A Modular Creative Coding Framework for Plural Classrooms in STEAM Higher Education

Carla Molins-Pitarch[1], Carles Sora-Domenjó[2], Beatriz Martinez-Navarro[3], Marta Fernández-Ruiz[4], Josep Torelló[5], Eva Villegas[6]

Image Processing and Multimedia Technology Center, Universitat Politècnica de Catalunya-Barcelona Tech

Abstract

Creative programming courses offer a unique opportunity to integrate artistic expression with computational thinking, enabling students with diverse technical and creative backgrounds to engage meaningfully with code. Recent pedagogical research supports open-ended, visually rich, and hands-on projects that foster creativity, skill acquisition, and learner autonomy, especially in interdisciplinary classrooms that mix students from design, art, and computing. This study presents the Modular Creative Coding Framework, developed to support inclusive teaching in STEAM higher education. It has been piloted and refined across two academic years (2023–24 and 2024-25) in courses that bring together students from Art and Digital Design, Multimedia Technologies, and Video Game Development programs. The framework is implemented using p5.js in the OpenProcessing environment and is structured around thematic modules that emphasize visual feedback, conceptual clarity, and creative exploration. Preliminary results gathered through student reflections, instructor observations, and project development evaluations show increased engagement, stronger interdisciplinary collaboration, and improved confidence in applying programming concepts to creative outcomes. These findings support the framework's potential to enhance inclusive learning and adaptability in higher education, especially in contexts that bring together students with differing levels of coding experience and disciplinary perspectives.

Keywords: STEAM; creative coding; programming; interdisciplinarity; creativity