ABSTRAK

Ramadhani, Nadia. 2025. *Pengaruh PhET Interactive Simulation Berbasis Inkuiri Terbimbing Untuk Meningkatkan Keterampilan Proses Sains Peserta Didik SMA Fase E Pada Materi Struktur Atom.* Skripsi. Tanjungpinang: Jurusan Pendidikan Kimia, Fakultas Keguruan dan Ilmu Pendidikan, Universitas Maritim Raja Ali Haji. Pembimbing I: Assist. Prof. Inelda Yulita, S.Pd., M.Pd. Pembimbing II: Assist. Prof. Yudi Umara, M.Pd.

Kata Kunci: Inkuiri Terbimbing, Keterampilan Proses Sains, *PhET Interactive Simulation*, SMA Fase E, Struktur Atom

Studi ini dilakukan untuk menguji keefektifan *PhET Interactive Simulation* berbasis inkuiri terbimbing dalam meningkatkan keterampilan proses sains peserta didik SMA Fase E pada materi struktur atom. Keterampilan proses sains adalah kemampuan yang dimiliki oleh peserta didik dalam proses pembelajaran melalui beberapa proses seperti mengamati, memprediksi, melakukan percobaan, mengkomunikasikan, dan seterusnya untuk meningkatkan keaktifan dan pemahaman terhadap suatu konsep. Dalam penelitian ini didukung oleh kenyataan bahwa capaian KPS peserta didik di SMAN 7 Tanjungpinang masih rendah, sehingga membutuhkan strategi yang inovatif dan media visualisasi konsep abstrak, seperti media *PhET Interactive Simulation.* Penelitian ini menggunakan metode *quasi eksperimen* dengan desain *Non-equivalent Control Group*. Adapun populasi adalah seluruh peserta didik kelas X SMAN 7 Tanjungpinang, dan sampel ditentukan melalui teknik *purposive sampling* diperoleh sampel sebanyak 64 peserta didik dari 2 kelas yaitu kelas X-2 dan X-3. Kemudian sampel dibagi menjadi dua kelompok yaitu kelompok eksperimen dan kelompok kontrol. Kelompok eksperimen menggunakan media *PhET* dan model pembelajaran Inkuiri Terbimbing, sedangkan kelompok kontrol menggunakan model pembelajaran konvensional. Data dikumpulkan menggunakan tes yaitu *pretest* dan *posttest*, serta wawancara yang teruji validitas untuk mengukur KPS peserta didik. Dari hasil uji analisis statistik uji *independent sample t-test* membuktikan bahwa nilai rata-rata N-Gain KPS kelompok eksperimen lebih tinggi yaitu sebesar 64,65%, sedangkan pada kelompok kontrol sebesar 56,99%. Kesimpulannya bahwa integrasi *PhET Interactive Simulation* dengan model pembelajaran inkuiri terbimbing terbukti lebih efektif dalam mengoptimalkan KPS peserta didik pada materi struktur atom.

ABSTRACT

Ramadhani, Nadia. 2025. The Effect of PhET Interactive Simulation Based on Guided Inquiry to Improve Science Process Skills of Senior High School Students Phase E on Atomic Structure Material. Thesis. Tanjungpinang: Department of Chemistry Education, Faculty of Teacher Training and Education, Raja Ali Haji Maritime University. Supervisor I: Assist. Prof. Inelda Yulita, S.Pd., M.Pd. Supervisor II: Assist. Prof. Yudi Umara, M.Pd.

Keywords: Guided Inquiry, Science Process Skill, PhET Interactive Simulation, High School Phase E, Atomic Structure

This study was conducted to test the effectiveness of PhET Interactive Simulation based on guided inquiry in improving the science process skills of Phase E high school students on atomic structure material. Science process skills are the abilities possessed by students in the learning process through several processes such as observing, predicting, conducting experiments, communicating, and so on to increase the activeness and understanding of a concept. In this study, it is supported by the fact that the achievement of KPS students at SMAN 7 Tanjungpinang is still low, so it requires innovative strategies and visualization media for abstract concepts, such as PhET Interactive Simulation media. This study used a quasi-experimental method with a Nonequivalent Control Group design. The population was all students of class X of SMAN 7 Tanjungpinang, and the sample was determined through a purposive sampling technique obtained a sample of 64 students from 2 classes, namely class X-2 and X-3. Then the sample was divided into two groups, namely the experimental group and the control group. The experimental group used PhET media and the Guided Inquiry learning model, while the control group used the conventional learning model. Data were collected using tests, namely pretest and posttest, as well as interviews that were tested for validity to measure students' KPS. The results of the statistical analysis of the independent sample t-test showed that the average NGain KPS value of the experimental group was higher, namely 64.65%, while in the control group it was 56.99%. The conclusion is that the integration of PhET Interactive Simulation with the guided inquiry learning model has proven to be more effective in optimizing students' KPS on atomic structure material.