

ABSTRAK

Iis Sumiati. 2025. **Model Pembelajaran *Flipped Laboratory* Berbasis Masalah dan Tingkat Pemahaman Literasi Halal Terhadap Peningkatan Kemampuan Berpikir Tingkat Tinggi Pada Konsep Bioteknologi**

Penelitian ini bertujuan untuk menganalisis penerapan model pembelajaran *Flipped Laboratory* berbasis masalah dan tingkat pemahaman literasi halal terhadap peningkatan kemampuan berpikir tingkat tinggi (*Higher Order Thinking Skills/HOTS*) peserta didik pada konsep bioteknologi. Latar belakang penelitian ini adalah perlunya model pembelajaran inovatif yang mendukung keterampilan abad ke-21 serta menanamkan nilai literasi halal dalam pembelajaran sains. Penelitian dilakukan di SMA Kartika XIX-3 Bandung dengan sampel sebanyak 96 peserta didik kelas X, menggunakan metode eksperimen dengan desain faktorial 3x3 (*multi treatment factorial design*). Dalam penelitian, model *Flipped Laboratory* berbasis masalah akan dibandingkan dengan model *Problem Based Learning* (PBL) secara *full offline* maupun *full online*, serta mempertimbangkan tingkat pemahaman literasi halal (tinggi, sedang, dan rendah). Instrumen yang digunakan adalah tes HOTS berbentuk pilihan ganda beralasan dan angket pemahaman literasi halal. Hasil penelitian menunjukkan adanya perbedaan signifikan skor HOTS berdasarkan model pembelajaran ($p = 0,023$), serta kontribusi positif tingkat pemahaman literasi halal terhadap capaian HOTS ($p = 0,000$). Ditemukan pula interaksi signifikan antara model pembelajaran dan tingkat pemahaman literasi halal ($p = 0,000$). Simpulan penelitian ini menegaskan bahwa model *Flipped Laboratory* berbasis masalah efektif digunakan dalam pembelajaran bioteknologi untuk meningkatkan kemampuan berpikir tingkat tinggi sekaligus membentuk kesadaran nilai *halalan thayyiban* pada peserta didik.

Kata Kunci: *flipped laboratory* berbasis masalah, tingkat pemahaman literasi halal, kemampuan berpikir tingkat tinggi.

ABSTRACT

Iis Sumiati. 2025. **Problem Based Flipped Laboratory Learning Model and Level Understanding of Halal Literacy in Improving Higher Order Thinking Skills on Biotechnology Concepts.**

This study aims to analyze the application of the problem based Flipped Laboratory learning model and the level understanding of halal literacy in improving students' Higher Order Thinking Skills (HOTS) on biotechnology concepts. The background of this study is the need for an innovative learning model that supports 21st-century skills and instills halal literacy values in science learning. The study was conducted at SMA Kartika XIX-3 Bandung with a sample of 96 grade X students, using an experimental method with a 3x3 factorial design (multi treatment factorial design). In the study, the problem based Flipped Laboratory model will be compared with the Problem Based Learning (PBL) full offline and PBL full online modes, and considering the level understanding of halal literacy (high, medium, and low). The instruments used were a HOTS test in the form of reasoned multiple choice questions and a questionnaire on understanding halal literacy. The results showed a significant difference in HOTS scores based on the learning model ($p = 0,023$), as well as a positive contribution of the level understanding of halal literacy to HOTS achievement ($p = 0,000$). A significant interaction was also found between the learning model and the level understanding of halal literacy ($p = 0,000$). The conclusion of this study confirms that the problem based Flipped Laboratory model is effective in biotechnology learning to improve higher order thinking skills while fostering awareness of halal values in students.

Keyword: problem based flipped laboratory, level understanding of halal literacy, higher order thinking skills