Python for Everybody: Interactive Online Course using DataCamp

Matthew Hancock
matthancock17@gmail.com
Undegraduate in Computer Science - Saint Martin's University
Lacey, Washington

Rachel Burk
Rachel.Burk@stmartin.edu
Undegraduate in Computer Science - Saint Martin's University
Lacey, Washington

Harold Nelson, Ph.D
HNelson@stmartin.edu
Research Advisor and Instructor - Saint Martin's University
Lacey, Washington

ABSTRACT

Electronic learning is becoming more relevant and valuable with recent technology. Several online platforms yield simple implementation of supplemental learning for students in the classroom. This is especially useful for computer science, where students need constant feedback about the correctness of their code. DataCamp allows for interactive learning by utilizing console exercises that provide instant feedback on the mistakes made. We designed and implemented a course in DataCamp Lite as supplemental learning material for an introductory programming course involving Python. The purpose of this course is to improve student engagement and comprehension of course material.

ACM Reference Format:
Matthew Hancock, Rachel Burk, and Harold Nelson, Ph.D. 2019. Python for Everybody: Interactive Online Course using DataCamp. In *Proceedings of ACM Conference (Conference'17).* ACM, New York, NY, USA, 2 pages. https://doi.org/10.1145/nnnnnnn.nnnnnnn

1 PROBLEM AND MOTIVATION

Our objective is to create a comprehensive and intuitive DataCamp course that will be used to teach students in an accessible and engaging medium. We believe that by applying our programming skills to create this content, it will benefit future computer science students of Saint Martin's University. This DataCamp course will be utilized in CSC101 to introduce programming to computer science students.

2 BACKGROUND AND RELATED WORK

We reviewed pedagogic topics specifically from University of Colorado's Center for Faculty Development. The process for designing this course will require three stages. The first stage of the course design is to outline each chapter that will be covered in the DataCamp course. The Python for Everybody (PY4E) text has chapters broken into roughly sixteen subsections. These subsections benefit the structure of our course as well as influence learning objectives. The first stage's primary focus is to write "observable learning objectives" which, the University of Colorado's Center for Faculty Development (UCCFD) states, "provides students with a clear purpose to focus their learning efforts" (Assessment, 2007). A great distinction provided by the UCCFD is between learning goals and learning objectives. The difference is that "learning goals are what you hope to accomplish in your course: the overall goals that do not necessarily result in products of observable and measurable behavior". Whereas "learning objectives are brief, clear statements about what students will be able to do when they complete instruction" (Assessment, 2007). This is significant for course design because of how concise learning objectives must be to check that students will complete the material successfully. As mentioned, learning objectives need to be observable and measurable. Learning objectives, outlined by UCCD, include the following: * Condition - the condition under which the student will perform the described behavior * Behavior - a description of a specific, observable behavior * Degree - the degree indicates the desired level or degree of acceptable performance

In our PY4E course, for example, the learning objective for chapter one is the following: * Condition: "Identify the reserved words in python" * Behavior: Students will be able to pick the reserved python words from a list * Degree: Students will be able to identify reserved words at a minimum of 80The second stage of the course design will be to create interactive activities and assessments to guide learning. DataCamp offers the ability to utilize multiple choice and console practices as both activities and assessments. Per "Bloom's pyramid, which illustrates that thinking occurs at different levels of complexity," multiple choice and console practices use remembering, understanding, applying, and creating processing levels (Assessment, 2007). These processing levels benefit the student because students will be tested in the same style as they are practicing. In computer science, practicing coding skill is essential to correct coding performance. Utilizing many types of process levels to achieve a learning objective may be most effective. For example, multiple-choice questions are great for an activity that requires remembering and memorizing.

3 APPROACH AND UNIQUENESS

Our approach to this online course is to provide a robust and constructive method to reinforce what the students need to learn. The layout and overall content of the DataCamp course is meant to be supplemental and to be a way for students to get hands on experience coding in Python with interactive elements that give useful feedback. The submission correctness tests for each module are robust and straight-forward. Students have plenty of guidance and have enough information to complete the course provided by hints and feedback that lets the student know where they went

Conference'17, July 2017, Washington, DC, USA

ACM ISBN 978-x-xxxx-xxxx-x/YY/MM…$15.00
https://doi.org/10.1145/nnnnnnn.nnnnnnn

wrong. The implementation will take place through GitHub and DataCamp. This will require us to understand the python commands that DataCamp recognizes and structure our activities to reflect that. Exporting our course to GitHub allows us to document and implement the material as well as allowing future input on the course. This is especially important because there is a great likelihood that Python for Everybody through DataCamp will need to be worked on by a second senior team. The way that we will handle this transition is to comment our content well, and to leave detailed instructions on the direction we were looking to head for the content.

4 RESULTS AND CONTRIBUTIONS

Electronic learning can be a fantastic tool for teaching and reinforcing material for students. Especially in computer science, having immediate feedback for syntax errors in programming for an interpreted language like Python, it is most valuable. This allows instructors to better teach their students and give better interactive and helpful practice. Implementing the DataCamp course into the introductory programming class and seeing how students perform both with and without this material will determine how successful this application is. If students show a better understanding and perform better in their exams with this DataCamp course, then future applications of electronic learning will be developed to improve student understanding in the classroom.

5 REFERENCES

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