

ABSTRAK

Meli Sartika Silaban: **Pengembangan Bahan Ajar Pengayaan Kimia Berbasis *Project Based Learning* terintegrasi STEAM untuk Meningkatkan Kemampuan Berpikir Kritis Ditinjau Dari Motivasi Siswa Kelas XII**. Tesis. Medan: Program Studi Pendidikan Kimia, Pascasarjana Universitas Negeri Medan, 2026.

Penelitian ini bertujuan untuk menganalisis kebutuhan bahan ajar siswa kelas XII; memperoleh bahan ajar pengayaan berbasis *Project Based Learning* (PjBL) terintegrasi *Science, Technology, Environment, Art, Mathematics* (STEAM), mengetahui perbedaan kemampuan berpikir kritis antara siswa yang diajar menggunakan bahan ajar pengayaan berbasis PjBL terintegrasi STEAM dengan siswa yang diajar menggunakan bahan ajar X, mengetahui perbedaan kemampuan berpikir kritis berdasarkan motivasi belajar siswa, mengetahui interaksi bahan ajar pengayaan berbasis PjBL terintegrasi STEAM dengan tingkat motivasi ditinjau dari peningkatan kemampuan berpikir kritis siswa; dan mengetahui respon siswa terhadap penggunaan bahan ajar pengayaan berbasis PjBL terintegrasi STEAM. Metode penelitian menggunakan model ADDIE. Populasi dalam penelitian ini adalah seluruh SMA kelas XII IPA di subrayon 14 Medan Denai. Sampel dalam penelitian ini yaitu: sampel bahan ajar sebanyak 2 buku yaitu buku X edisi kurikulum merdeka (2024) penerbit Erlangga dan bahan ajar sifat koligatif larutan kurikulum merdeka (2021). Sampel siswa sebanyak 2 kelas XII IPA di SMA N 14 Medan yakni sampel pada penelitian ini adalah kelas XII IPA 3 sebanyak 30 siswa sebagai kelas eksperimen I dan XII IPA 3 sebanyak 30 siswa sebagai kelas eksperimen II. Hasil penelitian menunjukkan bahwa: ¹Hasil analisis kebutuhan pembelajaran menunjukkan persentasi angket siswa sebesar 91,53 % memerlukan bahan ajar. ²Bahan ajar pengayaan berbasis PjBL terintegrasi STEAM memperoleh hasil validasi dengan nilai rata-rata 3,74 pada kategori sangat layak. ³Rata-rata kemampuan berpikir kritis siswa yang diajar dengan menggunakan bahan ajar pengayaan PjBL terintegrasi STEAM sebesar 84,17 sedangkan rata-rata kemampuan berpikir kritis siswa yang dibelajarkan dengan menggunakan buku ajar Buku X adalah sebesar 78,26. ⁴Hasil rata-rata kemampuan berpikir kritis dengan motivasi tinggi kelas eksperimen I sebesar 90,86 dan pada kelas eksperimen II sebesar 81,81 sedangkan rata-rata kemampuan berpikir kritis dengan motivasi rendah pada kelas eksperimen I sebesar 70,31 dan pada kelas eksperimen II sebesar 74,71. ⁵Rata-rata N-Gain kemampuan berpikir kritis siswa yang dibelajarkan dengan menggunakan bahan ajar pengayaan PjBL terintegrasi STEAM sebesar 86,00 untuk siswa motivasi belajar tinggi dan 44,88 untuk siswa yang motivasi belajar rendah, sedangkan rata-rata N-Gain kemampuan berpikir kritis siswa yang dibelajarkan dengan menggunakan buku ajar Buku X adalah sebesar 49,25 untuk siswa yang motivasi belajarnya tinggi dan 47,64 untuk siswa yang motivasi belajarnya rendah. ⁶Respon siswa setelah menggunakan bahan ajar pengayaan berbasis PjBL terintegrasi STEAM diperoleh sebesar 79 termasuk kategori baik.

Kata kunci : *Pengembangan, PjBL, STEAM, Kemampuan Berpikir Kritis, Motivasi Belajar*.

ABSTRACT

Meli Sartika Silaban: **The Development of STEAM Integrated Project Based Learning Enrichment Chemistry Teaching Materials to Enhance Critical Thinking Skills In Terms of Grade XII Students' Motivation.** Thesis. Medan: Chemistry Education Study, Postgraduate School, State University of Medan, 2026.

This study aims to analyze the need for teaching materials among Grade XII students; to develop enrichment teaching materials based on Science, Technology, Environment, Art, Mathematics (STEAM) integrated Project Based Learning (PjBL); to examine differences in critical thinking skills between students taught using STEAM-integrated PjBL-based enrichment materials and those taught using conventional teaching materials; to investigate differences in critical thinking skills based on students' learning motivation; to analyze the interaction between STEAM-integrated PjBL based enrichment materials and students' motivation levels in improving critical thinking skills; and to determine students' responses to the use of STEAM-integrated PjBL based enrichment teaching materials. The research method employed the ADDIE model. The population of this study consisted of all Grade XII science students in Sub rayon 14 Medan Denai. The samples in this study included: teaching material samples comprising two textbooks, namely *X book* based on the *Kurikulum Merdeka* (2024) published by Erlangga; and student samples consisting of two Grade XII science classes at SMA Negeri 14 Medan. The samples in this study were class XII IPA 3 with 30 students as experimental class I and class XII IPA 4 with 30 students as experimental class II. The results of the study indicate that: ¹the analysis of learning needs showed that 91.53% of students required teaching materials based on the questionnaire results; ²the STEAM-integrated PjBL-based enrichment teaching materials obtained a validation score with an average of 3.74, categorized as highly feasible; ³the average critical thinking ability of students taught using STEAM-integrated PjBL-based enrichment materials was 84.17, while the average critical thinking ability of students taught using the *X* textbook was 78.26; and ⁴the average critical thinking ability of students with high motivation in Experimental Class I was 90.86 and in Experimental Class II was 81.81, whereas for students with low motivation, the averages were 70.31 in Experimental Class I and 74.71 in Experimental Class II. ⁵The average N-gain of students' critical thinking skills for those taught using STEAM-integrated PjBL-based enrichment teaching materials was 86.00 for students with high learning motivation and 44.88 for those with low learning motivation. In contrast, the average N-gain of students' critical thinking skills for those taught using the *X* textbook was 49.25 for students with high learning motivation and 47.64 for those with low learning motivation. ⁶Students' responses after using the STEAM-integrated PjBL-based enrichment teaching materials yielded a score of 79, which falls into the good category.

Keywords: Development, Project Based Learning (PjBL), STEAM, Critical Thinking Skills, Learning Motivation.