

Student Reflections on Online Project-Based Learning Design for a Computer Science Course

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Abstract: An existing undergraduate course on Object-Oriented Systems was redesigned to a fully-online format in compliance with Quality Matters (QM) standards. We applied a project based learning design with the goal of developing in students a systematic, problem-solving mindset to modularize projects into a cycle of steps, beginning with analysis and design (i.e. using pseudo-code, flowcharts, diagrams) to plan the solution before jumping into coding, debugging, and testing. This cycle of “working-thru a problem” is repeated across multiple programming projects in the course to help students develop a habit of approaching programming problems systematically. Reflection assignments were required at the end each problem solving cycle to encourage metacognition. We coded and analyzed 353 reflection posts to identify common themes. First, student reflections in a project-based learning environment are highly personal where students share positive and negative feelings from their learning experience with course projects. Second, students reflect on how they learn, particularly identifying learning strategies or processes that support or hinder their learning progress. Lastly, students reflect on what learning resources and materials help them become successful in the course. We conclude with instructor observations and recommendations on a model for applying project based learning in online Computer Science courses.