

Design Thinking Hub

Drs. Susan Crichton, Ray Taheri, and Sabine Weyand

Background

Design Thinking is not an exclusive attribute of engineers and designers. Genuinely great innovators in music, art, critical writing, science, and business have practiced and master it. So, why it is called Design Thinking? What is unique about Design Thinking is that the design thinking processes formulates a methodology to extract, teach, learn and apply human-centered skills and techniques to solve problems in a critical, creative and innovative way. Problem solving is a highly valued skills among employers. World class educational institutes must shift from conventional theoretic knowledge base approaches to applied design thinking problem solving approaches.

Project Description

This project provides students, faculty, and staff from all disciplines across UBC Okanagan with experiential learning in design thinking, design manufacturing, and group design work. Students are introduced to design and manufacturing as a process that is human-centered and relies on empathy, ideation, iteration, prototyping, and testing.

This project developed blended learning modules that provide students with the opportunity to obtain certificates (badges) that showcase their knowledge in the following areas:

- ❖ Design thinking (e.g. need finding, need scoping, ideation, and virtual design);
- ❖ Design prototyping and manufacturing (e.g. techniques for building and testing designs);
- ❖ Implementing design thinking and design prototyping in small groups inside or outside the classroom.

This certificate program is available beyond core curriculum requirements and badge 3 will also be integrated into several courses including APSC 171, APSC 169, APSC 258 and STEM education. In the future, the program could also be offered regionally as community outreach. The program leveraged the development of a new makerspace UBCO located in EME 1256.

The program, in collaboration with makerspace UBCO, has access to many rapid prototyping tools, including: 3D prints, 3D scanner, CNC machine, soldering stations, PCB, textile cutting and embroidery, BioRadio, Power tools, and Hand tools. As well as software for 3D modelling/simulation.

Project Execution

The UBCO Thinking Design Hub program created a number tangible elements that make substantial and meaning contributions to the teaching, learning and research environment on campus.

The primary tangible outcome was sustainable online and in person training modules to develop makerspace competence. Also by completing these badges students learn:

- ❖ To apply design thinking to their projects, linking theoretic learning to real world contexts (**Badge 1**)
- ❖ To develop solutions to a well-defined problem (**Badge 1**)
- ❖ To develop virtual prototypes to a problem (Badge 1)
- ❖ To apply design prototyping and manufacturing skills (Badge 2)
- ❖ To select and use rapid prototyping skills (Badge 2)
- ❖ To create a physical prototype to solve a problem (Badge 2)
- ❖ To test and evaluate prototypes (Badge 2)
- ❖ To apply design thinking and prototyping skills in small group work (Badge 3)
- ❖ To use design thinking to work within the varied contexts of advance manufacturing (Badges 1,2, and 3)
- ❖ To apply their badges within specific courses within their program as well as add these badges to their CVs



