Activity

4

Metals 1.0: Art & Engineering

Educator: Ross Brown, Faculty, Art
Context: In-class; Engineering 199: Special Topics
Keywords: art in engineering, course reflection, educator feedback
Student Activity Time: 10 minutes

Engineering students reflected on their art and engineering class experience.

Introducing the Reflection Activity

In a special topics art course, Metals 1.0, an educator introduced engineering students to several metal fabrication techniques. At the end of the course, students reflected on the course content and responded to the course experience in several domains. The purpose of this activity was to prompt students to consider the many topics and skills developed in the Metals 1.0 course.

At the beginning of the course, the educator introduced the course journal and provided a list of expected documentation to include in the journal such as welding techniques, specification information, and their project design sketches and notes. In the first half of the art and engineering course, students were introduced to and practiced a variety of metal fabrication techniques. For the second half of the course, students chose any relevant techniques that they previously learned, and applied those skills in an open-ended design project. At the end of the project and the academic term, the educator distributed a reflection form with the following prompts:

1. What process in this course did you find the most interesting and why?
2. What, if anything, did you learn that was new about metal as a material and its uses?
3. What welding process did you find most difficult and why?
4. Is there anything you would like to see added to the offerings of this course?

The educator collected these reflections and analyzed the students' feedback to improve the syllabus and course planning for the next term. After completing the reflection, the students had an opportunity to make sense of the course content and their project, and for many, to value the importance of art and engineering together. The educator was also prepared to make changes to the course schedule and content to ensure students' success in the next term.

DIGITAL LIBRARY CONTENT

4.1 Metals 1.0 Reflection Handout

Recreating the Reflection Activity

	Description
1	Assign the course journal at the beginning of the term.
2	Complete the course project.
3	Distribute the course reflection and remind students to use their journals to complete the reflection.
4	Collect and analyze course reflection feedback.

In the words of the Educator: Tips and Inspiration

Pair the course reflection with journaling. To make the end of course reflection helpful, students need to think about and document their experience throughout the term. Pairing the course with a journal element helps them do that. In the beginning of the term, the journal is just about technical content; how to weld this, what metal is this, melting temperatures and other information that is pretty formal and standard. In the second part of the term, they apply that information to their design project, and start figuring out what else they needed to know, or topics that required more time for students to grasp. Also, having conversations with the students about what is going on in the course is helpful so that you can adjust the content and schedule throughout the term. At the end of the term, they are able to inform their final course reflection with their journal entries, so that they can clearly identify what they needed more time for.

Be flexible enough to respond and create the right environment. You need to be able to improve a little bit—just be loose enough to seize the moments that occur in the classroom. You have to learn how to listen, and in a lot of different ways. This form is just one way of listening to students, but also listen to them in their journals, office hour visits, and regular teaching. The environment has to be improvisational for you and for the students. Sometimes I tell students that I've been teaching for 40 years and I have this "fun for me, trouble for you moment" and not to take it personally, but that I want to understand their perspective. Their form of expression is just as valuable as mine as the educator. It's our job to create an environment where reflection is constant—students are always reflecting, with or without us.

What was the inspiration for the reflection activity? This activity lends itself to balancing unity and variety. It's not easy to balance the two, but it is a beautiful problem, in a way. I see it all the time. I have a class, it's getting boring and I need to do something or I need to get the students to do something to get them active and involved. In a way, the process is just like making art. Making art is a conversation; I'd make something and ask if it is saying what I wanted it to say. If not, I have to do something, so it's back and forth. In one classroom, there is a 3-way conversation because students are having a conversation or exchange

with the material, the tasks they are assigned, and then I throw in my 2-cents. You are always trying to unify those three conversations and unify them, but account for the variety of students and how they individually interact with the material, tasks, and you.

This class doesn't promote that engineering students should become artists. In our society we have very limited shops and hands-on classes in high school and college. We've been downsizing all of that because manufacturing was heading overseas, but now it's coming back again. There's a huge part of the population that learns by doing, so why not learn engineering by doing it? The students that learn by doing are the ones that I really enjoy having in the class.