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Developing an Arduino-based Kitchen Fire Prevention System for Educational Enhancement

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Abstract

This project focuses on the development of a physical fire prevention system specifically tailored for a kitchen setting, by 12th-grade students within the Erasmus+ project Digital for Active Education. Using Project-Based Learning (PjBL) and a STEAM approach, the students integrated sensors and an Arduino microcontroller to detect gas leaks and flames. Beyond its technical implementation, the project also pursues meaningful educational goals. It seeks to cultivate students' environmental awareness and to strengthen their ability to manage natural resources responsibly. Through the hands-on development of the system, learners are encouraged to acquire and apply competencies in computational thinking, programming, and hardware integration. By engaging with real-world problems and designing tangible solutions, students enhance their creativity, autonomy, and problem-solving capacity. Thus, this initiative merges the practical construction of a safety device with a holistic approach to educational enrichment and skills development.

Keywords: Computational Thinking, Education, Programming, Arduino