Figure 1. How to acquire Badge Zero (Safety) badges



Figure 2. Operations Badge Series Conceptual Overview

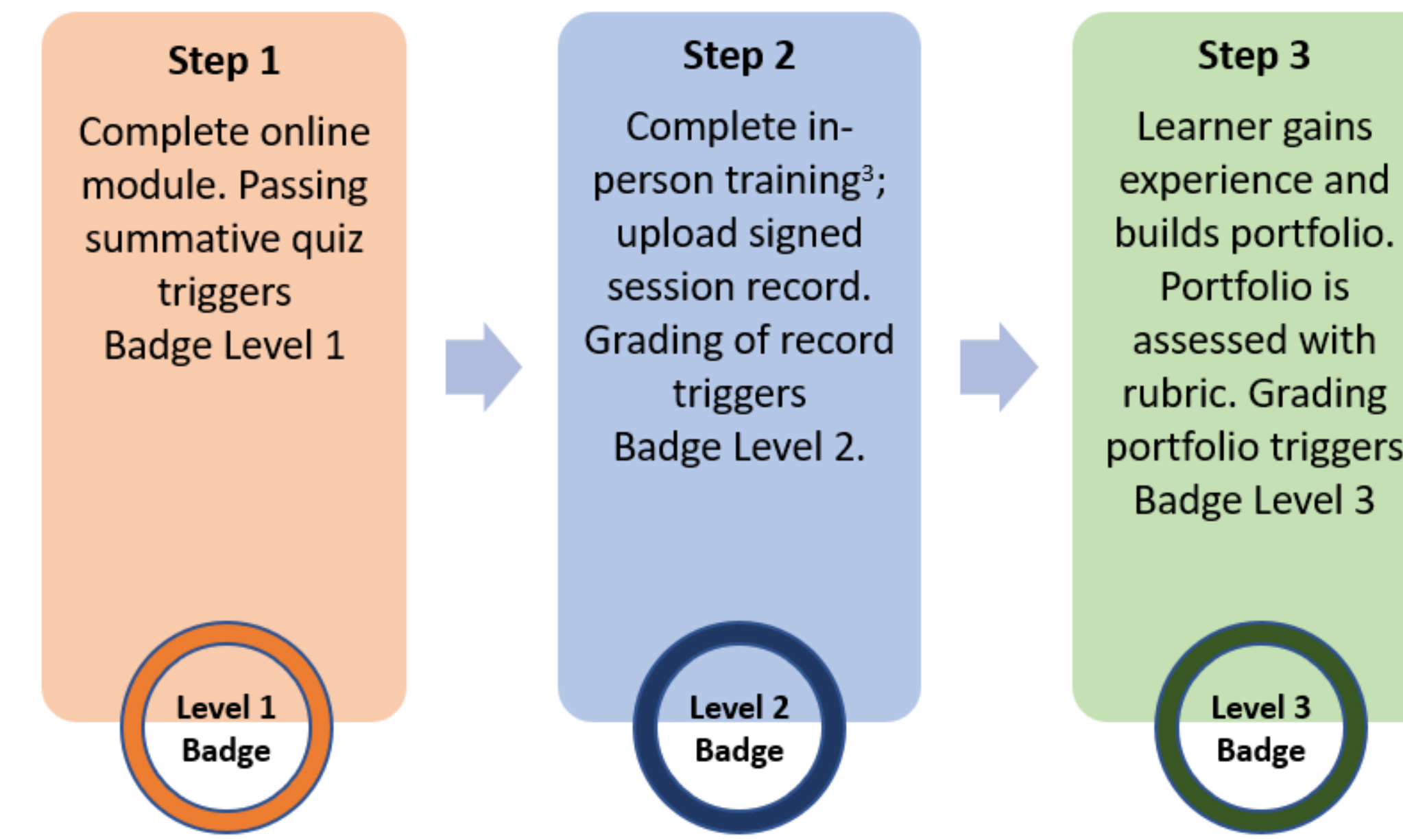


Figure 3. Idealised Operations Badge-earning Process

