Practical Adoption of Green Coding: A Comparative Study across Organizations in Finland and Globally

About

This study investigates how software development organizations in Finland and globally are practically adopting green coding practices. It uses a qualitative research method, combining a systematic literature review with semi-structured interviews with 15 software professionals to compare academic recommendations with real-world industry applications.

Problem

The Information and Communication Technology (ICT) sector has a significant and growing environmental footprint, contributing to global greenhouse gas emissions. While green coding offers a way to create more energy-efficient software, there is a notable gap between academic proposals and their practical adoption in the industry, leaving developers without standardized guidelines or integrated tools.

Study Outcome

- Organizations widely adopt practices that improve both performance and energy efficiency, such as caching, lazy loading, and database query optimization.
- The explicit focus on 'green coding' is more evident in European companies, influenced by regulations, while in non-EU regions it is often a secondary benefit of writing high-quality code.
- Green coding initiatives are typically driven from the bottom up by software engineers rather than through formal, top-down management mandates.
- There is a significant disconnect between innovative academic tools (e.g., LLM-based assistants) and their lack of adoption in the industry.
- The study highlights a need for standardized guidelines, better industry-academia collaboration to create practical tools, and integrating sustainability into computer science education.

Keywords

green coding • energy efficiency • green software engineering • sustainability • Finland