

DESIGN AND DEVELOPMENT OF E-SHOE: A FOOTWEAR ENERGY HARVESTER USING HUMAN LOCOMOTION

ABSTRACT

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This study designed and developed an energy-harvesting shoe that converts mechanical energy from walking into electrical energy using piezoelectric materials. The device was intended to store generated energy for possible use during emergencies, outdoor activities, or unexpected events. The study focused on system design, generation, and user acceptability. The study used a quantitative descriptive method with purposive sampling. Survey questionnaires assessed the footwear energy-harvesting device in terms of procedure and methodology, durability, efficiency, energy testing, and presentation. A t-test compared the assessments of two respondent groups. The source methods section also states that the device was rated “highly acceptable,” which is a result rather than a method. Group sample sizes and prototype test procedures are not reported. Information-technology specialists gave the device an overall mean of 3.67, while mechanical engineers gave an overall mean of 3.41. The group difference was not statistically significant ($t = 1.0766$, $p = 0.31305$), indicating similar acceptability assessments across the measured criteria. Respondents recommended establishing a clear procedure for calculating efficiency and measuring the amount of energy generated during use. They also suggested testing the shoe at different walking speeds and over a defined distance to quantify power generation.

RECOMMENDED CITATION

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