

ABSTRAK

Sawitri, Cantika. 2025. *Pengembangan E-Modul Berbasis Problem Based Learning Berbantuan Simulasi PhET Pada Materi Laju Reaksi Kimia*. Skripsi. Tanjungpinang: Program Studi Pendidikan Kimia, Fakultas Keguruan dan Ilmu Pendidikan, Universitas Maritim Raja Ali Haji. Pembimbing I: Assist. Prof. Ardi Widhia Sabekti, S.Pd., M.Pd. Pembimbing II: Assist. Prof. Yudi Umara, M.Pd.

Kata kunci : e-modul, Problem Based Learning (PBL), PhET Simulation, Reaction Rate, Hannafin and Peck Model

Pengembangan ini didasari oleh adanya kendala dalam proses pembelajaran kimia, khususnya pada konsep laju reaksi yang bersifat abstrak dan sulit dipahami peserta didik. Berdasarkan hasil wawancara dengan guru kimia SMA Negeri 24 Batam, ditemukan bahwa rendahnya pemahaman peserta didik dipengaruhi oleh keterbatasan media, minimnya sarana laboratorium, dan kurangnya bahan ajar yang menarik serta interaktif. Penelitian ini bertujuan untuk mengembangkan e-modul berbasis *Problem Based Learning* (PBL) yang didukung oleh simulasi PhET pada materi Laju Reaksi untuk peserta didik kelas XI SMA. Penelitian dilakukan di SMA Negeri 24 Batam pada semester genap tahun ajaran 2024/2025. Model pengembangan yang digunakan adalah Hannafin dan Peck, yang terdiri dari tiga tahap, yaitu: analisis kebutuhan, perancangan, dan pengembangan. Validasi produk dilakukan oleh ahli materi dan ahli media, sedangkan uji praktikalitas dilakukan oleh guru dan peserta didik. Hasil validasi menunjukkan bahwa produk tergolong sangat valid, dengan skor 92,50% dari ahli materi dan 90,28% dari ahli media. Sementara itu, uji praktikalitas menunjukkan bahwa guru memberikan skor 80,00% (kategori praktis) dan peserta didik memberikan skor 93,7% (kategori sangat praktis). Pengumpulan data dilakukan melalui lembar validasi dan praktikalitas, lembar validasi oleh ahli media dan materi, serta lembar kepraktisan media oleh peserta didik dan guru. Teknik analisis data melibatkan pendekatan deskriptif kualitatif dan kuantitatif. Dengan demikian, e-modul yang dikembangkan dinyatakan layak digunakan sebagai media pembelajaran interaktif dan mandiri. Modul ini tidak hanya memfasilitasi pemahaman konsep abstrak melalui simulasi PhET, tetapi juga mendorong peserta didik untuk berpikir kritis dan menyelesaikan masalah kontekstual melalui pendekatan PBL.

ABSTRACT

Sawitri, Cantika. 2025. Development of an E-Module Based on Problem Based Learning Assisted by PhET Simulation on Chemical Reaction Rates. Thesis. Tanjungpinang: Chemistry Education Study Program, Faculty of Teacher Training and Education, Raja Ali Haji Maritime University. Supervisor I: Assist. Prof. Ardi Widhia Sabekti, S.Pd., M.Pd. Supervisor II: Assist. Prof. Yudi Umara, M.Pd.

Keywords: e-module, Problem Based Learning (PBL), PhET simulation, reaction rate, Hannafin and Peck

This development is based on the constraints in the chemistry learning process, especially in the concept of reaction rates which is abstract and difficult for students to understand. Based on interviews with chemistry teachers at SMA Negeri 24 Batam, it was found that the low understanding of students is influenced by the limitations of media, the lack of laboratory facilities, and the scarcity of interesting and interactive teaching materials. This research aims to develop a *Problem Based Learning* (PBL) based e-module supported by PhET simulations on Reaction Rate material for XI grade students in high school. The research was conducted at SMA Negeri 24 Batam during the even semester of the 2024/2025 academic year. The development model used is Hannafin and Peck, which consists of three stages: needs analysis, design, and development. Product validation was carried out by material and media experts, while practicality testing was conducted by teachers and students. The validation results indicate that the product is categorized as highly valid, with a score of 92.50% from material experts and 90.28% from media experts. Meanwhile, the practicality test shows that teachers gave a score of 80.00% (practical category) and students gave a score of 93.7% (very practical category). Thus, the developed e-module is declared suitable for use as an interactive and independent learning media. This module not only facilitates the understanding of abstract concepts through PhET simulations, but also encourages learners to think critically and solve contextual problems through a PBL approach.