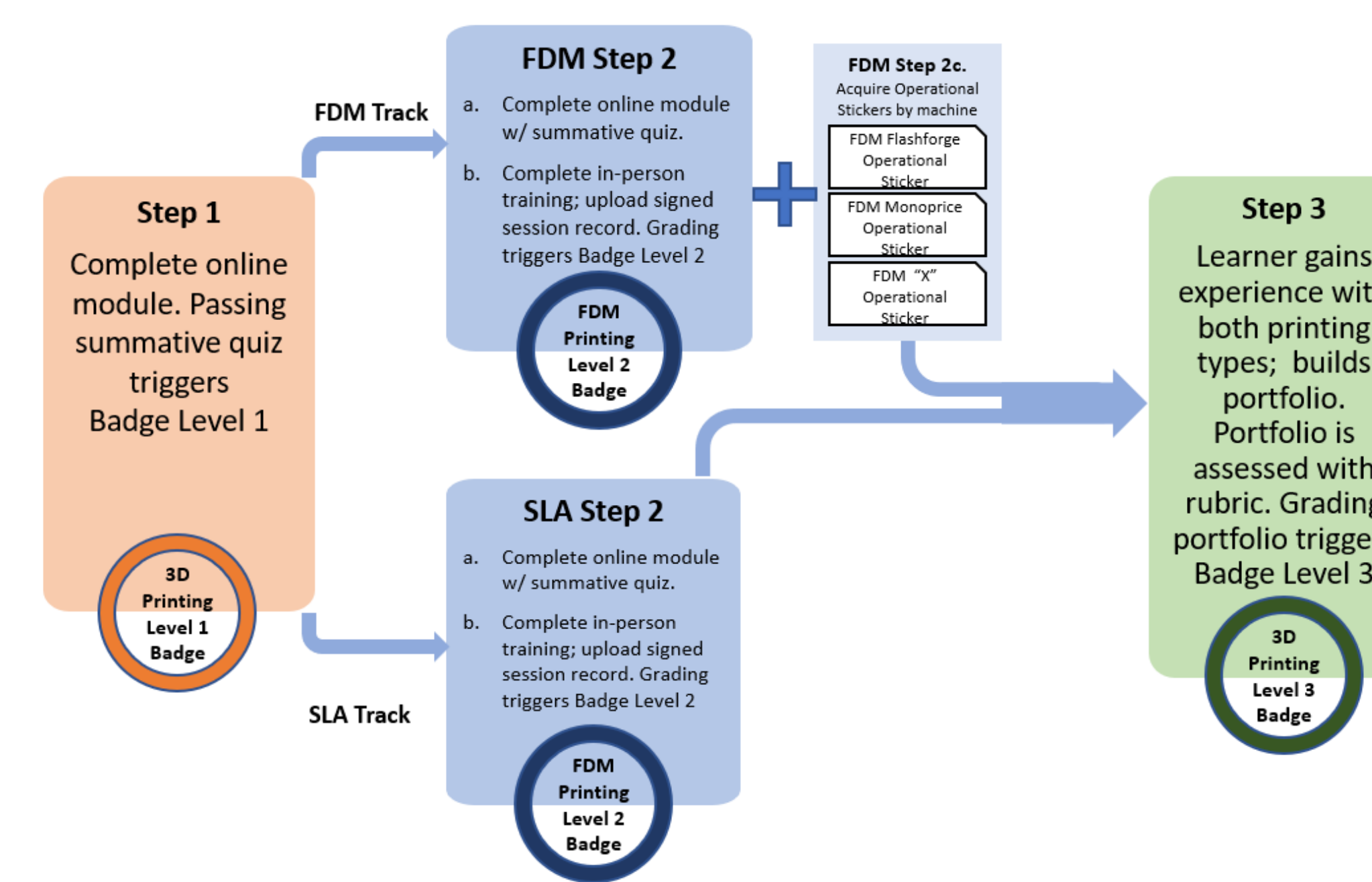


Figure 6. Badge earning process for 3-D Printing

Note common Level 1 and 3 badges, differentiated at Level 2 to account for distinct method differences and multiple manufacturers.

