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Digital CS1 Study Pack Based on Moodle and Python

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ABSTRACT

We believe that CS1 courses can be made more attractive to students:

o   by teaching a highly interactive scripting language – Python

o   by using an open source course management system - such as Moodle - to make all course resources available in a comprehensive digital study pack, and

o   by offering detailed self-guided online labs

We have used Moodle [1] and Python [2] to develop a "Python First" digital study pack [3] which comprises a wealth of new, original learning modules: extensive e-texts, detailed self-guided labs, numerous sample programs, quizzes, and slides. Our digital study pack pedagogy is described in recent ITiCSE and SIGCSE papers [4, 5]. "Python First" digital packs instances have already been adopted by instructors at several universities. This demonstration reveals instructor and student perspectives to the "Python First" digital pack. In particular, we demonstrate how instructors can use standard Moodle functionality to customize and manage digital packs. We also demonstrate several Moodle-supported, Python-based self-guided labs.

Categories and Subject Descriptors

K.3.2 **[Computers & Education]**: Computer Uses in Education - *Computer-assisted instruction (CAI)*

General Terms

Design, Human Factors

Keywords

Python, Moodle, course management system, active learning

1. THE INSTRUCTOR PERSPECTIVE

The "Python First" digital pack is based on Moodle [1], an increasingly popular open source course management system with rich functionality. Moodle provides course designers and instructors with easy-to-use Web forms interface. The management and customization of a Moodle-based "Python First" digital pack is a straightforward, intuitive process.

We demonstrate how instructors can:

o   Customize their digital study packs by removing, editing, and adding resources and activities

o   Download and upload resources

o   Manage enrolment and provide feedback to students

o   Save time with an online lab report system

2. THE STUDENT PERSPECTIVE

Our surveys show that students prefer online resources to printed ones. The importance of the digital study pack has been ranked by students as 4.5, on a scale form 1 to 5. The importance of a printed textbook, if one were actually adopted in our otherwise paperless CS1 course, has been ranked as 1.8 (the lowest ranking among all actual and potential study aids). Online lab assignments are ranked as high as 4.3 on a scale from 1 to 5.

Students from the net generation view self-guided online labs as very beneficial. These labs are based on Python and supported online by Moodle. We demonstrate several online self-guided lab assignments as specified below.

2.1 Interactive Exploration

This online lab guides students in an interactive exploration of string operations, functions, and methods. At the Python shell prompt, students experiment with a variety of expressions and statements and obtain intuitive understanding of string objects. Students save their interactive session in a text file and then receive immediate credit by submitting an online lab report.

2.2 Web Application: Live Stock Quotes

This online lab guides students in the development of a *Stock Analyzer* web application that downloads from Yahoo and display live stock quotes repeatedly within specified time intervals. The application determines the lowest, highest, and average stock prices from all downloaded stock quotes

2.3 Fractal Design

This online lab guides students in the development of a class-based *Mandelbrot Patterns* program. Students study a sample function-based program that draws Mandelbrot fractals then transform it into a class-based program. Finally, students use their program to produce various Mandelbrot fractals.

3. REFERENCES

[1]   Moodle. http://www.moodle.org.

[2]   Python. http://www.python.org.

[3]   Radenski, A. *Introduction to Computing with Python*. http://www.studypack.com.

[4]   Radenski, A. "Python First": A Lab-Based Digital Introduction to Computer Science. *ITiCSE'06*, 197-201.

[5]   Radenski, A. Digital Support for Abductive Learning in Introductory Computing Courses. *SIGSE'07*, 14-18.