IDD Development, Implementation, and Evaluation

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IST 522: Instructional Design

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Brief Introductory Info

Your Name	Amanda Philbrick
Your IDD Topic	Safe and Effective Vinyl Cutter Use
Organization	Monterey Bay Aquarium Innovation Lab
Learners	Innovation Lab Participants

An Introductory Note

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 also engages in outreach efforts that empower classroom teachers to confidently address climate education.

My subject matter expert (SME), MBA Education Programs Director Katy Scott, has provided a wealth of helpful information and support. My identified project is creation of a Thinkific instructional course that will accompany direct in-person training and final sign-off on one of many learning tools in the lab. The target audience is 11- to 65-year-old Innovation Lab participants.

The Innovation Lab houses many tools including 3D printers, vinyl cutters, sewing machines, a laser cutter, hand tools, and a heat press. To use them 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 advent of the pandemic online instruction has been made for some tools, but the majority still require creation. Finalization of which tool(s) I will create instruction on is pending, but at this time I am focusing my efforts on vinyl cutter instruction.

There have been no noteworthy changes to this plan since the submission of my IDD Instructional Strategies and Activities paper on this project.

Development Plan

The final capstone deliverable is projected for completion between late October and early November 2023. Implementation data analysis and final reporting will follow in December 2023 preceding my December graduation from the MIST (Master's in Instructional Science and Technology) program.

My capstone proposal will be finalized in the Spring 2023 IST 520 course. Spring 2023 will also see the creation of at least one module, including content and assessments. This module will be presented to my SME Katy Scott for feedback.

In Summer 2023, I will create testing measurements and assessments as I continue to build out as much of the final deliverable as possible. This build-out will facilitate test piloting of the course to garner participant feedback, guiding changes to the final product. My SME, Katy Scott, has reassuringly notified me that this timeline aligns perfectly with anticipated summer field trips to the Innovation Lab; there should be many ready participants to support evaluation.

This Fall 2022 semester has been devoted to establishing the client (the Monterey Bay Aquarium's Innovation Lab), identifying the SME (Katy Scott), completing assessments, and building out concepts for the projected deliverable. Ongoing communications with Katy Scott will solidify objectives, content, and design.

Project Deliverables & Schedule/Timeline

1. Learning Objectives
    a. *Status:* Learning objectives have been formulated based on an initial meeting and email communications with MBA stakeholders. Final approval is pending upcoming

SME meetings and feedback. My next meeting is scheduled for December 2022, with plans to arrange a January 2023 meeting date at that time.

b. *Estimated finalization date:* January 2023

c. Based upon the initial SME meeting, my understanding is that the final learning objective will be akin to: “Innovation Lab participants will be able to use the Innovation Lab vinyl cutter with supervision to create and cut a design with the use of job aids and references, without injury.” Mid-December and mid-January SME meetings will serve to clarify objectives, timelines, and goals.

2. Storyboarding the Seven Proposed Course Modules

    a. *Status:* Upcoming

    b. *Estimated finalization date:* February/March 2023

    c. The proposed vinyl cutter course will include seven succinct eLearning modules with integrated assessments and learning activities. The modules are currently slated to be: (1) Introduction to vinyl cutter parts, (2) Introduction to materials that may be used with the vinyl cutter, (3) Create a design in Adobe Illustrator, (4) Transfer design to CutStudio, (5) Instruction on vinyl cutter use, (6) Safety “Do’s” and “Don’ts,” and (7) Troubleshooting tips. Storyboards will be created for each of these modules which will detail the script, visual video content, integrated quiz questions and assessments, guided activity instructions, and linked resources. These storyboards will be drafted and presented to my SME for approval, facilitating early optimization and preventing waste of valuable time and resources.

3. Module Draft and Pilot Test

a. *Status:* Upcoming

b. *Estimated finalization date:* April – July 2023

c. An initial module draft will follow the approval of storyboarded strategies developed in the proposal. Formative evaluation testing will be conducted to ensure the module is easy to navigate, that it effectively meets finalized objectives, and to identify any areas that require modification. Volunteer summer field trip participants will support the formative evaluation process. Ideally, participant groups will reflect a wide range of ages and experience-levels, facilitating evaluation across the anticipated spectrum of student backgrounds. Feedback will be elicited from sample groups and my SME, guiding optimization and revision.

4. Finalized Course

    a. *Status:* Upcoming

    b. *Estimated finalization date:* October – November 2023

    c. The final course will reflect the feedback obtained from the test pilot participants, my SME, and any involved Innovation Lab stakeholders. I will collaborate with the Monterey Bay Aquarium education team via my SME to obtain final approval and course launch dates.

