<u>Under Pressure</u>: Applying active learning modalities in a shop setting

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Guiding Values

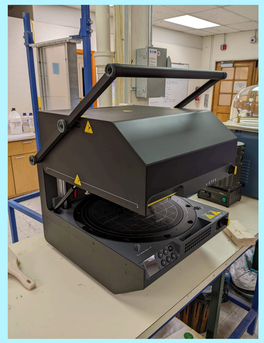
I believe that everyone should have the chance to go on adventures that are fun and fulfilling to each person. One way to open more doors for adventure is for people to spend time sharpening themselves so they can solve problems they run into on their way to their destination. I love helping people in their adventure, and I thoroughly enjoy when others share with me what about their adventure gets them excited. I also thoroughly enjoy sharing what about my adventure gets me excited! Some of the things that get me excited are the “tools” and “toy blocks” that I have found that can allow a person to solve interesting problems in their own adventure. I also enjoy watching other people make progress in their adventure as they use the “tools” and “toy blocks” they gained along the way.

Unique Students

My coworkers are the “students” for my course/seminar, and they are notoriously hands-on learners, so letting them play with the machines as soon as possible is beneficial to their learning. Also, they are experts in their field, smarter than me in their area of expertise, and their expertise translates in ways that I cannot predict. It is important that these seminars are discussion focused, letting them bring up interesting nuances that they discover while making their products. I provide a framework of manufacturing process history, existing building blocks/toy blocks that they can analyze, and just enough knowledge of my own that I can make the learning process faster for them.

My “Course”

As an engineer in the Engineering Shop at UW, I am responsible for teaching my coworkers how to use a pressure forming machine and the types of customer projects it could be used for.



Course Outcomes

Learning Outcome 1: Given a hands-on learning environment guided by myself, my coworkers will be able to **<u>create</u>** a component design and manufacturing plan that **<u>integrates</u>** cost savings and ease of use design recommendations to fabricate a component using a pressure former.

Learning Outcome 2: Given the Engineering Shop’s work environment, my coworkers will be able to **<u>identify</u>** incoming projects where using the pressure former will save time, cost, and/or will produce higher quality results as compared to using other manufacturing processes.

These learning outcomes land on the <u>analysis</u>, <u>evaluation</u>, and <u>creation</u> levels of Blooms Taxonomy in the cognitive domain.

Instructional Strategy

Modified Team Based Learning:

- Flipped classroom with a pre-party that my coworkers must complete before the seminar
- iRAT/tRAT - Define an initial design recommendation list
- Mini-lecture directed by the questions my coworkers bring up
- Solve a problem: Use the pressure former to make several parts. Formative assessment is used as we review their mistakes and successes

Object-Based Learning: Used for formative assessment on how pressure formed objects can, should, and should not be made

Snowball: Used for self assessment and team building

Inclusive Modalities

Multiple Representations: In addition to the hands-on projects that we complete, and the physical project examples that they get to interact with, I included written and video summaries of the topics that we covered.

Assessment

Self-Assessment through Snowballs before and after the seminar: **“What else do you need to know/experience to be ready to use the pressure former to make parts for our customers?”**

Formative assessment was used as they try to figure out how particular objects are made and as they try to make their own components.

Are they able to build a thorough cost savings and ease of use design recommendation list? → **Yes/TBD**

Are they able to identify the constraints, issues, nuances, and benefits of using the pressure former to fabricate particular parts? → **Yes/TBD**

Are they identifying where the pressure forming process can be used in customer projects? → **TBD**

Future Directions

- Continue to gather data as my coworkers do or do not identify customer projects where pressure forming could be used
- Refine how I communicate why this process can be beneficial to use
- Run another seminar or two for the rest of my coworkers