



Energy Technology Program Students Build Bridges While Getting Hands-on Experience in Design Courses

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The Energy Technology Program was formed with Ignatian values and pedagogy at its core. In its third year, students are still receiving an engaging, project-based education based on these principles; in fact, students assess the Ignatian aspects of each course in the program, and faculty regularly revisit how well their courses are addressing Ignatian values.

Among many other Ignatian aspects of courses in the program, students in the first and second year design courses built bridges in the spirit of One Creighton while at the same time learning through Ignatian principles.

Experience, Reflection, and Action

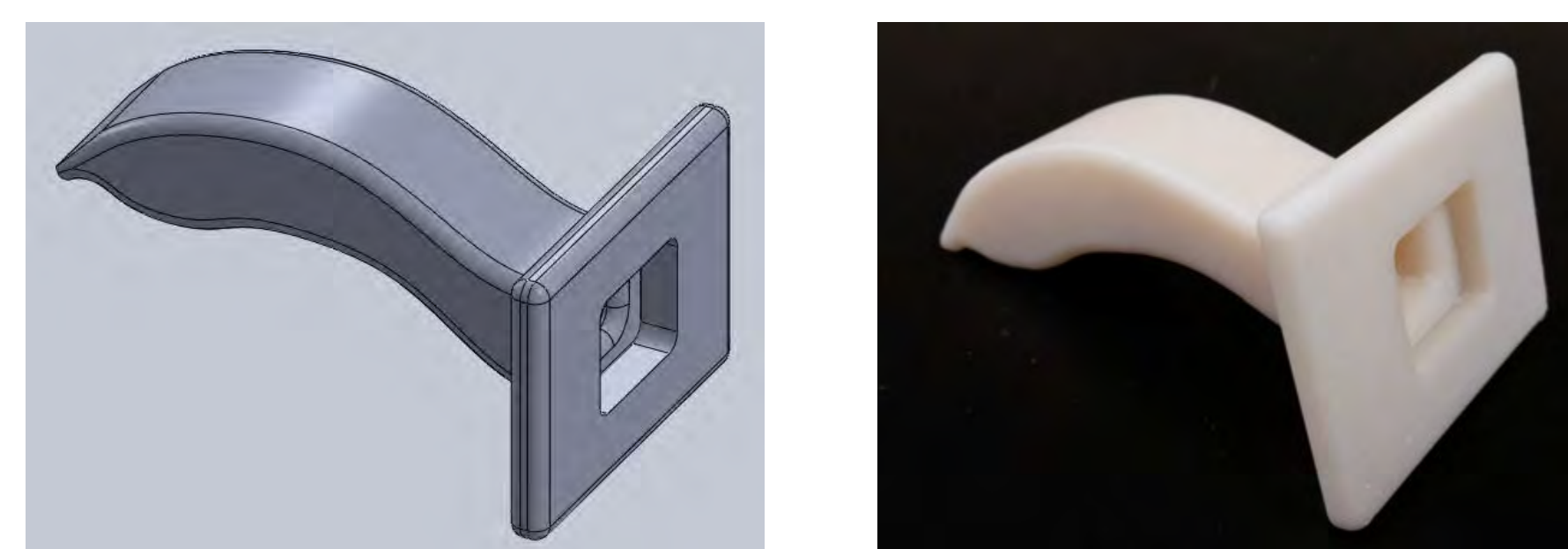
Our program's design courses are largely tied to the "pillars" of the Ignatian paradigm of experience, reflection, and action.

It is essential in these courses that the students don't just hear about the design process and how it can be used; instead, the students are fully immersed in directly **experiencing** design and are coached throughout the process. Students tackle open-ended, hands-on projects involving clients, stakeholders, and/or commercially available products (i.e. "real world" projects). The students approach these projects with a holistic perspective as they answer questions such as: How can I improve the clients' and stakeholders' lives with my design choices? How can I make my design sustainable to help protect the environment and, at the same time, make sense financially? How can I communicate my product's value to clients? In this way, a students "whole person" (mind, heart, and will) is engaged in learning; this learning goes beyond cognitive grasp of concepts.

Throughout the design courses, students are encouraged to

thoughtfully **reflect**. They reflect upon course material, their feelings toward their experiences in the course including client and stakeholder interactions, and their own work. Both design classes have incorporated electronic journals in which students are asked to reflect based on given prompts. Some topics were general, such as the students' goals inside and outside of the course, what design means to them personally and how it has played a part in their lives, their ability to be creative, and what they learned from and felt about various class activities. Other journal prompts were more specific, such as their own roles in energy consumption and conservation. Through this, students were given the opportunity to personalize course material and relate it to their lives in a broader sense.

Finally, the Ignatian and project-based approach of these courses is motivated by the hope that the students will be called to **action** in their lives. Although the long term effects of these courses has yet to be seen, most students have responded that the design courses have motivated them to become involved in related activities outside of class and to become life-long learners.



The CAD model (left) and printed prototype (right) designed by first year design student Karen Sass in collaboration with a surgeon at CUMC.

Collaboration with CUMC

During the fall semester, students in the first year Design and Rapid Prototyping course spent the last several weeks of the semester collaborating with a surgeon in the Creighton University Medical Center. The students were given the surgeon's invention patent documents and tasked with the following:

- Understand the medical device invention as fully as possible (including its intended use and how it will improve an associated procedure)
- Determine what criteria a successful device design would meet
- Sketch design ideas and evaluate which meet(s) the criteria
- Create designs in 3D modeling software to be 3D printed
- Present 3D printed device prototypes to the surgeon for feedback

In the end, students left this course feeling confident about their design skills while also knowing that they helped the lives of others.

Collaboration with Facilities Management

The second year Design and Rapid Prototyping courses are taught collaboratively between English, Communication Studies, and Energy Technology. This year's courses are focused on working with Facilities Management on sustainable design

projects to be implemented on campus. Each student group is working with a client on one of the following projects:

- Finding a sustainable and practical use for groundwater under the Rigge Science Building
- Installing electric vehicle charging stations on Creighton's campus
- Finding a solar solution for preventing the breakage of a heating coil in the Hixson-Lied Science Building
- Installing efficient solar lighting in an area currently in need of lighting

Aside from working closely with Facilities Management, these projects have also helped students make connections with other areas on Creighton's campus, such as Environmental Health and Safety, Public Safety, and the Jesuit community.

By the end of the spring semester (2014), the student groups hope to have completed all four of these projects.

Conclusion

With both of these design courses, students have had experience working on a project with a real client, stakeholders, and design consequences. They were constantly challenged to reflect upon their designs, interactions, and course material. And finally, it's with great hope that this course structure helps the students internalize and personalize their education, which will lead them to action.

We believe that this Ignatian approach to education lends itself beautifully to building bridges between the Energy Technology Program and other areas on Creighton's campus.

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