

Context

- Who?**
- Undergraduates enrolled in an introductory programming course for non-majors
 - Students majors will not be programming related
- What?**
- Students will learn basic introductory web development programming and design techniques
 - Students will ultimately create their own website upon unit completion
- When?**
- Two week unit embedded in an introductory programming course for non-majors
 - Consisting of two lectures and one recitation a week for two consecutive weeks
- Where?**
- Students will be taught mainly inside the classroom, but they'll have related assignments to complete outside of the standard course time
 - The course will be taught in the either the CS or HCI department
- Why?**
- Learning basic web development is a more engaging aspect of programming for non-computing majors
 - Shows students the relevance programming can have to their field
 - Students may be required to take the course, without seeing the relevance

Learners

- Developmental**
- Students likely to be young adults, between eighteen and twenty-three years old
 - Undergraduate level students, particularly in their first year, experience intellectual, social, emotional, and cultural development
 - Students are developing personal relationships, identity, career paths, and lifestyle decisions while embarking on this new journey into college
 - Depending on when they enroll in the course, students may be transitioning from excelling during high school to just meeting expectations in college

Knowledge & Background

- Programming knowledge likely limited to the prior weeks of instruction in the parent course
- Experience interacting with different varieties of websites
- Pre-existing dispositions of the students will affect how they interact with the course and unit
- Students may have a closed mind toward programming
- Misconceptions on how websites work or effect website design
- They'll have the metacognitive capability to reflect on their understanding and work

Individual Differences

- Interest in the topic of programming, specifically web development, will vary
- Students with high visual-spatial intelligence may be better visual designers
- Logical-mathematical intelligence may benefit students in writing code
- Students with sequencing troubles might have difficulty writing or debugging code
- Strong self-expression can benefit students in developing content for their website

Learning Goals

	Cognitive	Metacognitive
Knowledge	<ul style="list-style-type: none"> CK1 Understanding the basic functionality of a website CK2 Students will learn introductory levels of HTML and CSS syntax CK3 Recognizing the relevance that programming have in their domain CK4 Students will understand the purpose of HTML and CSS 	<ul style="list-style-type: none"> MK1 Planning the appropriate level of scope for the development of their website
Skills	<ul style="list-style-type: none"> CS1 Creating the necessary files for a website CS2 Programming HTML and CSS CS3 Students will utilize various debugging strategies 	<ul style="list-style-type: none"> MS1 Knowing when to implement certain design strategies based on the requirements and content of a website MS2 How to evaluate the quality of a website
Dispositions	<ul style="list-style-type: none"> CD1 Develop growth mindset toward programming CD2 Gain confidence in their programming abilities CD3 Students will be motivated to utilize programming 	<ul style="list-style-type: none"> MD1 Recognize and overcome closed mindedness toward programming MD2 Adjust feelings toward evaluating their own and other's work

Research

Research Question
 Do students self-assess their most challenging concept better when prompted before or after the completion of an assessment?

Hypothesis
 Students will be better predictors when the self-assessment question is asked at the end of a quiz

Design
 The following question will either be asked at the beginning or end of the first and second quiz
Question: "Which of the following areas do you believe is causing you the most trouble in this unit?"
Answers: Page layout, element styling, file linking, element identification, and debugging
Control: Self-assessment question at the end of their quiz
Treatment: Self-assessment question at the beginning of their quiz

Implications
 Correlate accuracy of self-assessment with attendance and scoring within the unit
 Insight into the best time to have students self-assess and if an incorrect bias could occur
 Determine areas students believe they're struggling the most with in this context

Assessment

	CK1	CK2	CK3	CK4	CS1	CS2	CS3	CD1	CD2	CD3	MK1	MS1	MS2	MD1	MD2
Survey One			✓					✓	✓	✓				✓	✓
Homework One	✓	✓		✓	✓	✓	✓								
Quiz One	✓	✓				✓	✓					✓	✓		
Homework Two	✓	✓		✓		✓	✓				✓	✓	✓		
Quiz Two	✓	✓				✓	✓					✓	✓		
Survey Two			✓					✓	✓	✓				✓	✓

- Surveys**
- Administered during the first and last lectures
 - Identical content using clicker-like system
 - Measure dispositional changes
 - Ex: "Programming is useful for my major?"
- Quizzes**
- Administered during both recitations
 - Assess topics in previous two lectures for that week
 - Used to identify student misconceptions
 - Provide students with feedback
- Homeworks**
- Create a basic website
 - Scaffolding templates provided
 - Scored on use of HTML tags and CSS styles
 - Visual design suggestions
 - Explanatory feedback

Template

Main Title

Link 1
Link 2
Link 3
Link 4

Header

Placeholder text for content.

Student Homework

Bruce's Banking

Checking
Savings
Loans
Careers
About

Why Bank With Us?

Banking with Bruce's Banking is a no brainer! We offer the lowest interest rates on loans on the entire east coast. We treat each customer with their respect they deserve. Quality and peace of mind are our two main priorities. You can sleep soundly knowing you're banking with the best, here at Bruce's Banking!

"There's no better bank!" - Hugh M.

Instruction

	Lecture	Lecture	Recitation
Week One	<ul style="list-style-type: none"> CK1, CK2, CK4, CS1, CS2 Survey One Homework One assigned Assess prior knowledge 	<ul style="list-style-type: none"> CK1, CK2, CK3, CK4, CS2, CS3, MS1, MS2 Emphasize transfer 	<ul style="list-style-type: none"> CS2, MS1, MS2, MD1, MD2 Quiz One Foster metacognition
Week Two	<ul style="list-style-type: none"> CK1, CK2, CK3, CS2, MK1, MS1, MS2 Homework One due Homework Two assigned Organization of Knowledge 	<ul style="list-style-type: none"> CK3, CS2, CD1, CD3 Motivation 	<ul style="list-style-type: none"> CS2, MS1, MS2, MD1, MD2 Quiz Two Collaboration

Routines

Lecture

- Begins with overview of learning goals
- Provide students with slides for use during lecture
- Use of Piazza-like system during class time for questions
- End of lecture for discussion

Recitation

- Begins with a quiz
- Complete worked example along with teaching assistant
- End of recitation for discussion

Instructional Activities

Slides

- Minimal text with ample anchored examples
- Interactive embedded components
- Provides ques to help organization of knowledge

Website Review

- Review their own, peers, and websites from the web
- Find website(s) with similar purpose to theirs
- Teaching assistant monitors misconceptions

Worked Example

- Complete faded worked example
- Assess common areas of difficulty

PNC Banking Example

HTML

```

<ul>
<li>No PNC fees for use.</li>
<li>Free transactions.</li>
<li>Highest level of rewards.</li>
<li>Highest level of interest.</li>
<li>Multiple ways to avoid.</li>
</ul>
    
```

CSS

```

.Money_Header {
color: light-gray;
font: Arial 24px bold;
}
.Money_Paragraph {
    
```