

Implementing an Open-access, Data Science Programming Environment for Learners

Austin Cory Bart, Javier Tibau, Eli Tilevich, Clifford A. Shaffer, Dennis Kafura

Computer Science

Virginia Tech

Blacksburg, Virginia, USA

acbart@vt.edu, jtibau@vt.edu, tilevich@vt.edu, shaffer@vt.edu, kafura@vt.edu

Abstract—A key retention issue when educating computing novices is ensuring that the frustrations of mastering programming fundamentals do not demotivate and discourage students from studying the discipline. In particular, non-CS majors often struggle to find relevance in traditional computing curricula that tend to either emphasize abstract concepts, focus on non-practical entertainment (e.g., game and animation design), or rely on decontextualized settings. To address these issues, this paper introduces BlockPy, a block-based environment for Python (<http://www.blockpy.com>). BlockPy is a web-based, open-access programming environment that supports introductory programming with an emphasis on data science. It promotes long-term transfer by scaffolding an introduction to textual programming (Python) through a block-based programming view, ideal for beginners of any background. By supporting the latest Learning Tools Interoperability (LTI) standards, BlockPy is designed to support both informal learners and formal class settings. Specifically, it can be configured to provide guiding feedback for its interactive programming problems, so as to support learners at their own pace. The results from a pilot study of the initial deployment and utilization of BlockPy indicate the potential of the environment to address many of the problems faced by novice learners.

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