

ABSTRAK

Siswanto Dwi Antoro. 2026. *Pengembangan Smart Deep Learning Module Digital Berbasis Problem Based Learning (PBL) terhadap Keterampilan Berpikir Kritis Siswa Sekolah Dasar*. Tesis. Madiun: Program Studi Magister Pendidikan Dasar, Sekolah Pascasarjana, Universitas PGRI Madiun. Pembimbing (I) Dr. Ivayuni Listiani, M.Pd., (II). Dr. Muh. Waskito Ardhi, M.Pd.

Kata kunci: *Smart Deep Learning Module Digital, Problem Based Learning, Deep Learning Pedagogy, keterampilan berpikir kritis, IPA, sekolah dasar.*

Penelitian ini dilatarbelakangi oleh rendahnya keterampilan berpikir kritis siswa sekolah dasar pada pembelajaran Ilmu Pengetahuan Alam (IPA), khususnya materi Tata Surya. Pembelajaran masih didominasi pendekatan yang berpusat pada guru sehingga siswa kurang aktif dalam mengonstruksi pengetahuan, memecahkan masalah, dan mengembangkan kemampuan berpikir tingkat tinggi. Selain itu, penggunaan media pembelajaran digital belum mampu memfasilitasi pembelajaran yang interaktif, adaptif, dan berorientasi pada pengembangan keterampilan berpikir kritis. Oleh karena itu, penelitian ini bertujuan untuk mengembangkan *Smart Deep Learning Module Digital* berbasis *Problem Based Learning* (PBL) yang valid, praktis, dan efektif dalam meningkatkan keterampilan berpikir kritis siswa kelas VI SDN Manukan Kulon Surabaya.

Penelitian ini menggunakan metode Research and Development (R&D) dengan model ADDIE yang meliputi tahap *Analysis, Design, Development, Implementation, dan Evaluation*. Efektivitas produk diuji menggunakan desain Pretest–Posttest Control Group Design. Subjek penelitian terdiri atas 50 siswa kelas VI, yang terbagi menjadi 25 siswa kelas eksperimen dan 25 siswa kelas kontrol, serta melibatkan ahli materi, ahli media, ahli pembelajaran, dan guru kelas VI sebagai validator dan pengguna produk. Teknik pengumpulan data dilakukan melalui observasi, wawancara, dokumentasi, angket validasi, angket respons guru dan siswa, serta tes *pretest* dan *posttest*. Analisis data menggunakan statistik deskriptif dan inferensial melalui uji normalitas, uji homogenitas, uji Independent Sample t-test, dan analisis N-Gain.

Hasil penelitian menunjukkan bahwa *Smart Deep Learning Module Digital* berbasis PBL memiliki tingkat kelayakan sangat layak, dengan hasil validasi ahli media sebesar 94%, ahli materi sebesar 86%, dan ahli pembelajaran sebesar 97,8%. Kepraktisan produk juga menunjukkan kategori sangat baik, ditandai dengan hasil uji coba perorangan yang memperoleh respons guru sebesar 84% dan respons tiga siswa berkisar 80–87%, uji kelompok kecil dengan respons guru sebesar 93,3% dan respons tujuh siswa berkisar 89–94%, serta uji lapangan dengan respons guru sebesar 97,3% dan respons dua puluh lima siswa berkisar 94–98%. Hasil implementasi menunjukkan rata-rata nilai *posttest* kelas eksperimen sebesar 80,08, lebih tinggi dibandingkan kelas kontrol sebesar 64,84. Nilai N-Gain kelas eksperimen sebesar 0,38 (kategori sedang), sedangkan kelas kontrol sebesar 0,19

(kategori rendah). Hasil uji Independent Sample t-test menunjukkan nilai signifikansi 0,000 ($p < 0,05$), yang membuktikan bahwa penggunaan *Smart Deep Learning Module Digital* berbasis PBL berpengaruh signifikan terhadap peningkatan keterampilan berpikir kritis siswa.

