Project Name **PyBlocks**

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Project Description: Pyblocks is an interactive learning site and web application that provides a structured environment to build, and run code, using both block-based programming and text based programming – along with resources that teach the effective skills needed to transition from block to text-based programming languages. Many young learners today first experience coding with block-based programs, e.g., Scratch. While these programs are useful tools for learning early on, they are limited by their lack of support for standard practices. Pyblocks is designed to augment the transition to higher level coding by integrating a block-based programming environment and a text-based coding language, Python, into one system. Our goal is to provide a means for kids to learn advanced concepts, using a more challenging, but recognizable approach, to help them gain knowledge, confidence, and improve motivation.

Features: The application consists of three [3] key features; namely, the tutorial section, hybrid support system, and grid-world section. In-depth and interactive tutorials offer a comprehensive way for users to gain detailed information on control structures such as loops and branches. The hybrid support enables the transition between code blocks and text – based on user preferences. It does this by allowing the user to work with a block where they can type python text code into. By allowing the user to write text-code fragments in a block-based program the user begins to learn and integrate some of the text-based skills they will need when they begin coding in text in its entirety. Lastly, an interactive grid world provides visual cues for the user to see their code perform when working on activities. The grid world can be interacted on with both text and blocks, and also helps the user keep a consistent idea of what their code will do while working with them.

Evaluation: We evaluated our system by having a group of ten [10] middle and high school aged kids with little to no coding experience test complete two challenges with our system. We split the participants into two groups (A and B) and had Group A complete the first task with blocks only while Group B had to use at least one Hybrid Block. Then we had both groups complete a task using just text code. We found that Group B had about ten percent better completion time on the second task. This shows that our idea of using the hybrid block was helpful, but not as much as we would have liked.

Challenges and Future Work: The use of supplementary audio and visual effects throughout the system would be worthwhile as the look and feel of the application plays a key role in user acceptance of the system. The interactive grid world may also be expanded on to boost engagement levels by providing the user with more activities to perform. Along with extra activities we would like to have the user be able to design their own grid worlds and run code on them. The future of PyBlocks lies in enhancing the design of the website and GUI, while refining the content of the material to strongly connect with more kids and young adults.





