

DIY GUIDE

In the spirit of fostering participation in open-educational resources, we offer here some guidance on producing your own modules like those found in the Information Ecosystems Cookbook. This guide is based on our process and experiences throughout our original development process. The Info Eco DIY Guide outlines our approach for planning and developing an Info Eco Cookbook style learning module.

PLANNING FOR YOUR MODULE

Coming up with a module topic will depend on a variety of factors including content expertise, instructional need, and desired outcomes.

Our task-driven, proficiency-oriented cookbook is about allowing advanced beginners to master the skills of organizing, arranging, manipulating, and deploying data responsibly. As such, we considered two main dimensions for topical consideration:

1. The skills that the module designer desired to teach; and
2. The responsibilities/ethical considerations to those skills.

More often than not, both dimensions were addressed simultaneously during the first iterative phase. We offer here questions that can guide you as you also think these dimensions through.

Questions you might ask yourself about the tools/data you want learners to master in your module include:

- What is a common exercise you facilitate with your students?
- Do you have a data-related skill or method taught in your classes that you often find yourself having to spend more in-class time on than you might prefer?
- Do you have a data-related skill or method that you wish more people knew how to use?
- Do you often find yourself wishing that you had a resource that you could point to that would help teach a particular data-related skill or method?

Questions you might ask yourself about the responsibilities and ethical considerations that you want learners to explore in your module include:

- What is an issue or consideration that frequently comes up in your work/teaching about data?

- What is an issue or consideration that you wish was more prominent or could be made more explicit in your work/teaching about data?

PROJECT MANAGEMENT AND DESIGN

In addition to the content of the modules, it is important to consider how they will be executed.

For our cookbook, we developed consistent project management protocols and incorporated evidence-based instructional design principles for the intended audience.

- Module design
 - Asynchronous delivery: These modules live openly on the internet for anyone to access. As such, they should be designed so that learners are asynchronously guided through the tasks and final realizations.
 - Iterative process: To be able to communicate complex ideas through the use of digital tools, we opted for an iterative design process that encouraged incremental refinement and tweaking at each stage. This structure allowed the development team to start with vague answers to the questions above and mold them into practical applications and understandings of our relationships with data.
- Skills/knowledge needed
 - Content knowledge: This may go without saying, but the authors must have fairly intimate knowledge of the content they present in the modules. Subject expertise grounds and adds ethos to each module.
 - Technological proficiency: Given the purpose and delivery format of these modules, it is necessary that the authors are proficient, or are willing to become proficient, with the tools they propose for exploration but also with the software used to design the modules. In the case of our cookbook, video editing, simple website editing skills, and understanding of information architecture were indispensable. That being said, don't let a perceived lack of skill deter you. Many of these skills can be learned during the creation process.
 - Technical/instructional design: Being able to do something requires a different skill set than being able to communicate how to do that thing. By following the structure and advice in this guide (modeled on techniques from [Small Teaching Online](#)), you should have the tools to design your own instructional module.
- Expectations
 - Time: Things that appear to be the most simple are often only that way because of extensive labor behind the scenes. In this case, it was common for months of intermittent work conducted by multiple parties to go into producing a single module. Additionally, given the iterative project design, each module went through several phases of revision which was necessary for producing cohesive, refined exercises related to some very complicated ideas.

- Collaboration: Not every person who worked on this project had each of the skills and knowledge base mentioned above. We strongly suggest a collaborative approach for module development.
- Incentives: It is important to understand the needs of your collaborators and attempt to provide an appropriate rewards structure to ensure project commitment. Identifying the project's relationship with tenure/career requirements, applicability to collaborator's instruction and research needs, and societal goals of the project were productive incentives in our case.

DEVELOPING YOUR MODULE

The module structure should match learning objectives. That is, start with the objective or outcome, consider the form that would best suit that outcome, and develop content that works with this form of instruction.