Simpulan penelitian menunjukkan bahwa Smart Deep Learning Module Digital berbasis *Problem Based Learning* merupakan bahan ajar digital yang valid, praktis, dan efektif untuk meningkatkan keterampilan berpikir kritis siswa sekolah dasar pada materi Tata Surya. Kebaruan penelitian ini terletak pada integrasi pendekatan *Problem Based Learning*, *Deep Learning Pedagogy*, multimedia interaktif, latihan berbasis HOTS, refleksi pembelajaran, serta sistem *smart feedback* dalam satu modul digital yang mendukung pembelajaran konstruktivistik, adaptif, dan berpusat pada siswa. Produk ini berkontribusi sebagai inovasi pembelajaran digital yang mendukung implementasi Kurikulum Merdeka dan penguatan kompetensi abad ke-21.

ABSTRACT

Siswanto Dwi Antoro. 2026. *Development of a Smart Deep Learning Digital Module Based on Problem-Based Learning (PBL) to Enhance Elementary School Students' Critical Thinking Skills.* Master's Thesis. Madiun: Master's Program in Elementary Education, Graduate School, Universitas PGRI Madiun. Supervisor I: Dr. Ivayuni Listiani, M.Pd.; Supervisor II: Dr. Muh. Waskito Ardhi, M.Pd.

Keywords: Smart Deep Learning Digital Module, Problem-Based Learning, Deep Learning Pedagogy, Critical Thinking Skills, Science Education, Elementary School.

This study was motivated by the low level of elementary school students' critical thinking skills in Science learning, particularly on the Solar System topic. The learning process was still predominantly teacher-centered, resulting in limited opportunities for students to actively construct knowledge, solve problems, and develop higher-order thinking skills. In addition, the existing digital learning media had not optimally facilitated interactive, adaptive, and problem-oriented learning. Therefore, this study aimed to develop a Smart Deep Learning Digital Module based on Problem-Based Learning (PBL) that is valid, practical, and effective in improving the critical thinking skills of sixth-grade students at SDN Manukan Kulon Surabaya.

This study employed a Research and Development (R&D) method using the ADDIE model, consisting of the stages of Analysis, Design, Development, Implementation, and Evaluation. The effectiveness of the developed product was examined using a Pretest–Posttest Control Group Design. The participants consisted of 50 sixth-grade students, including 25 students in the experimental group and 25 students in the control group, as well as subject matter experts, media experts, instructional experts, and classroom teachers. Data were collected through observations, interviews, documentation, expert validation questionnaires, teacher and student response questionnaires, and pretest–posttest assessments. Data analysis employed descriptive and inferential statistics, including normality tests, homogeneity tests, the Independent Samples t-test, and N-Gain analysis.

The findings revealed that the Smart Deep Learning Digital Module based on PBL achieved a high level of feasibility, with validation scores of 94% from media experts, 86% from subject matter experts, and 97.8% from instructional experts, all categorized as highly feasible. The product also demonstrated excellent practicality, as reflected in teacher and student responses during individual, small-group, and field trials. Teacher responses increased from 84% in the individual trial to 93.3% in the small-group trial and 97.3% in the field trial, while student responses ranged from 80–87%, 89–94%, and 94–98%, respectively. The implementation results indicated that the experimental group achieved a mean posttest score of 80.08, which was higher than the control group's mean score of 64.84. Furthermore, the N-Gain score of the experimental group was 0.38 (moderate category), whereas the

control group obtained 0.19 (low category). The Independent Samples t-test yielded a significance value of 0.000 ($p < 0.05$), indicating that the Smart Deep Learning Digital Module based on PBL had a statistically significant effect on students' critical thinking skills.

In conclusion, the Smart Deep Learning Digital Module based on Problem-Based Learning is a valid, practical, and effective digital learning resource for improving elementary school students' critical thinking skills in Science learning, particularly on the Solar System topic. The novelty of this study lies in integrating Problem-Based Learning, Deep Learning Pedagogy, interactive multimedia, Higher-Order Thinking Skills (HOTS)-based exercises, reflective learning activities, and a smart feedback system into a single digital learning module. This innovation supports constructivist, student-centered, and technology-enhanced learning while contributing to the implementation of the Merdeka Curriculum and the development of 21st-century competencies.