

ABSTRAK

Aditya, Hana Pramesti. 2026. Pengaruh Model *Problem-based Learning* berbantuan *Augmented Reality* terhadap Kompetensi Sains Siswa pada Materi Sistem Reproduksi Kelas XI di SMA Negeri 4 Tanjungpinang. Skripsi, Program Studi Pendidikan Biologi, Fakultas Keguruan dan Ilmu Pendidikan, Jurusan Pendidikan Matematika dan Ilmu Pengetahuan Alam, Universitas Maritim Raja Ali Haji Tanjungpinang. Pembimbing I: Dr. Nurul Asikin, S.Pd., M.Pd. dan Pembimbing II: Dios Sarkity, S.Pd., M.Pd.

Kata Kunci: *Problem-based Learning*, Kompetensi sains, *Augmented Reality*

Kompetensi sains merupakan salah satu kemampuan penting yang perlu dikembangkan dalam pembelajaran abad ke-21. Namun, pembelajaran yang belum memanfaatkan model dan media inovatif secara optimal menyebabkan kompetensi sains siswa masih perlu ditingkatkan, khususnya pada materi sistem reproduksi yang bersifat abstrak. Penelitian ini bertujuan untuk mengetahui pengaruh model *Problem-Based Learning* (PBL) berbantuan *Augmented Reality* (AR) terhadap kompetensi sains siswa kelas XI di SMA Negeri 4 Tanjungpinang. Penelitian ini menggunakan pendekatan kuantitatif dengan metode kuasi eksperimen dan desain *pre-test post-test control group*. Populasi penelitian berjumlah 343 siswa kelas XI SMA Negeri 4 Tanjungpinang, dengan sampel sebanyak 61 siswa yang terdiri atas 31 siswa kelas eksperimen dan 30 siswa kelas kontrol yang dipilih menggunakan teknik *cluster random sampling*. Instrumen penelitian berupa tes kompetensi sains berbentuk esai yang telah memenuhi uji validitas, reliabilitas, tingkat kesukaran, dan daya beda. Analisis data dilakukan menggunakan uji normalitas *Shapiro–Wilk* dan uji hipotesis *Mann–Whitney*. Hasil penelitian menunjukkan nilai signifikansi sebesar 0,019 ($p < 0,05$), sehingga terdapat perbedaan kompetensi sains yang signifikan antara kelas eksperimen dan kelas kontrol. Dengan demikian, model *Problem-Based Learning* (PBL) berbantuan *Augmented Reality* (AR) berpengaruh signifikan dan lebih efektif dibandingkan model *Discovery Learning* (DL) berbantuan AR dalam meningkatkan kompetensi sains siswa pada materi sistem reproduksi kelas XI di SMA Negeri 4 Tanjungpinang.

ABSTRACT

Aditya, Hana Pramesti. 2026. The Effect of the Problem-based Learning Model Assisted by Augmented Reality on Students' Scientific Competence in the Reproductive System Topic for Eleventh-Grade Students at SMA Negeri 4 Tanjungpinang. Thesis, Biology Education Program, Faculty of Teacher Training and Education, Department of Mathematics and Natural Sciences Education, University of Maritime Raja Ali Haji, Tanjungpinang. Advisor: Dr. Nurul Asikin, S.Pd., M.Pd. and Co-Advisor: Dios Sarkity, S.Pd., M.Pd.

Keywords: *Problem-based Learning, Scientific Competence, Augmented Reality*

Scientific competence is one of the essential skills that should be developed in 21st-century learning. However, the limited implementation of innovative learning models and instructional media has resulted in students' scientific competence requiring further improvement, particularly in the topic of the reproductive system, which involves abstract concepts. This study aimed to determine the effect of the Problem-Based Learning (PBL) model assisted by Augmented Reality (AR) on the scientific competence of eleventh-grade students at SMA Negeri 4 Tanjungpinang. This study employed a quantitative approach using a quasi-experimental method with a pre-test–post-test control group design. The population consisted of 343 eleventh-grade students at SMA Negeri 4 Tanjungpinang, while the sample comprised 61 students, including 31 students in the experimental class and 30 students in the control class, selected using the cluster random sampling technique. The research instrument was an essay-based scientific competence test that had been evaluated for validity, reliability, item difficulty, and discrimination index. Data were analyzed using the Shapiro–Wilk normality test and the Mann–Whitney hypothesis test. The results showed a significance value of 0.019 ($p < 0.05$), indicating a significant difference in scientific competence between the experimental and control groups. Therefore, the Problem-Based Learning (PBL) model assisted by Augmented Reality (AR) had a significant effect and was more effective than the Discovery Learning (DL) model assisted by Augmented Reality (AR) in improving students' scientific competence on the reproductive system topic among eleventh-grade students at SMA Negeri 4 Tanjungpinang.