

Applying Project-Based Learning for an Online Object-Oriented Systems Course

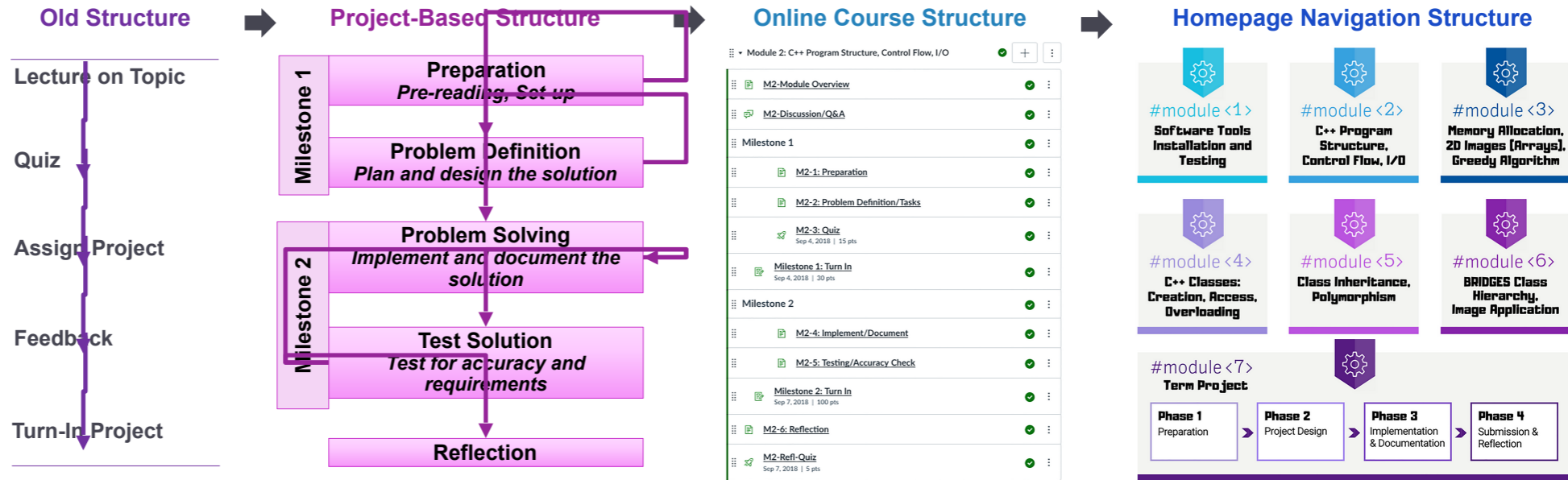
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Project-Based Learning for Online CS Courses

- PBL: An approach to develop in students a routine of *systematic problem-solving and practice*
- Use projects as a **means for learning**, than a **means to assess**
- Multi-cycles of “working-thru” problems with *reflection* to promote *metacognition*
- Break down computing problems to start with analysis and design logic
- BRIDGES real-world projects taught with a different methodology
- Plan first, Code later.**

Course Structure: ITCS 3112 Design and Development of Object Oriented Systems (External Review in Progress, Quality Matters)



Research Design

Research Question:

How do we characterize student reflections in an online project-based course?

Sample: 49 students (juniors / seniors)

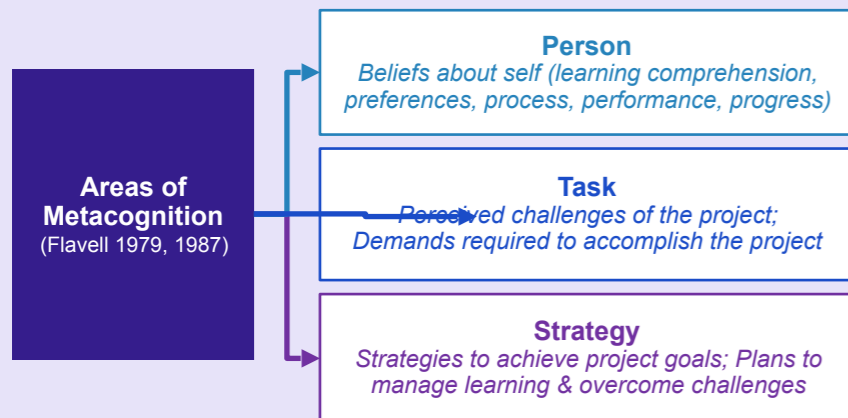
Projects: Real-world projects from BRIDGES

Modality: Fully online course

Data Collection: 4 Modules (112 reflection posts)

Data Analysis: Content analysis of reflections to generate themes

Theoretical Framework:



Emerging Themes

What Made Projects Engaging	What Made Projects Demanding
<ol style="list-style-type: none"> Sense of challenge Free tinkering Flowcharts before coding Problems applicable across platforms 	<ol style="list-style-type: none"> Time Unstable software tools Lack of documentation or tutorials
What Helps Me/Others Progress	How I Feel
<ol style="list-style-type: none"> Pre-loaded software Visual & clear instructions Rhythm, structure, & schedule Scaffolded projects 	<ol style="list-style-type: none"> Sense of personal progress Sense of accomplishment Sense of regret

The assignment was pretty fun and I took more time on it than I had to because I was having fun doing different things to make the face look more like a surprised face!

I loved interacting with bridges to visualize [the Colorado Mountains]. It challenged my programming ability... just difficult enough where I could feel challenged, but also feel satisfied.

The assignment helped me visualize the data on a grid. I was able to get some graph paper and draw what I wanted my face to look before putting it into code blocks... never had to visualize it like this assignment had me do.

Considering it is an online class, and some people are more visual learners, it may help to have additional visuals.. on the instructions for installation and manipulation of the VM and code::blocks software.

Implications

- Students tap not one, but a combination of metacognitive areas (i.e. person, task, strategy).
- More students reflect on prior experience (*what happened or what they did*).
- Fewer students reflect on *how they can do better to manage or improve learning*.

Reflections enable:

- Understanding of “How I Learn”
- Monitoring of progress and mistakes
- Communication with instructor (*early alerts*)

PBL supports students:

- Start projects early (*project management*)
- Strengthen analysis & design skills (*logic*)
- Accomplish mini goals (*scaffolding*)