

ID Brief: Monterey Bay Aquarium Innovation Lab Vinyl Cutter Capstone Project
Spring Semester Module Creation Plan

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Problem Analysis

The Innovation Lab is a maker space within the Monterey Bay Aquarium's (MBA) Bechtel Family Center for Ocean Education and Leadership (Monterey Bay Aquarium, 2022). Their projects grant young people the opportunity to engage in discovery learning, building a sense of their power to positively impact the world and combat climate change. The center additionally engages in outreach efforts that empower classroom teachers to confidently address climate education.

The Innovation Lab houses many tools including 3D printers, vinyl cutters, sewing machines, a laser cutter, hand tools, and a heat press. To use each tool with supervision, participants must obtain a "Level 1 Badge" by completing training on safe and effective use. Prior to the COVID-19 pandemic, the entirety of training was completed in-person. Since the pandemic's advent online instruction has been made for some tools, but the majority still require creation. My efforts will focus upon creation of a "Level 1 Badge" vinyl cutter course.

While all training was initially synchronous, the Innovation Lab's team wishes to capitalize on technology's capacity to deliver the initial portion of the training asynchronously. As Stolovitch and Keeps (2011) point out, this will allow more people in more places to access the training in whatever timeframe works best for them, however often they feel necessary. Synchronous completion of the online coursework in-person will remain an option. Virtual course accessibility will maximize efficiency, significantly cutting down on time and personnel resource utilization in the Innovation Lab, while also allowing novice learners to receive in-person support.

Target Audience

The target audience is 11- to 65-year-old Innovation Lab participants. The lab hosts multiple school field trips, summer programs, and teacher trainings. As the age range is wide, and participants come from a variety of backgrounds, prior knowledge of tools will not be assumed. It will be important to create instruction that aims to meet the needs of novices and that instructs to the lowest level of understanding.

Full Course Agenda

1. Introduction Video and Slides (5 min): Introduce vinyl cutter uses, example projects, the importance of safety, and present course objectives.
2. First Teaching/Learning Activity (3 min): Introduction to vinyl cutter parts
3. Second Teaching/Learning Activity (2 min): Introduction to materials that may be used with the vinyl cutter.
4. Third Teaching/Learning Activity (10 min): Create a design in Adobe Illustrator
5. Fourth Teaching/Learning Activity (2 min): Transfer design to CutStudio
6. Fifth Teaching/Learning Activity (5 min): Instruction on vinyl cutter use
7. Sixth Teaching/Learning Activity (4 min): Safety “Do’s” and “Don’ts”
8. Seventh Teaching/Learning Activity: Troubleshooting tips (4 min)
9. Eighth Teaching/Learning Activity (22 min): In-person vinyl cutter training and sign-off
10. Summary (3 min)

This semester’s efforts will focus on creation of sections 1-3 and 6-8, as deemed appropriate and possible by the Monterey Bay Aquarium’s Innovation Lab team. I am currently awaiting feedback from the SME on the proposal to confirm this plan. It is possible efforts might be assigned to alternate sections of the course based on this feedback.

Learning Objectives

Identification of objectives is an essential initial step for building instruction, providing a reference map, and streamlining efforts. The ultimate goal of this training is to prepare Innovation Lab participants to safely use the vinyl cutter with supervision.

Declarative objectives for this course include:

- 1) Given a job aid, Innovation Lab participants will be able to state the purposes of the GS-24 vinyl cutter major parts with 100% accuracy.

- 2) From memory, Innovation Lab participants will be able to identify four purposes for which the GS-24 vinyl cutter can be used with 75% accuracy.
- 3) Given access to a job aid, Innovation Lab participants will be able to identify materials appropriate to use with the vinyl cutter with 100% accuracy.
- 4) Given access to the GS-24 User's Manual, Innovation Lab participants will be able to identify a common troubleshooting scenario and demonstrate their ability to find the steps to address it.
- 5) From memory, Innovation Lab participants will be able to accurately identify basic safety "Do's" and "Don'ts" with 100% accuracy on presented test questions.

Assessment

It will be determined if declarative objectives are met via test items integrated throughout and presented at the conclusion of the course. Question types will include multiple choice, drag-and-drop, and fill-in-the-blank. When the full course is created, it will be determined if procedural objectives are met by way of test behavior checklists utilized by supervisory personnel as learners physically demonstrate knowledge of steps.

Instructional Strategies

Module learning activities will include video instruction, physical and online job aids, picture references, direct software interaction accompanied by text instruction, and, eventually, in-person training and sign-off. Storyboarded and well-shot audiovisual instruction will provide valuable guidance for physical action, as most of the work is procedural. These videos will be made easily accessible as a reference even after the "Level 1 Badge" is obtained. Job aid references will also be created and made readily available for both online and physical in-person access. Authentic activities with software design and the vinyl cutter machine in the final iteration of the course will optimize transfer.

The course's creation will be informed by behavioral, cognitivist, and constructivist learning theories. As this course requires that participants learn correct safety information, most of the educational material will rely upon objectivist methodologies to effectively convey

accurate safety and operational information. Gagne's Nine Events of Instruction, an instructional theory borne of cognitivist origins, will inform the structure of the course (Harasim, 2017). The multimedia principles outlined by Clark and Mayer (2016) will guide audiovisual choices.

Recognizing the limits of short-term memory, information will be presented in small chunks with frequent engagement check-ins (Stolovitch & Keeps, 2011). The behavioral concept of programmed learning will be incorporated – small steps will be followed by simple testing before students move on to the next item. Confirming or corrective feedback will be provided after each miniature assessment and the opportunity to retry will be offered after each question. This will be done to increase engagement and motivation through success (Bonaiuti, 2011). The timing of course completion will be student-directed, allowing for pausing and review of previous materials, empowering students to curate their own learning experience.

The mantra recommended by Stolovitch and Keeps (2011) will guide the design of this course. It will be “learner-centered” and “performance-based.” Learner performance will be elicited through frequent quizzes and, eventually, software design and hands-on vinyl cutter use.

Resources

The Monterey Bay Aquarium utilizes the learning management system (LMS) Thinkific. This LMS's standalone course-building space integrates well with multiple software and offers 24/7 support (Raounda, 2022). The course I create will be housed within this learning management system.

The skeleton of basic instruction exists for the vinyl cutter in the form of two Google Docs and a Google Forms seven-question assessment quiz. One Google Doc is a simple introduction that includes images, text, and a link to the GS-24 vinyl cutter user's manual (Roland DG Corporation, 2015). The other is a procedural checklist for vinyl cutter skill

demonstration. I will use these existing materials as a reference and will integrate relevant elements.

Subject matter expert Katy Scott has communicated that professional videography tools, filming personnel, and talent are available through MBA. The videos already in place for the 3D printer tool are simple, but effective. I will utilize these video templates, continue to research existing training, and collaborate with the MBA team to optimize the scripting and production of instructional videos.

Current MBA Thinkific courses incorporate products made with Adobe Spark, Nearpod Jamboard, Screencastify, Flipgrid, Educreations, Google Earth, iMovie, and Kahoot! It is my intention to create the majority of the course with either Articulate 360 Storyline or Articulate 360 Rise. However, the MBA Thinkific currently utilized tools may also be integrated, based upon SME feedback.

References

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