ABSTRAK

Tuange, Junita Sara Vanessa Barbarina (2026). *Pengembangan Desain Pembelajaran Inkuiri Terbimbing Berbantuan Virtual Lab Pada Pembelajaran IPA Untuk Meningkatkan Pemahaman Konsep Siswa SMP.* Tesis, Program Studi S2 Teknologi Pendidikan, Program Pascasarjana, Universitas Pendidikan Ganesha.

Penelitian dan pengembangan ini bertujuan untuk menghasilkan desain pembelajaran berbasis inkuiri terbimbing berbantuan *virtual lab* pada materi Suhu, Kalor, dan Pemuaian yang valid, praktis, dan efektif dalam meningkatkan pemahaman konsep siswa SMP. Menggunakan model pengembangan 4-D (*Define, Design, Develop, Disseminate*), penelitian ini melibatkan siswa kelas VII SMP Negeri 12 Jayapura sebagai subjek uji coba. Media pembelajaran dikembangkan dengan mengintegrasikan Canva, Nearpod, dan PhET *Simulations* ke dalam perangkat tablet sekolah. Hasil penelitian menunjukkan bahwa media memenuhi kriteria sangat valid dengan nilai Aiken's sebesar 0,93 dari ahli media dan 0,84 (validitas tinggi/sedang) dari ahli materi dengan persentase kumulatif 95%. Pada uji kepraktisan menggunakan *User Experience Questionnaire* (UEQ), media meraih predikat *Excellent* di semua aspek, baik pada uji coba perorangan maupun kelompok kecil. Uji efektivitas membuktikan adanya peningkatan pemahaman konsep siswa yang signifikan, ditunjukkan oleh kenaikan rata-rata nilai dari *pre-test* (56,77) ke *post-test* (81,61) dengan rata-rata *N-Gain* sebesar 0,56 (kategori sedang) dan *effect size* 0,75. Sebanyak 77,5% siswa mencapai kriteria *gain* sedang, 22,5% kriteria tinggi, serta 90% siswa memenuhi ketuntasan minimal. Dengan demikian, desain pembelajaran *virtual lab* ini teruji layak, praktis, dan efektif sebagai solusi inovatif untuk mengatasi keterbatasan laboratorium serta meningkatkan pemahaman konsep sains siswa.

Kata Kunci: desain pembelajaran, inkuiri terbimbing, pemahaman konsep, virtual lab.

ABSTRACT

Tuange, Junita Sara Vanessa Barbarina (2026). Development of a Guided Inquiry Learning Design Assisted by Virtual Lab in Science Learning to Improve the Conceptual Understanding of Junior High School Students. Thesis, S2 Educational Technology Study Program, Graduate Program, Ganesha Education University.

This research and development aims to produce a guided inquiry-based learning design assisted by virtual lab on the material of Temperature, Heat, and Expansion that is valid, practical, and effective in improving the conceptual understanding of junior high school students. Using the 4-D development model (Define, Design, Develop, Disseminate), this study involved students of class VII of SMP Negeri 12 Jayapura as the test subjects. The learning media was developed by integrating Canva, Nearpod, and PhET Simulations into school tablet devices. The results of the study show that the media meets the criteria of very valid with Aiken's value of 0.93 from media experts and 0.84 (high/medium validity) from material experts with a cumulative percentage of 95%. In the practicality test using the User Experience Questionnaire (UEQ), the media achieved the Excellent predicate in all aspects, both in individual and small group trials. The effectiveness test proved the existence of a significant increase in students' understanding of the concept, indicated by the increase in the average value from the pre-test (56.77) to the post-test (81.61) with an average N-Gain of 0.56 (moderate category) and an effect size of 0.75. As many as 77.5% of students achieved the moderate gain criteria, 22.5% high criteria, and 90% of students met the minimum proficiency. Thus, the design of this virtual lab learning is tested to be feasible, practical, and effective as an innovative solution to overcome the limitations of the laboratory and improve the understanding of science concepts of students.

Keywords: Learning design, guided inquiry, concept understanding, virtual lab