IDD Instructional Strategies and Activities

Amanda Philbrick

Instructional Science and Technology, California State University, Monterey Bay

IST 522: Instructional Design

Dr. Sheryl Hathaway and Dr. Gary Rauchfuss

November 22, 2022

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.

Media and Delivery System Decisions

Delivery Format(s)

Stolovitch and Keeps (2011) identify four major types of training: receptive, directive, guided, and exploratory. Most of this instructional course's content falls into the category of directive training. Clear performance objectives are matched with test items, and learners are guided to engage in meaningful activities "as they progress along predetermined paths" (Stolovitch & Keeps, 2011, p. 122 – 125). As a major component of this training is safety assurance, learner self-direction is curtailed at this stage. Successfully attaining a "Level 1 Badge" will set learners up to later engage in guided discovery learning, implementing the skills they gain in this course to tackle case studies and presented challenges.

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). As it was created primarily as a marketing rather than an instructional tool, it can present challenges for complex course design and website creation flexibility is limited. To familiarize myself, I have completed multiple MBA Thinkific courses, including the Innovation Lab's "General Safety" and "3D printer" classes. I have noted that multiple media formats can be integrated, navigation is straightforward, and visual design is unobtrusive. I plan to address questions regarding my ability to integrate knowledge checks, closed-captioning, and alternate language options with my SME, Katy Scott, at an upcoming meeting in early December.

Based upon her work with current capstone students, my professor Dr. Sarah Evanick informed me that Thinkific supports integration with Adobe Captivate. At the SME meeting next month, I will inquire further into which eLearning authoring tools are compatible with MBA's Thinkific platform, which are recommended, and if MBA provides access to any of these software tools. The identified authoring software will be utilized to create approximately eight to nine modules on safe and effective vinyl cutter use.

Based upon student hardware and software access, the first modules may be completed either asynchronously at home or synchronously at the Innovation Lab. Final hands-on instruction, assessment of procedural understanding, and ultimate "Level 1 Badge" sign-off will take place synchronously in the Innovation Lab under certified personnel supervision. The goal of this blended approach is to maximize students' ability to access and retain information, while also providing the essential concrete experiences that transfer learning.

While all training has previously been 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 for them, and however often they feel is necessary. Additionally, virtual accessibility will cut down significantly on time and personnel resource utilization in the Innovation Lab, maximizing efficiency. In-person, synchronous completion of this online coursework will, however, also remain an option. This will facilitate provision of the support some novice learners may require.

Media

Media will include video instruction, physical and online job aids, picture references, direct software interaction accompanied by text instruction, and in-person training and sign-off.

Well-crafted audiovisual instruction will provide valuable guidance, 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 will optimize transfer.

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 some elements.

Subject matter expert Katy Scott has informed me 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.

Audio and visual elements within videos will be conscientiously combined. The dual channel principle advises that auditory and visual information are processed in two separate channels; well-scripted audio instruction that accompanies a carefully filmed video can maximize understanding (Clark & Mayer, 2018).

The limited capacity principle warns that learners are only able to “process a small amount of information in each channel at any one time” (Clark & Mayber, 2018, p. 261). Keeping this in mind, I will avoid overloading the visual processing channel with overlapping images and text.

For novice learners, studies have demonstrated that “a series of still frames resulted in learning that was as good as or better than the animated versions” (p. 263). If the available technology offers simple animation options, I will carefully consider if still frame presentation can instead be implemented in alignment with cognitive processing principles. Simplicity and effectiveness will be prioritized.

As the online training will often be completed prior to hands-on viewing and interaction in the lab, it cannot be expected that learners will have achieved full transfer of course content. Simple job aids will be made easily accessible online both during and after the course. Physical reference sheets will additionally be created for ready access in the lab. These job aids will incorporate carefully selected visuals that include only relevant information. As Clark and Mayer (2018) advise, “especially for novice learners, removing non-essential details from visual representations may be advisable (p. 263).

This training will culminate in authentic experiences. Hands-on interaction with the software tools Adobe Illustrator and CutStudio will be facilitated. The final training and sign-off will take place with the vinyl cutter in the Innovation Lab. Training will remain “learner-centered” and “performance-based” as Stolovitch and Keeps (2011) recommend.

