Programming Classroom Resource System: Supporting Online and Inverted Classrooms

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Traditional Classroom Model

Before class

read a textbook chapter (optional)

In class

listen to the lecture on a concept

After class

get stuck on the assignment questions
Inverted Classroom Model

Before class
   learn a concept

In class
   practice solving problems with instructor/ta help

After class
   solve a set of problems to reinforce the concept
The PCRS

An online learning environment designed to facilitate delivery of inverted and online courses.
## PCRS Evolution

<table>
<thead>
<tr>
<th></th>
<th>v. 1.0</th>
<th>v. 2.0</th>
<th>v. 3.0</th>
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<tbody>
<tr>
<td><strong>Before class</strong></td>
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<tr>
<td><strong>In class</strong></td>
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<tr>
<td><strong>After class</strong></td>
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v1.0: Before class

Clickers for code

Submissions

Testcases
## PCRS Evolution

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</tbody>
</table>
v2.0 After class

Allow students to work on lab exercises outside of the scheduled labs.

<table>
<thead>
<tr>
<th>Test Expression</th>
<th>Expected</th>
<th>Description</th>
<th>Result</th>
<th>Passed</th>
<th>Debug</th>
</tr>
</thead>
<tbody>
<tr>
<td>index_find (&quot;no letter you need&quot;)</td>
<td>-1</td>
<td>String has no letter a</td>
<td>0</td>
<td>😞 Trace</td>
<td></td>
</tr>
<tr>
<td>index_find (&quot;aaAaaAaaA&quot;)</td>
<td>0</td>
<td>Only a's</td>
<td>0</td>
<td>😊 Trace</td>
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<tr>
<td><strong>After class</strong></td>
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</tbody>
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v3.0 (beta) Before class

New features for students:

- Online access to study resources
- Getting help
v3.0 (beta) Before class

New features for instructors:

- Content creation
- Content management
- Section management
v3.0 (beta) Content delivery

- Text
- Video
- Problems
  - Multiple Choice
  - Coding
Demo time!

A bit of terminology…

Content Item - text, video, problem

Challenge - a sequence of content items with a deadline
Technologies

Back-end: Django

Front-end: HTML
  CSS
  JavaScript and jQuery
  Bootstrap
Requirements

- Production-ready by Sept 1st
- Load of over 1,000 students
Challenges - Front end

- User Interface
- Device/Browser Compatibility
Challenges - Back end

- Performance
- Extensible back-end design
v4.0 Wish List

Support for:

- Self-paced course offering
- More programming languages
- New problem types
- Courses from other departments
Questions