Potential Challenges & Contingency Planning

I am very fortunate to have secured a supportive relationship with SME Katy Scott. While the MBA team is very busy, Katy has demonstrated great generosity, providing abundant time in our initial face-to-face meeting to acquaint me with the space, answer my questions, and introduce me to the Innovation Lab's team members. She offered to arrange monthly meetings to facilitate course development and expressed appreciation for the anticipated work I will be

completing. We currently have upcoming meetings scheduled in December 2022 and January 2023. While I know that consistent SME communication can be one of the greatest challenges students in the MIST program face, I am optimistic that Katy will be reliable and responsive, for which I am very grateful. Additionally, the MBA team member who facilitated my SME relationship – the MBA Director of Learning and Engagement, Brianne Fitzgerald – is a former MIST student who has offered her advisement as needed.

Even with the advantages with which I am fortunate to begin, it will be wise to anticipate time management as a possible challenge. In collaboration with my capstone advisor Dr. Evanick, I plan to communicate with the Innovation Lab team well ahead of time, ensuring timelines for preliminary module provision, test piloting, and final deliverables are known. Providing ample time for coordination will allow contingencies to be arranged when unforeseeable events potentially result in rescheduling. I work well with deadlines, and always strive to complete assignments with a degree of time cushioning, allowing for unforeseen technology malfunctions, emergencies, etc.

One of the most compelling reasons for my application to the MIST program was a desire to build my technical competencies. With limited experience, I anticipate that one of my greatest hurdles will be establishing competence with the technologies I utilize to create the eLearning modules. I am, however, excited to tackle this barrier and learn in the process. The cursory introductions to multiple applicable technologies I received in IST 501 under Professor Beem's tutelage were valuable. Not only was I provided with a baseline knowledge of available tools and their functions but completing the IST 501 assignments informed me that answers to questions that arise are available via software guides and the internet community. I look forward to engaging in upcoming technology courses that will expand my skillset. I will consciously strive

to enjoy the process because I believe that the more fun I have along the way, the more I will learn.

Implementation Plan

The final eLearning course of seven modules will be made available via the Monterey Bay Aquarium's learning management system (LMS) Thinkific. This online portion of the vinyl cutter course will ultimately be made available for asynchronous completion in the homes of Innovation Lab participants. As Stolovitch and Keeps (2011) point out, this will allow more people in more places to access the training in the timeframe that works best for them, however frequently they feel is necessary. Virtual accessibility will cut down on time and personnel resource utilization in the Innovation Lab, maximizing efficiency. Asynchronous completion in the Innovation Lab may also be an option, but this opportunity will be limited by Innovation Lab staff availability and resources.

Of note, modules that require use of Adobe Illustrator and CutStudio software can only be completed at home if Innovation Lab participants possess personal access. If participants do not have these tools available at home, they will be able to complete these sections when they go to the Innovation Lab for the final required synchronous portion of the course.

The course's eighth learning activity is a hands-on vinyl cutter skill sign-off in the Innovation Lab, overseen by certified supervisory personnel. This learning experience in an authentic environment is completed with the goal of maximizing transfer (Stolovitch & Keeps, 2011). Guidance will be provided by the supervisor with the support of an authorized performance checklist that allows assessment of whether the learner has met objectives, facilitating corrective and supportive feedback (Stolovitch & Keeps, 2011).

Instructors and/or Administrators

The subject matter expert for this project is the Monterey Bay Aquarium Education Programs Director Katy Scott. She is the main point of contact and will be responsible for coordinating the learning process and providing final sign-off. It is possible that other MBA Innovation Lab team members, such as the vice president of education Dr. Jenny de la Hoz, may also be involved in the final sign-off process.

The course's design plan includes the creation of multiple instructional videos. Katy Scott has communicated that professional videography tools, filming personnel, and talent are available through MBA. I will coordinate with Katy Scott to facilitate contact with the professional filming team and will collaborate with the MBA team to optimize the scripting and production of these videos.

While a goal of the eLearning course is to allow for asynchronous completion, ideally, administrative personnel will support arranging in-person beta testing, facilitating direct, immediate feedback.

The final section of the course requires hands-on vinyl cutter sign-off with certified instructors. I will need to determine the degree of training required to prepare the certified personnel to support this portion of the sign-off. It is possible that this training is already integrated into higher Badge Level sign-off and may not require my support. Minimally, arrangements to coordinate supervisor availability will be necessary. Supervisors will need to be available for meetings that finalize the sign-off process. A schedule will need to be built that establishes supervisor availability for in-person sign-offs.

Other Implementation Requirements

The majority of the course's modules will be completed online and will be available in the Thinkific LMS Innovation Lab training section. The final module will be completed in the Innovation Lab via the established field trip program.

This project was provided to me by the Innovation Lab team and is already approved by the Monterey Bay Aquarium for creation. It is my understanding that the field trip schedule is well-established, and that marketing of the course is unnecessary, but I will confirm this assumption with my SME.