Instructional Strategies and Activities

Agenda Explanation

The agenda of this course is informed by an intention to maintain triangulated alignment among objectives, learning activities, and assessments. Iterative analyses within “an intentional learning environment” (Dempsey & Van Eck, 2018, p. 230) will support alignment.

Recognizing the limits of short-term memory, information will be presented in small chunks with frequent engagement check-ins (Stolovitch & Keeps, 2011). It is known that,

without preexisting knowledge, about four chunks of information can be held in short-term memory. If this data goes untreated, it disappears within 10-15 seconds (Stolovitch & Keeps, 2011). Recognizing this, B.F. Skinner's behavioral concept of programmed learning will be implemented – many 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 small assessment. The opportunity to retry will be offered after each question. This will be done to increase engagement and motivation through success (Bonaiuti, 2011).

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, software design, and hands-on vinyl cutter use.

Agenda

1. Introduction Video and Slides (5 min): Introduce vinyl cutter uses, example projects, the importance of safety, and identify 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)

Teaching/Learning Activities

Introduction (5 min): Introduce vinyl cutter uses, example projects, the importance of safety, and identify objectives

The introductory module will address the first and second steps of the *Five-Step Model for Structuring Training* that Stolovitch and Keeps (2011) prescribe: *rationale* and *objectives*.

The purposes for which the vinyl cutter may be used will be introduced in video format. To gain attention, specific examples of products created with the vinyl cutter will be given. If possible and appropriate, volunteer participants may be asked to briefly present their work in a video. In an upcoming meeting with my SME, I will inquire as to the ability to gather case examples and presenters. A slide will reiterate vinyl cutter uses within the context of examples, allowing for critical information to be reviewed with the attached meaning gained from case examples.

Within this introductory section, it may be reasonable to incorporate a non-example of a broken device or a failure to maintain safety standards that resulted from improper use of the vinyl cutter, solidifying the rationale for completing this safety training.

In providing clear examples and non-examples of vinyl cutter use, the adult learning principle of *readiness* that Stolovitch and Keeps (2011) identify is met. It is made clear that this training provides an opportunity for growth and helps to avoid a problem.

Explaining the ultimate objective to learners is not a step to overlook. Stolovitch and Keeps (2011) relate that research "demonstrates the value of clarifying to the learners what it is they will be able to do at the end of the…course…The clearer…it is for the learners, the higher the probability they will learn it" (pp. 72 - 79). Having established the rationale for this training, the objectives of the course will be listed in the final introductory slide. The Innovation Lab participants, upon completion of this course, will be able to design and physically create vinyl cutter products with supervision and access to job aids.

Final decisions on which portions of this introduction will be in slide or video presentation format will be made based on available resources and known learner principles. Important details, including a clear list of objectives and a list of vinyl cutter uses will be

presented in both slide and video format to allow for review within the course and to minimize cognitive load.

The audience's age will range from 11-year-old to 65-year-old learners. It will be important to instruct for the lowest possible experience level. Providing encouragement, alongside clear guidelines, will aim to speak to all experience levels. The training will state that, regardless of experience level, successful completion of training is required to use tools within the Innovation Lab.

First Teaching/Learning Activity (3 min): Introduction to vinyl cutter parts

A succinctly scripted and shot video will introduce the learner to vinyl cutter parts. The video will pause twice for check-in quiz questions. One question will ask the participant to demonstrate understanding of information already provided, while the second will request that they guess the purpose of a part to which they are about to be introduced. This will be done in accordance with the adult learning principle of *action* (Stolovitch & Keeps, 2011).

A visual aid slide with labeled vinyl cutter parts will be provided. A job aid link will be made available online in the final section of the module; the learner will be informed of this access. A physical job aid will also be available in-person in the Innovation Lab directly beside the vinyl cutter.

A note will be included that, if you are completing this online training in the Innovation Lab, you are encouraged to ask a supervisor with the appropriate badge level to introduce you the vinyl cutter before proceeding.

This section will conclude with a drag and drop quiz of the vinyl cutter parts, eliciting active participation and review.