Given that we wanted an experience-based learning approach that combined technical skills and deep thinking about the ethics of those skills and competencies, we split each module into 4 sections:

- **Watch** - Using a 7-10 minute recorded video, the "Watch" section demonstrates the module theme by walking the learner through the solution to an appropriate exercise, using data and a tool chosen by the designer.
 - *Example:* Alison is creating a module about the importance of standards as the basis of the interoperability of digital systems. The "Watch" section is a walkthrough that shows the learner how data created in Google Maps online can move to Google Earth and back again, using KML as a cross-platform standard.
- **Do** - The "Do" section provides a written, step-by-step activity, closely related to the example in the first section, intended for the learner to do on their own. This is envisioned as an exercise that parallels, but does not entirely duplicate the one presented in "Watch." However, you may choose how much you want this section to feel like or repeat the content provided in the previous section.
 - *Example:* Alison chooses to write out the steps of the "Watch" section in detail, asking the learner to copy her interactions with the tools using their own geolocational context so that they might find connection and active engagement with the exercise.
- **Explore** - The "Explore" section should then provide a much less directive prompt or set of prompts for the learners to use to engage with, and *apply*, the theme. Here, we encourage suggesting the use of a different tool or dataset than what was used in either of the previous sections in order to present a new environment for the learner to explore the same theme.
 - *Example:* Alison presents links to the ArcGIS suite of applications and provides information about how this ecosystem differs from the one used in "Watch" and "Do," suggesting forms of play and exploration for the learner to try on their own.

- **Guiding Realizations** - Wrapping up the module, the “Guiding Realizations” will provide descriptions of the overarching concepts and challenges that the module designer(s) hope that the participants will have encountered during their work that they may or may not have been able to put into words quite yet. We anticipate and encourage some overlap between the realizations presented in different modules.
 - *Examples:* (1) Don’t confuse the way the data is *represented* for any fundamental feature of the data. Interfaces assert a world that isn’t necessarily the totality of your options; (2) Your capacity to manipulate data depends on the interface you are using, but if you are working to a standard (like KML) then any new interface should be able to display the data accurately, even if it cannot help you produce it; (3) Data standards are the basis of interoperability between digital systems.

The iterative workflow

We used a version of the following workflow designed around the available personnel and our desire to minimize wasted effort. The workflow is divided into three main phases that are subdivided into two phases that oscillate between authorial and technical contributions.

PHASE 1.1 : AUTHORIAL TASKS

Gather Datasets and Tools

Identify datasets that you would like to use for each of the first 3 sections, and also identify the tools you would like to use/present for each.

The “Watch” and “Do” datasets can be identical to one another if you would like to have the participants “Do” the exact exercise presented in the “Watch” section, but they can be different if you would like visitors to “Do” a slightly different example than is shown in “Watch.”

The “Explore” datasets should be distinct from the ones used in the first two sections, whether they are taken from separate, but related domains or simply different examples from the same domain. Suggested tools related to those used in “Watch” and “Do” are also very welcome.

Draft “Guiding Realizations” (Sec. 4)

Draft 3-5 brief statements that reflect what you hope participants will realize by the end of the module-- something that an expert would notice, but learners may not yet be able to describe. We advise you to use these as a guide to what aspects of the tools/datasets you intend to demonstrate.



PHASE 1.2: TECHNICAL TASKS

Draft Module Mock-Up

Using preliminary materials, draft a skeleton module page including some boilerplate text that describe the work of the “Do” and “Explore” sections.



PHASE 2.1 : AUTHORIAL

Write “Do” (Sec. 2)

Draft a written, step-by-step activity for the learners to do on their own using the dataset and a tool that you have chosen.

Write “Explore” (Sec. 3)

Draft prompt(s) for this more unguided section.

Revise “Guiding Realizations” (Sec. 4)

Update “Guiding Realizations” based on content developed for “Do” and “Explore” as needed.



PHASE 2.2: TECHNICAL TASKS

Edit and Upload

Copyedit, upload, and format written content for all sections except “Watch.”

Plan Video Production

Refine your preferences for how Phase 3.1 video production will proceed.



PHASE 3.1 : AUTHORIAL TASKS

Video Production (depending on your preference)

- Record a mock-up for us to recreate;
- Perform it live for us to recreate;
- Write a script for us to follow;
- Record your own.

Revise “Do” (Sec. 2)

Update “Do” based on challenges/opportunities encountered during video production as needed.

Revise “Explore” (Sec. 3)

Update “Explore” based on challenges/opportunities encountered during video production as needed.

Revise “Guiding Realizations” (Sec. 4)

Update “Explore” based on challenges/opportunities encountered during video production as needed.

PHASE 3.2: TECHNICAL TASKS**Video Post-Production**

Edit video accordingly including adding captions, transitions, adding intro/end screen, and thumbnail selection.

Final Edits & Launch

Review, edit, and publish the modules