

ABSTRAK

DEDE RUSTANDI. 2026. **EFEKTIVITAS PEMANFAATAN MEDIA PEMBELAJARAN WEB SIMULATOR PADA PELATIHAN ARDUINO *INTERNET OF THINGS* (IoT)** (Studi pada Peserta Pelatihan di Balai Latihan Kerja Kabupaten Tasikmalaya). Jurusan Pendidikan Masyarakat, Fakultas Keguruan dan Ilmu Pendidikan, Universitas Siliwangi, Tasikmalaya.

Kemajuan Teknologi Informasi dan Komunikasi (TIK) telah mengubah cara manusia berinteraksi dan mengakses informasi secara global. Dalam pelatihan mikrokontroler Arduino di Balai Latihan Kerja (BLK) Kabupaten Tasikmalaya, ditemukan kendala berupa tingginya tingkat kerusakan komponen akibat kesalahan pemasangan serta keterbatasan peserta dalam bereksperimen karena kekhawatiran merusak perangkat. Kondisi ini berdampak pada hasil belajar peserta. Penelitian dilakukan di BLK Kabupaten Tasikmalaya. Penelitian ini bertujuan untuk mengetahui efektivitas pemanfaatan media pembelajaran web simulator pada pelatihan Arduino *Internet of Things* (IoT) di BLK Kabupaten Tasikmalaya. Metode yang digunakan adalah kuantitatif dengan *desain pre-eksperimen One Group Pretest-Posttest*. Sampel berjumlah 15 peserta (usia 19–32 tahun). Analisis data menggunakan uji normalitas Shapiro-Wilk dan uji hipotesis Wilcoxon Signed Rank Test. Hasil penelitian menunjukkan nilai posttest (89,33) lebih tinggi dibandingkan pretest (69,67) setelah lima pertemuan (50 JP). Nilai N-Gain sebesar 0,65 termasuk kategori sedang (cukup efektif). Sebanyak 80% peserta (12 orang) mengalami peningkatan, 13,33% penurunan, dan 6,67% tidak berubah. Uji Wilcoxon menunjukkan $T \text{ hitung } (8) < T \text{ tabel } (21)$ dan $|z \text{ hitung}| (2,7936) > z \text{ tabel } (1,96)$, yang berarti terdapat perbedaan signifikan antara pretest dan posttest. Selain itu, rata-rata skor persepsi peserta sebesar 84,13 berada pada kategori sangat efektif. Simpulan penelitian ini adalah efektivitas pemanfaatan media pembelajaran web simulator terbukti efektif meningkatkan hasil belajar peserta pelatihan Arduino di BLK Kabupaten Tasikmalaya serta direspons positif, sehingga peserta menjadi lebih antusias dan berani bereksperimen tanpa khawatir merusak komponen.

Kata kunci: Peningkatan hasil belajar, media pembelajaran, web simulator, pelatihan Arduino.

ABSTRACT

DEDE RUSTANDI. 2026. ***THE EFFECTIVENESS OF THE UTILIZATION OF WEB SIMULATOR LEARNING MEDIA IN ARDUINO INTERNET OF THINGS (IoT) TRAINING*** (A Study on Trainees at Balai Latihan Kerja Kabupaten Tasikmalaya). Department of Community Education, Faculty of Teacher Training and Education, Universitas Siliwangi, Tasikmalaya.

Advancement of Information and Communication Technology (ICT) has transformed the way individuals access information and engage in learning activities. In Arduino microcontroller training at the Job Training Center (BLK) of Tasikmalaya Regency, participants encountered challenges such as frequent component damage caused by incorrect circuit assembly and limited opportunities for experimentation due to concerns about damaging hardware. These conditions affected participants' learning outcomes. Therefore, this study aimed to examine the effectiveness of utilizing a web simulator as a learning medium in Arduino Internet of Things (iot) training at the BLK of Tasikmalaya Regency. This study employed a quantitative approach using a pre-experimental One Group Pretest–Posttest design. The sample consisted of 15 training participants aged 19–32 years. Data were analyzed using the Shapiro–Wilk normality test and the Wilcoxon Signed Rank Test. The findings revealed that the average posttest score (89.33) was higher than the average pretest score (69.67) after five training sessions (50 instructional hours). The N-Gain score of 0.65 was classified as moderate, indicating that the learning medium was reasonably effective. Furthermore, 80% of participants showed improvement in learning outcomes, while 13.33% experienced a decrease and 6.67% showed no change. The Wilcoxon test results indicated that Tcount (8) was lower than Ttable (21) and |zcount| (2.7936) was greater than ztable (1.96), demonstrating a statistically significant difference between pretest and posttest scores. In addition, the average participant perception score was 84.13, which was categorized as very effective. The study concludes that the use of a web-based simulator as a learning medium effectively improves learning outcomes in Arduino iot training and receives positive responses from participants. The simulator enhances participants' enthusiasm, confidence, and willingness to experiment without fear of damaging physical components.

Keywords: *Learning outcome improvement, instructional media, web-based simulator, Arduino training.*