Steps four and five of Stolovitch and Keeps' (2011) *Five-Step Model for Structuring Training* are *evaluation* and *feedback.* All instructional modules will include check-in evaluation quizzes like this "drag and drop" quiz to verify if understanding has been achieved and to identify gaps that require support. Corrective or confirming feedback will immediately follow evaluations, followed by encouragement to attempt again if needed. Within the course, these evaluation and feedback opportunities may be labeled as "learning checks" or "practice exercises" rather than "quizzes" or "tests" to mitigate the fear the latter terms can elicit (Stolovitch & Keeps, 2011).

Second Teaching/Learning Activity (2 min): Introduction to materials that may be used with the vinyl cutter

A short video will present appropriate materials that may be used with the vinyl cutter, as well as non-examples of materials that cannot be used. A check-in multiple choice quiz question will be integrated into the video. The learner will be met with correcting or confirming feedback and the opportunity to retry if needed.

A review slide will list appropriate materials introduced in the video. A job aid link will be made available online in the final section of the module; the learner will be informed of this access. A physical reference will also be available in-person in the Innovation Lab directly beside the vinyl cutter.

A short two- to three- multiple choice quiz will follow the video. Confirming or correcting feedback will follow quiz completion with the opportunity to retake the quiz if needed. Feedback to one of the quiz questions will include an example of the negative results of using a non-recommended material, maximizing meaningfulness for the learner.

Third Teaching/Learning Activity (10 min): Create a design in Adobe Illustrator

The third step in the Stolovitch and Keeps' (2011) *Five-Step Model for Structuring Training* is *activities*. This module requires hands-on engagement navigating Adobe Illustrator software.

Learners will be provided a step-by-step guide requesting that they open Adobe Illustrator and follow provided instructions to create one of multiple possible simple designs. The learner will be notified that, if they are completing this course at home and do not have access to the Adobe Illustrator, this portion of the training will be completed in the Innovation Lab.

The adult learning principles of *experience* and *autonomy* will be addressed in this module. Specific supportive guidance will be provided, but participants with prerequisite experience will be encouraged to create designs as complicated as their skill levels permit. All learners, regardless of skill level, will be provided multiple design options to choose from, incorporating a degree of autonomy into the training's structure.

This activity successfully incorporates the adult learning principle of *action*. The admonition of Stolovitch and Keeps (2011) to "Above all, keep…training active" (p. 126) is honored.

The *experience* of learners will be acknowledged in a note that advises learners may alternatively use CorelDraw or InkScape if they are familiar with one of these software tools. If learners have home access to software, they may choose to use them. I will confirm which software are available for use in the Innovation Lab with my SME.

Fourth Teaching/Learning Activity (2 min): Transfer design to CutStudio

This module continues to incorporate *activities*, the third step in Stolovitch and Keeps' (2011) *Five-Step Model for Structuring Training*. Hands-on procedural engagement with

software is required as learners follow simple step-by-step guidance to transfer the design they created in Adobe Illustrator, CorelDraw, or InkScape to CutStudio.

Fifth Teaching/Learning Activity (5 min): Instruction on vinyl cutter use: Loading the material, turning the machine on, setting the origin, removing the vinyl background, and shutting down the machine

A carefully scripted and shot video will demonstrate the steps to operate the vinyl cutter. Three quiz questions will be integrated into the video for engagement. Confirming or corrective feedback and the opportunity to retry will accompany all questions.

A job aid describing steps will be provided in both online and physical form. This job aid will be included within the module in a slide that follows the video. A job aid link will be made available in the final section of the module; the learner will be informed of this access. A physical job aid will also be available in-person in the Innovation Lab directly beside the vinyl cutter.

A four- to five- question multiple choice quiz will follow the video. Confirming or correcting feedback will follow quiz completion with the opportunity to retake the quiz.

Sixth Teaching/Learning Activity (4 min): Safety “Do’s” and “Don’ts”

An engaging video will provide the most important safety “do’s” and “don’ts.” Examples of successful and unsuccessful adherence to safety standards may be provided to elucidate the importance of provided directions. At the end of the video, the viewer will be asked to reflect on the provided safety instructions and why they are important.

The seven-question safety quiz that follows this section must be completed with 100% accuracy before the participant is permitted to proceed. This quiz will include a mixture of multiple choice, “drag and drop,” and short answer questions. Confirming or corrective feedback

will be provided after the quiz is completed. The quiz may be reattempted an unlimited number of times until success is achieved.

