DECLARATION

I do hereby declare that every respect which is written in this research paper entitled **"STEM LEARNING ON ELECTRICITY USING ARDUINO-PhET BASED EXPERIMENT TO IMPROVE 8th GRADE STUDENTS' STEM LITERACY"** is genuinely pure result of my own original ideas, effort, research, work, and not copied or plagiarized from other papers. The opinion and the invention of the other researcher which is contained in this research paper have been quoted or referenced based on scientific code of conduct and accordance with an ethical science that applied in scholarly society. This declaration is created truthfully and consciously, when subsequently it is found an infringement toward scientific ethics, or if there is a claim of any other towards the authenticity of this research paper, hence I am willing to responsible and accept academical concequence correspond to applicable rules.

Bandung, August 2017

Declarant,

Tiara Diba Oktaviani

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STEM LEARNING ON ELECTRICITY USING ARDUINO-PhET BASED EXPERIMENT TO IMPROVE 8th GRADE STUDENTS' STEM LITERACY

Tiara Diba Oktaviani

International Program on Science Education
Universitas Pendidikan Indonesia
Tiara.diba.oktaviani@student.upi.edu

ABSTRACT

Technology is the application of scientific knowledge for practical purposes, especially in industry. One way to support the development of the technology is by integrating the use of technology and build the technology with the learning process in the form of STEM (science, technology, engineering, mathematics) Learning approach. Applying STEM Learning could improve Students' STEM Literacy. The learning approach is applied in every aspect of Learning including the application of STEM Learning in the lesson plan and worksheet. The method that used in this research is weak experimental. One group class (N=15) taken and learn by STEM Learning approach. The topic that learned by students is the electricity topic which is separated into electrical circuit and electrical parameters. The learning process separated into 3 meeting and it is conducted once a week. 15 Students are given a test item before and after the lesson. There are 25 question that used to measure student STEM Literacy. The result of the normalized gain shows there are improvement in students' STEM Literacy. The most higher improvement is the students' technology literacy. Students' learn using the same technology in every meeting. That's influence students' technology literacy.

Keywords : *STEM Learning Approach, Arduino-PhET based experiment, STEM Literacy*

PEMBELAJARAN STEM PADA MATERI LISTRIK MENGGUNAKAN EKSPERIMEN ARDUINO-PHET UNTUK MENINGKATKAN KEMAMPUAN STEM LITERASI KELAS 8

Tiara Diba Oktaviani

International Program on Science Education
Universitas Pendidikan Indonesia
Tiara.diba.oktaviani@student.upi.edu

ABSTRAK

Teknologi adalah penerapan ilmu pengetahuan untuk tujuan tertentu, terutama pada industri. Salah satu cara untuk mendukung perkembangan teknologi adalah dengan menintegrasikan teknologi dan membangun teknologi dalam proses belajar dalam bentuk pendekatan STEM (ilmu pengetahuan, teknologi, tehnik, matematika). Dalam mengaplikasikan pendekatan STEM akan didapatkan kemampuan literasi STEM. Pendekatan ini diaplikasikan pada setiap aspek pembelajaran termasuk aplikasi pada rencana pembelajaran dan lembar kerja siswa. Metode yang di gunakan adalah *weak experiment.* Satu grup (N = 15) diambil dan diberikan kegiatan belajar mengajar dengan menggunakan Pendekatan STEM. Topic tang digunakan adalah kelistrikan yang dibagi menjadi Properti listrik dan rangkaian listrik. Proses belajar mengajar dibagi menjadi 3 pertemuan dan dilaksanakan sekali dalam seminggu. 15 orang siswa diberikan test sebelum dan sesudah belajar. Ada 25 soal yangdigunakan untuk mengukur kemampuan literasi STEM siswa. Hasil dari *normalized gain* menunjukan peningkatan kemampuan literasi STEM siswa. Peningkatan tertinggi terjadi pada literasi teknologi siswa. Siswa belajar dengan menggunakan teknologi yang sama pada setiap pertemuan. Ini adalah faktor yang mempengaruhi kemampuan literasi teknologi siswa .

Kata Kunci : *Pendekatan pembelajaran STEM, experimen berdasarkan Arduino-PhET, Literasi STEM*

PREFACE

Bismillahirohmanirrohiim.

All prises and gratefulness to Allah Subhanahu wa ta'ala for His blessing, guidance, and grace so that the accomplishment of research paper entitled "STEM learning on electricity using Arduino-PhET based experiment to improve 8th grade students' STEM Literacy " can conducted well. Sholawat and salam always devoted to Prophet Muhammad Sholallahu 'alaihi wassalam, to his families, and also to all moslems in all round the world.

This research paper is the last demands and requirements for all university students in educational major to complete their study and obtain Sarjana Pendidikan as well as in Department of International Program on Science Education (IPSE). Moreover, the research paper is a step or a platform to devote all knowledges along four years learning in university. To finish the research paper, the author is require to propose and conduct a research about certain idea. This research paper consist of background, theoritical foundation, research methodology, result and analysis, and conclusion of the whole research.

However, the perfection is only belongs to Allah. Author do realize that this research paper still has so many weaknesses. Therefore, comments and suggestions are pleasurely welcome to improve the quality of learning. Hopefully, the result which is obtained in this research paper can be beneficial for other teacher, schools, and all readers from educational fields as a source and reference to improve more knowledges.

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