



Implementation of Open Science Framework for Materials Engineering

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Abstract

This study seeks to promote collaboration, transparency, and reproducibility in scientific research by analyzing the use of the Open Science Framework (OSF) as a support tool for students and engineers within higher education. Recognizing the increasing relevance of open platforms in contemporary scientific practice, the research explores how OSF contributes to organizing, preserving, and disseminating research data during the academic research cycle. A retrospective cross-sectional observational analytical study was conducted among students and engineers engaged in research activities at the Polytechnic University of Panama between October 2024 and October 2025, based on predefined inclusion criteria associated with their participation in scientific projects. Data were collected through structured surveys evaluating the frequency and purpose of OSF use, as well as the perceived advantages of this platform compared to other research-support tools. Descriptive statistical analyses were performed, including measures of central tendency, standard deviation, and frequency distributions. Results show that approximately 80% of participants rely primarily on OSF to manage and document their research processes, while the remaining 20% depend on alternative databases or digital tools. The findings suggest that the systematic use of OSF contributes to improved data management practices, enhanced project transparency, and more consistent documentation of research procedures. Furthermore, participants reported that OSF facilitates collaboration and long-term preservation of materials, supporting reproducibility and open-access principles. Overall, the study highlights OSF as a valuable and accessible platform capable of strengthening research competencies and preparing future engineers to excel in an academic and professional environment increasingly defined by open science, digital integration, and collaborative knowledge production.

Keywords: Open Science Framework (OSF), Materials engineering, Open platform, Research data management, Reproducibility, Transparency