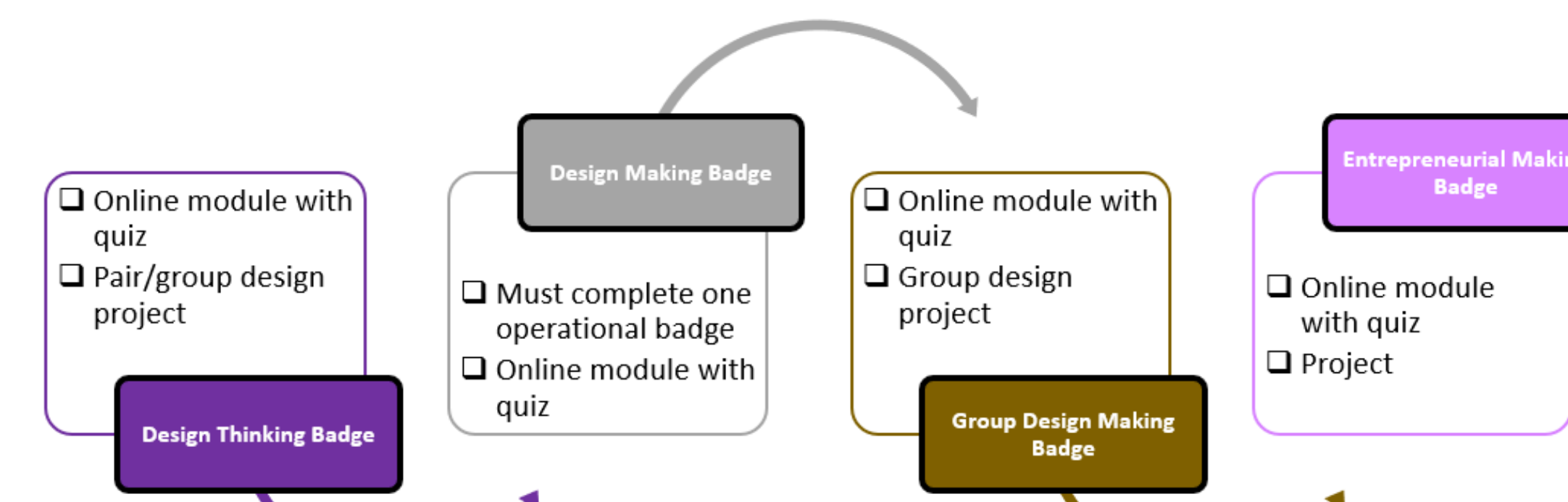


Figure 7. Maker Leaders Program

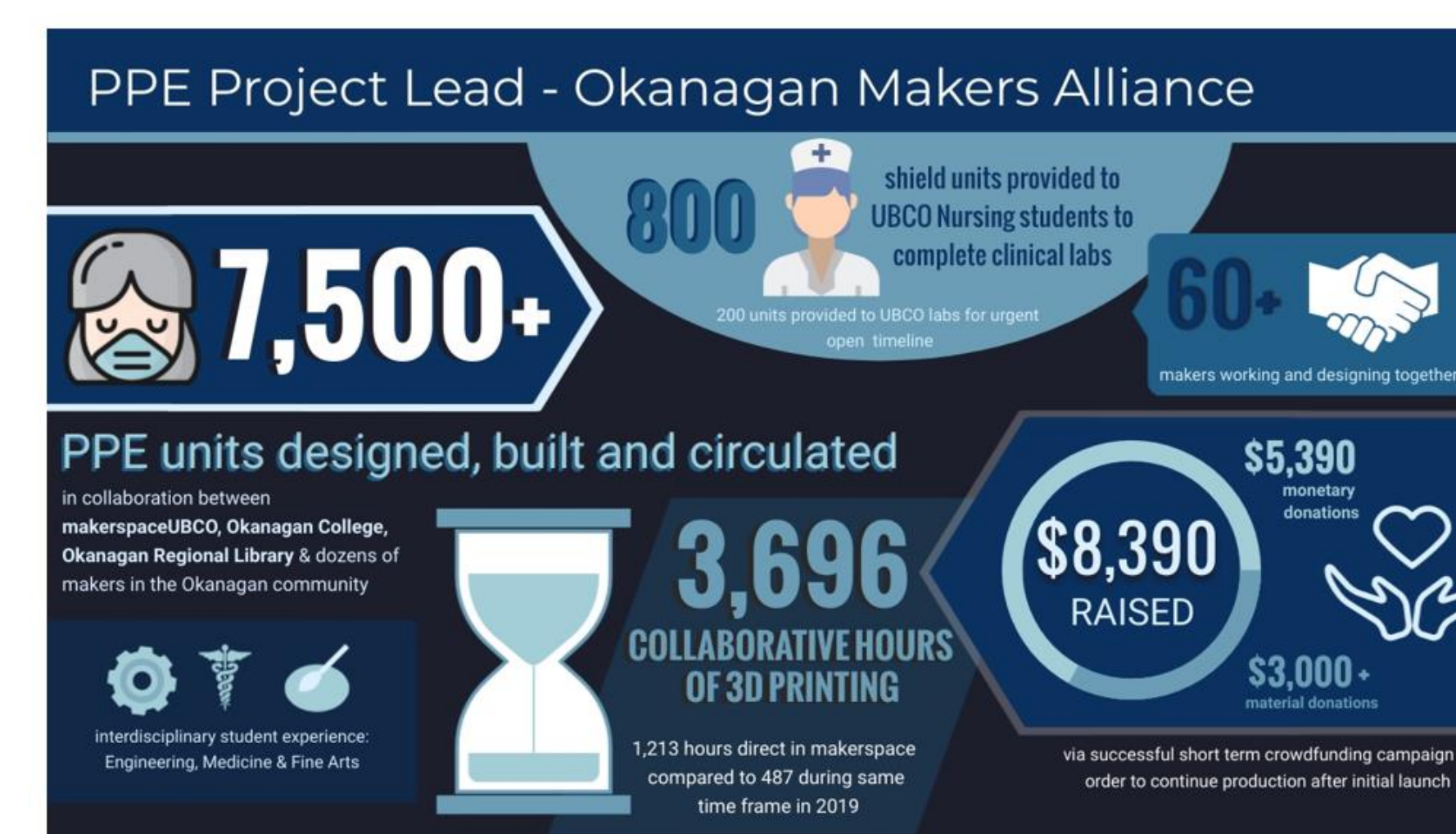


Figure 6. Chart displaying intentional use of space outside of curriculum based requirements, demonstrating passion for the space

Project Impact

The project impact was measured through the number of people from the UBCO community that have completed the badges. As of May 2022 over:

- ❖ 2,293 total number of badges awarded
- ❖ 1,383 unique students enrolled in the canvas module
- ❖ 862 individual users claimed all badges required (meaning in person visit and space use was confirmed)
- ❖ 15 students employed and trained in design thinking and maker equipment
- ❖ 6 young STEM workshops (2 student summer camps/year since 2019)
- ❖ 4 new badges in varying stages of production (to be implemented Sept 2022) including:
 1. makerspace 101- safety and design thinking
 2. 3D printing- additive manufacturing
 3. Electronics- introduction to soldering & microcontrollers
 4. makerspace design process coordinator – student staff onboarding module

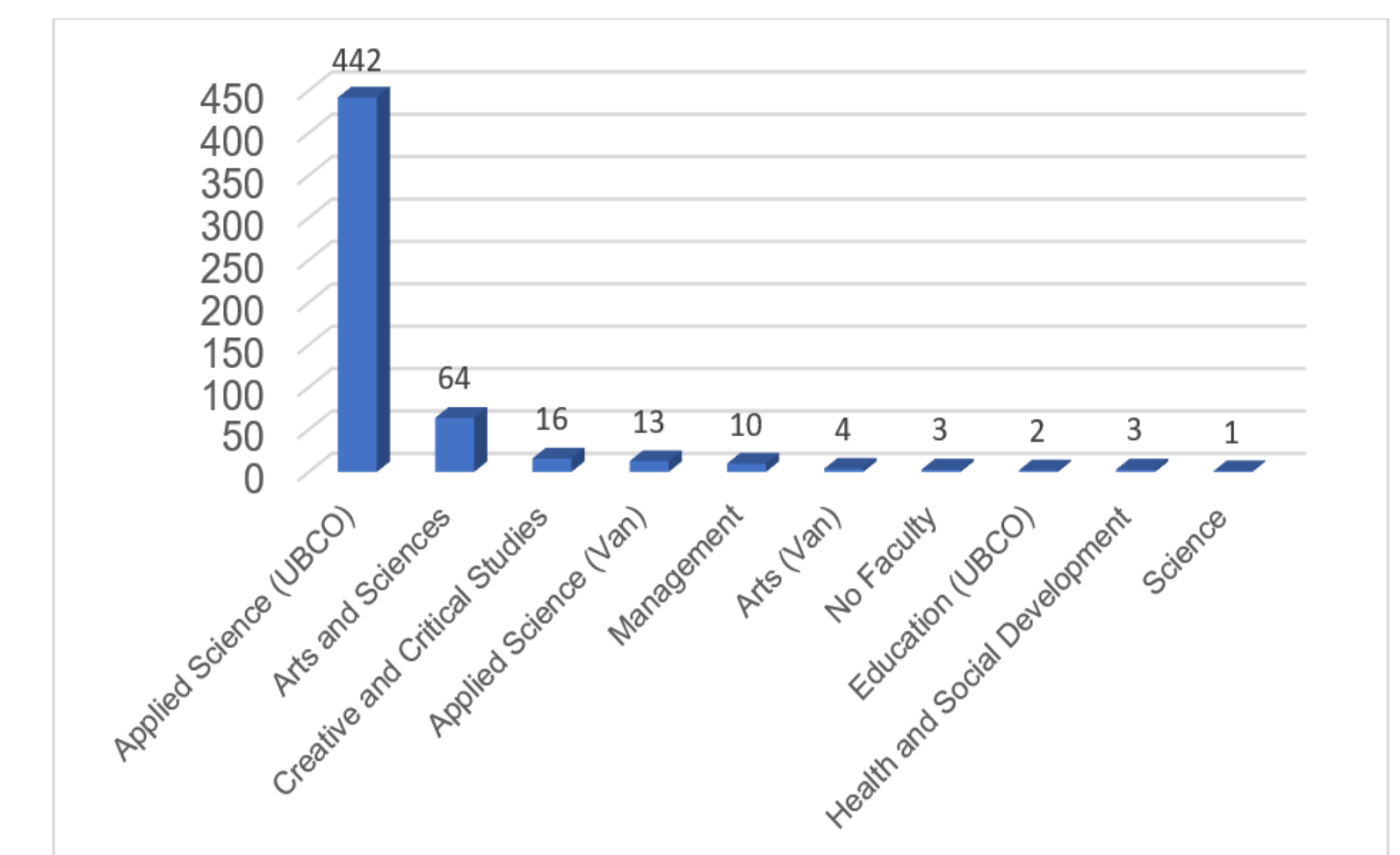


Figure 7. Safety Badge Acquired by the end of 2020

Acknowledgement

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