Evaluation Plan

The course will undergo multiple formative evaluations and final summative evaluations. SME and Innovation Lab team members' feedback will comprise most of the formative evaluation data. Summer field trip Innovation Lab participants will provide valuable user feedback in the test piloting phase. Summative evaluation will be conducted in the final stage, projected for October – November 2023, facilitating final modifications in December 2023 before delivery.

Formative Evaluation

Formative module evaluations will take place throughout the creation process. Rothwell et al. (2016) describes four major formative evaluation methods. I intend to implement the formative evaluation strategies they describe of (1) expert reviews by SMEs and both (2) individual and (3) group pilot testing.

Storyboards, scripts, and drafted proposals will be presented to my SME for feedback. Monthly meetings with my SME will facilitate ongoing communications that allow corrective action to be implemented early. As Rothwell et al. (2016) advise, I will elicit SME feedback on course materials, audiovisuals, case examples, and content. Catching mistakes or areas that

require optimization early in the process will minimize the need for massive revisions late in development.

The more user feedback I can gather, the better prepared I will be to identify modification needs – of delivery style, formatting, questions, pause points, general clarity, etc. Innovation Lab summer field trip participant course participation will provide most of this user feedback. As the course is to be housed in the LMS Thinkific, I may be limited in my ability to elicit thoughts from users not enrolled in the MBA's education program; perhaps preliminary versions housed in the authoring tool outside the LMS may allow classmates, professors, etc. to participate and provide additional critiques. As Stolovitch and Keeps (2011) assert, it is critical to gather detailed feedback on the front-end when creating eLearning content; when the online course is launched, many will have no accessible instructor support.

Summative Evaluation

The Kirkpatrick Four-Level Evaluation framework is comprised of (1) learner satisfaction (also referred to as "Reaction"), (2) new knowledge or skill acquisition (also called "Learning"), (3) implementation or transfer of knowledge or skill to the workplace (also called "Application"), and (4) actual impact on the organization's desired outcomes (Rothwell et al., 2016). Beyond this four-level evaluation framework, the Phillips ROI model adds an additional fifth level: return-on-investment (ROI) (Mindflash, n.d.).

- **Reaction (Level 1)** will be evaluated via learner surveys administered upon completion of the course. It is important to remember that, while this type of assessment provides valuable data, it is highly subjective and studies have demonstrated little correlation between learner reaction and actual learning and transfer (Rothwell et al., 2016).

- **Learning (Level 2)** will be evaluated throughout the course via check-in quizzes and the final procedural skill sign-off facilitated by supervisors. Data collected from these quizzes and behavioral checklist performance may be utilized for statistical analyses.
- **Application (Level 3)** is unlikely to undergo systematic evaluation. Learners may be encouraged to provide feedback on their future projects within the Innovation Lab. Documentation of created works after training completion could provide data on the degree to which learning was implemented. I will communicate with my SME and the Innovation Lab team to determine if and how they would like to gather this type of data.
- **Impact (Level 4)** may be measured in determining the degree to which asynchronous completion of online portions of the course reduces the labor and personnel required to sign off participants. If the dissemination of this course demonstrates an impact that reduces the labor and resources of Innovation Lab personnel, it may support creation of more instructional modules to address the rest of the tools the Innovation Lab houses.
- If completed, data collected to assess the 'Impact' could support evaluation of **ROI (Level 5)**. Quantitative ROI evaluation would likely prove challenging, but as the course will be student-created, it is my hope that the ROI will benefit the organization given the degree of student input.

As Rothwell et al. (2016) assert, the resources and effort of evaluation increase as the levels go up. I will communicate with my SME and key stakeholders to determine the degree to which evaluation of reaction, learning, behavior, impact, and ROI are desired.

Summary

The development, implementation, and evaluation of this course on safe and effective vinyl cutter use for MBA Innovation Lab participants is largely theoretical at this point and is pending SME approval. It is valuable to have a preliminary plan in place, creating a framework around which specific goals and timelines can be organized.

Creation of storyboards, initial modules, and preliminary mock-ups will facilitate initial and ongoing formative evaluations that dictate modifications and allocation of labor. Feedback from my SME and stakeholders in the Innovation Lab will be critical for direction, as will the results of pilot testing with summer field trip Innovation Lab participants.

The depth and degree of desired summative evaluation will be discussed with my SME and Innovation Lab team members. Their input will determine if assessment is to go beyond the initial levels of “Reaction” and “Learning.”

The development, implementation, and evaluation of this course will be conducted in a collaborative fashion. I will seek direction and apply myself in developing the skills necessary to be successful in this endeavor. Ultimately, I hope that the creation of this course will benefit the Innovation Lab team and many participants in years to come.

References

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