83, dengan *N-Gain* sebesar 0,66 yang termasuk kategori sedang. Sementara itu, kreativitas peserta didik dinilai berada pada kategori "kreatif" dengan persentase 71,85% berdasarkan kualitas produk proyek yang dihasilkan, yang mencerminkan orisinalitas, struktur logis, dan relevansi kontekstual. Penelitian ini berhasil menunjukkan bahwa pengembangan desain pembelajaran *Flipped classroom* berbasis proyek dapat meningkatkan kemampuan berpikir tingkat tinggi dan kreativitas peserta didik.

Kata Kunc*i*: Energi Terbarukan, *Flipped Classroom*, HOTS, Kreativitas. Pembelajaran Berbasis Proyek

ABSTRACT

This study aims to develop and evaluate the feasibility of a project-based Flipped classroom instructional design to enhance students' higher-order thinking skills (HOTS) and creativity in learning renewable energy topics. The main problem addressed is the low level of HOTS and creativity among students in science learning, especially in understanding the concept of renewable energy, which requires critical thinking and innovation. The study employed a Research and Development (R&D) approach using the ADDIE model and was conducted with tenth-grade students at SMA Pondok Schooling Darul Ilmi Kab. Bandung during the second semester of the 2024/2025 academic year. The instructional design was validated by three experts: a physics education lecturer, a science content expert, and a physics subject teacher as a field practitioner. The design was also tested through limited implementation. Research instruments included expert validation sheets, HOTS tests based on the revised Bloom's taxonomy (C4–C6), and a creativity rubric adapted from the Student Product Assessment Form (SPAF). The results indicated that the instructional design was categorized as highly feasible. Quantitatively, students' HOTS scores improved from an average of 39.08 to 78.83, with an N-Gain of 0.66, categorized as moderate. Meanwhile, students' creativity was assessed as "creative" based on the quality of the projects they produced, which demonstrated originality, structure, and contextual relevance. This instructional model integrates self-directed digital learning with collaborative, project-based activities, making it relevant to the characteristics of 21st-century learning. The findings suggest that the project-based Flipped classroom model has strong potential for broader implementation as an innovative approach in science education.

***Keywords**: Creativity, Flipped Classroom, HOTS, Project-Based Learning, Renewable Energy*