Research and Teaching Methods for Electrical Circuits in Science, Technology, and Engineering: A Bibliometric Analysis

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Abstract

This study employed a bibliometric analysis to investigate a variety of approaches and research patterns in the instruction of electric circuits within the realms of science, technology, and engineering. Through a bibliometric review, the current body of research was examined, offering quantitative insights through statistical analysis. A statistical analysis of the distribution of paper titles, author keywords, and keywords plus was carried out to determine predispositions in methodologies for electric circuits. As a result of the filtration process using the Scopus database, only 94 documents covering the period from 1988 to 2023 were found, indicating a limited scope of the research. Study results identified bibliographic information, diverse methodologies, and research trends, providing future research on electric circuits with valuable quantitative insights. Compared to traditional methods of teaching electrical circuit concepts, previous research emphasized the use of hands-on, virtual applications and inquiry-based learning techniques, etc. In conclusion, the bibliometric analysis indicated that more innovative teaching methods could be explored to effectively teach electric circuits in a more meaningful way. It was further discovered that there were still other innovative methods that were missing and could be explored in future research. Based on a bibliometric review, the author intended to present a novel method for evaluation among science teachers called Ohm's law table method, which was missing in the bibliometric analysis, could be a potential research subject in the future.

Keywords: Classroom methodologies, electric circuits, research trends