Seventh Teaching/Learning Activity (4 min): Troubleshooting tips

A short video will provide simple troubleshooting tips and techniques. Quiz questions will be incorporated into the video. Answers will be met with confirming or corrective feedback and the option to retry questions until success is achieved.

Instructions to reference the manual with an included GS-24 Manual link (Roland DG Corporation, 2015) will be included.

Eighth Teaching/Learning Activity (22 min): Innovation Lab hands-on demonstration and sign-off with supervision

The third step of Stolovitch and Keeps' (2011) *Five-Step Model for Structuring Training* is *activities*. They assert that learning in authentic environments maximizes transfer. In this final sign-off learning activity, participants will complete hands-on training and sign off with the Innovation Lab vinyl cutter, accompanied by certified supervisory personnel.

Supervisory sign-off personnel will meet learners where they are, review hands-on use instructions, and provide scaffolded support. As Hoadley and Van Haneghan (2018) state, scaffolding can take many forms, including "activity structures [and] larger social structures that support learning" (p. 73). Guidance on vinyl cutter use will be provided by the supervisor with the support of a structured performance checklist that assesses if the learner has met objectives. Existing instructional materials include a performance checklist for final sign-off. This form will be reviewed and optimized for use with SME support.

Summary Module (3 min)

A final summary module will succinctly list the content covered in the course. It will provide links to reference videos, job aids, and the GS-24 vinyl cutter user's manual (Roland DG Corporation, 2015).

Instructions on how to access guidance in the Innovation Lab via personnel, online guides, and physical job aids will be provided.

A brief introduction to the succeeding badge levels and how to obtain them will be provided, encouraging further engagement if the participant is motivated and interested.

Congratulations will be provided for successful completion of this course. Learners will be encouraged to return to these materials as often as needed for review and support.

Instructional Strategies and Activities Worksheet Summary

The instructional strategies and activities employed in the design of this course were selected with the goal of maximizing learner engagement. Adult learning principles – readiness, autonomy, experience, and action – were consciously incorporated within Stolovitch and Keeps' (2011) *Five-Step Model for Structuring Training*. Rationale and objectives are provided in the introduction, followed by meaningful activities, evaluation, and feedback.

The purpose of the course is to prepare MBA Innovation Lab participants to use the vinyl cutter safely and effectively with supervision. All modules are built with this outcome in mind. Delivery format decisions were made based on accessible tools, and the type of procedural safety-bound learning I aim to facilitate. Media choices were made to maximize engagement and minimize cognitive load. Ultimately, participants who complete this course and obtain a "Level 1 Badge" will possess the necessary skills to safely use the Innovation Lab vinyl cutter with supervision and will be empowered to seek out answers to questions that arise.

References

Bonaiuti, G. (2011, Dec 20). *B.F. Skinner. Teaching machine and programmed learning*. https://www.youtube.com/watch?v=jTH3ob1IRFo

Clark, R. C., & Mayer, R.E. (2018). Using rich media wisely. In R.A. Reiser & J.V. Dempsey (Eds.), *Trends and issues in instructional design and technology* (4th ed.) (pp. 259 – 268). Pearson Education, Inc.

Dempsey, J.V., & Van Eck, R.N. (2018). E-Learning and instructional design. In R.A. Reiser & J.V. Dempsey (Eds.), *Trends and issues in instructional design and technology* (4th ed.) (pp. 229 – 236). Pearson Education, Inc.

Hoadley, C., & Van Haneghan, J.P. (2018). The learning sciences: Where they came from and what it means for instructional designers. In R.A. Reiser & J.V. Dempsey (Eds.), *Trends and issues in instructional design and technology* (4th ed.) (pp. 68 - 75). Pearson Education, Inc.

Raounda, K. (2022, Jan 24). *27 best online learning platforms (updated 2022).* LearnWorlds. https://www.learnworlds.com/online-learning-platforms/

Roland DG Corporation. (Ed.) (2015). *GS-24 User's Manual.* https://files.rolanddga.com/Files/GS-24_UsersManual/Responsive_HTML5/index.htm#t=GS-24_USE_EN_03_3.html

Monterey Bay Aquarium. (2022). *New Center, New Direction*. https://www.montereybayaquarium.org/stories/new-center-new-direction

Stolovitch, H.D. & Keeps, E.J. (2011). *Telling Ain't Training* (2nd ed). Association for Talent Development.