

ABSTRAK

Nurkholijah Rohma Hasibuan. NIM: 8236122010. Pengembangan *E-modul Heyzine Flipbook* Berbasis *Discovery Learning* Pada Materi Pemanasan Global Kelas X di SMA Negeri 12 Medan. Tesis. Program Studi Teknologi Pendidikan Pascasarjana Universitas Negeri Medan, 2025.

Peserta didik kerap mengalami kesulitan dalam memahami konsep-konsep fisika yang bersifat abstrak serta belum memiliki akses terhadap sumber belajar yang *variatif, efektif* dan *efisien* kapan saja dan di mana saja. Kondisi ini menyebabkan rendahnya hasil belajar serta partisipasi peserta didik dalam pembelajaran fisika, khususnya pada materi pemanasan global. Penelitian ini bertujuan untuk mengembangkan *E-modul Heyzine Flipbook* yang diintegrasikan dengan model *Discovery Learning* sebagai solusi untuk meningkatkan hasil belajar peserta didik serta untuk menganalisis tingkat kelayakan, keefektifan, dan kepraktisan *E-modul* tersebut pada peserta didik kelas X di SMA Negeri 12 Medan. Penelitian ini menggunakan metode *Research and Development* (R&D) dengan model pengembangan ADDIE yang meliputi tahapan Analisis, Desain, Pengembangan, Implementasi, dan Evaluasi. Subjek penelitian ditentukan melalui teknik *Cluster Random Sampling*, kelas X.E-2 sebagai kelas eksperimen dan X.E-3 sebagai kelas kontrol. Teknik pengumpulan data dilakukan melalui observasi, wawancara, angket, dan tes hasil belajar, sedangkan teknik analisis data mencakup uji kelayakan, uji kepraktisan, dan uji persyaratan analisis. Uji Validasi ahli Materi diperoleh rata-rata 91,55 % dengan kategori sangat layak. Uji Validasi ahli Media diperoleh rata-rata 91,57 % dengan kategori sangat layak. Uji Validasi ahli Design diperoleh rata-rata 93,31 % dengan kategori sangat layak. Uji coba perorangan masuk dalam kategori sangat baik dengan rata-rata skor 92,03 %, Uji coba kelompok kecil masuk dalam kategori sangat baik dengan skor rata-rata 88,64 %. Uji coba lapangan masuk dalam kategori sangat baik dengan skor rata-rata 83,06%. Uji Kepraktisan oleh Guru mendapat skor rata-rata 96,04% (sangat praktis), demikian juga hasil uji kepraktisan oleh peserta didik mendapat skor rata-rata 89,70% (sangat praktis). Hasil percobaan penggunaan *E-modul heyzine Flipbook* berbasis *Discovery Learning* pada kelas eksperimen diperoleh rata-rata hasil belajar 91,37, sedangkan peserta didik yang diajarkan tanpa media tersebut mendapatkan nilai rata-rata 73,61. Pengujian hipotesis menggunakan *Independent t-test* mendapatkan hasil sig. (2-tailed) sebesar 0,000 yang mana hasil tersebut $< 0,05$. Sehingga dapat disimpulkan bahwa *E-modul Heyzine Flipbook* berbasis *Discovery Learning* sangat layak digunakan sebagai media pembelajaran fisika pada materi pemanasan global, efektif dalam meningkatkan hasil belajar peserta didik, dan dan praktis untuk diterapkan di kelas

Kata kunci: *E-modul, Heyzine Flipbook, Discovery Learning*, pembelajaran fisika, pemanasan global, hasil belajar, pengembangan media pembelajaran.

ABSTRACT

Nurkholijah Rohma Hasibuan. NIM: 8236122010. Development of a Heyzine Flipbook-Based E-Module Using Discovery Learning on Global Warming Material for Grade X at SMA Negeri 12 Medan. Thesis. Postgraduate Educational Technology Program Of Universitas Negeri Medan, 2025.

Students often face difficulties in understanding abstract physics concepts and lack access to diverse, effective, and efficient learning resources that can be used anytime and anywhere. This condition contributes to low learning outcomes and student participation in physics classes, especially in the topic of global warming. This study aims to develop a Heyzine Flipbook E-module integrated with the Discovery Learning model as a solution to improve student learning outcomes, as well as to analyze the feasibility, effectiveness, and practicality of the E-module for Grade X students at SMA Negeri 12 Medan. The research employed a Research and Development (R&D) approach using the ADDIE development model, which consists of Analysis, Design, Development, Implementation, and Evaluation phases. The research subjects were determined using Cluster Random Sampling, with class X.E-2 assigned as the experimental group and X.E-3 as the control group. Data collection techniques included observation, interviews, questionnaires, and learning outcome tests. Data analysis techniques comprised feasibility testing, practicality testing, and prerequisite analysis testing. The validation results from the subject matter expert showed an average score of 91.55%, categorized as very feasible. The media expert validation yielded an average score of 91.57%, also categorized as very feasible. The design expert validation achieved an average score of 93.31%, categorized as very feasible. The individual trial received an average score of 92.03%, falling into the very good category. The small group trial scored an average of 88.64%, also in the very good category. The field trial yielded an average score of 83.06%, classified as very good. The practicality test by teachers scored an average of 96.04% (very practical), while the practicality test by students received an average score of 89.70% (very practical). In the experimental class that used the Heyzine Flipbook E-module based on Discovery Learning, the average learning outcome was 91.37, whereas students who were taught without the media scored an average of 73.61. Hypothesis testing using an independent t-test resulted in a sig. (2-tailed) value of 0.000, which is less than 0.05. Therefore, it can be concluded that the Heyzine Flipbook E-module based on Discovery Learning is highly feasible to be used as a physics learning medium on the topic of global warming, effective in improving student learning outcomes, and practical for classroom implementation.

Keywords: *e-module, Heyzine Flipbook, Discovery Learning, physics learning, global warming, learning outcomes, learning media development.*