

## ABSTRAK

**Nasio Ruth Lusianna Simbolon, NIM 4213131068 (2025). Pengembangan Modul *Flipbook* Berbasis *Project Based Learning* (PjBL) Pada Materi Ikatan Kimia Kelas XI SMA**

Penelitian ini bertujuan untuk mengembangkan dan menganalisis validitas, respon siswa, dan efektivitas modul *flipbook* berbasis *Project Based Learning* (PjBL) pada materi ikatan kimia di SMA Negeri 21 Medan. Metode penelitian yang digunakan adalah model 4D (*Define, Design, Develop, dan Disseminate*), dengan fokus pada validasi modul berdasarkan standar BNSP, respon siswa, dan peningkatan hasil belajar. Tahap analisis kebutuhan menunjukkan bahwa siswa kelas XI hanya menggunakan satu buku paket dan guru belum menggunakan modul *flipbook* sebagai bahan ajar tambahan. Dari hasil wawancara dengan guru kimia yang mengajar di kelas XI, diperoleh bahwa siswa kurang tertarik mempelajari materi kimia, hal ini terlihat dari hasil belajar siswa yang rata-rata sebesar 40. Modul *flipbook* yang dikembangkan divalidasi 3 orang validator yang masing-masing berperan sebagai validator ahli materi dan media. Hasil validasi dari ahli materi memperoleh skor 93,76%, sedangkan validasi dari ahli media mencapai 97,41%, keduanya termasuk dalam kategori “Sangat Layak”. Respon siswa terhadap modul *flipbook* menunjukkan 82,00%, yang juga termasuk dalam kategori “Sangat Puas”. Efektivitas modul diukur menggunakan uji N-Gain, dengan skor 0,65 (65%), yang termasuk dalam kategori “Sedang”, menunjukkan bahwa modul *flipbook* berbasis PjBL cukup efektif dalam meningkatkan pemahaman siswa. Hasil penelitian ini menunjukkan bahwa modul *flipbook* berbasis PjBL layak digunakan sebagai bahan ajar interaktif dalam pembelajaran kimia.

**Kata Kunci:** Model pengembangan R&D, modul *flipbook* berbasis PjBL, Ikatan kimia

## ABSTRACT

**Nasio Ruth Lusianna Simbolon, NIM 4213131068 (2025). Development of Flipbook Module Based on Project Based Learning (PjBL) on Chemical Bonding Material for Grade XI SMA**

This study aims to develop and analyze the validity, student responses, and effectiveness of flipbook modules based on Project Based Learning (PjBL) on chemical bonding material at SMA Negeri 21 Medan. The research method used is the 4D model (Define, Design, Develop, and Disseminate), with a focus on module validation based on BNSP standards, student responses, and improving learning outcomes. The needs analysis stage shows that grade XI students only use one book package and teachers have not used flipbook modules as additional open materials. From the results of interviews with chemistry teachers who teach in grade XI, it was found that students were less interested in studying chemistry material, this can be seen from the average student learning outcomes of 40. The developed flipbook module was validated by 3 validators, each of whom acted as a validator for material and media experts. The validation results from material experts obtained a score of 93.76%, while validation from media experts reached 97.41%, both included in the "Very Eligible" category. Student responses to the flipbook module showed 82.00%, which is also included in the "Very Satisfied" category. The effectiveness of the module was measured using the N-Gain test, with a score of 0.65 (65%), which is included in the "Moderate" category, indicating that the PjBL-based flipbook module is quite effective in improving student understanding. The results of this study indicate that the PjBL-based flipbook module is feasible to use as interactive teaching materials in chemistry learning.

**Keywords:** R&D development model, PjBL-based flipbook module, Chemical bonds