THE COMPARISON OF STUDENTS' SCIENCE PROCESS SKILLS IN LEARNING DYNAMIC ELECTRICITY THROUGH TRADITIONAL AND COMBINED LABORATORY

RESEARCH PAPER

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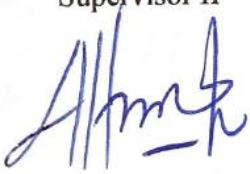

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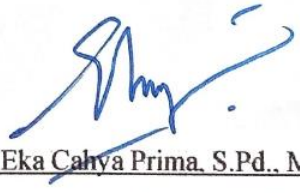

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DECLARATION

I hereby declare that the thesis entitled "The Comparison of Students' Science Process Skills in Learning Dynamic Electricity Through Traditional and Combined Laboratory" and all its content have been done by my work. I do not plagiarize or quote citations from other research in ways that are not following the ethics of science applicable in scientific societies. For this statement, I am prepared to bear the risk of sanction if later violation of scientific ethic is discovered of there is a claim from another part for the authenticity of my work.

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ABSTRACT

Virtual laboratory activity appears useful during remote education and offline learning to avoid the risk that can be gained during traditional laboratory activity. The results from PISA show that the skills and knowledge of Indonesian students in science are below the average and lower than the previous result. Laboratory activities are also suggested as effective ways to promote science process skills. This study aims to compare students' science process skills through traditional laboratory and combination of traditional and virtual laboratory in the form of PhET Simulation. This research is quantitative research with two-groups pretest-posttest design. The population of this research is 9th grade students with the total of 34 students. The measurement of students' science process skills uses objective test and direct observation rubric. Data from both groups is analysed using SPSS 24.0 software referring to Mann Whitney test. The result shows that students' science process skills in combined laboratory is significantly different with traditional laboratory on students' observing, communicating, classifying, planning an experiment, and asking questions skills between combined laboratory and traditional only laboratory activities with the lowest significancy value is 0.00. Contrary, there is no significant difference on students' hypothesizing, interpreting, predicting, and applying concept skills through combined laboratory and traditional laboratory activities with the highest significancy value is 0.95.

Keywords: Dynamic Electricity, Ohm's Law, PhET Simulation, Science Process Skills, Traditional Laboratory, Virtual Laboratory.

PERBANDINGAN KETERAMPILAN PROSES SAINS SISWA DALAM PEMBELAJARAN LISTRIK DINAMIS MELALUI LABORATORIUM FISIK DAN KOMBINASI

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ABSTRAK

Kegiatan laboratorium virtual tampaknya bermanfaat selama pendidikan jarak jauh dan pembelajaran luring untuk menghindari risiko yang dapat diperoleh selama kegiatan laboratorium tradisional. Hasil PISA menunjukkan bahwa keterampilan dan pengetahuan siswa Indonesia dalam bidang IPA berada di bawah rata-rata dan lebih rendah dari hasil sebelumnya. Kegiatan laboratorium juga disarankan sebagai cara yang efektif untuk mempromosikan keterampilan proses sains. Penelitian ini bertujuan untuk membandingkan keterampilan proses sains siswa melalui laboratorium tradisional dan kombinasi laboratorium tradisional dan virtual dalam bentuk *PhET Simulation*. Penelitian ini merupakan penelitian kuantitatif dengan desain *two-group pretest-posttest design*. Populasi penelitian ini adalah siswa kelas 9 yang berjumlah 34 siswa. Pengukuran keterampilan proses sains siswa menggunakan tes objektif dan rubrik observasi langsung. Data dari kedua kelompok dianalisis menggunakan software SPSS 24.0 mengacu pada uji Mann Whitney. Hasil penelitian menunjukkan bahwa keterampilan proses sains siswa di laboratorium gabungan berbeda secara signifikan dengan laboratorium tradisional pada keterampilan siswa mengamati, berkomunikasi, mengklasifikasikan, merencanakan percobaan, dan bertanya antara laboratorium gabungan dan laboratorium tradisional saja dengan nilai signifikansi terendah adalah 0,00. Sebaliknya, tidak ada perbedaan yang signifikan pada keterampilan berhipotesis, menafsirkan, memprediksi, dan menerapkan konsep siswa melalui kegiatan laboratorium gabungan dan laboratorium tradisional dengan nilai signifikansi tertinggi adalah 0,95.

Keywords: Hukum Ohm, Keterampilan Proses Sains, Laboratorium Tradisional, Laboratorium Virtual, Listrik Dinamis, Simulasi PhET

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