

September 12, 2022 Education Working Group Call

Attendees: Mary Lofton, Jason McLachlan, Jody Peters, Dexter Howard, Abby Lewis, Cazimir Kowalski, Alyssa Willson

Regrets: Gerbrand Koren, Anna Sjodin, Antoinette Abeyta

Agenda/Notes:

1. Updates or Requests for Input

a. Mary - Macrosystems EDDIE

- i. Testing 2 modules. 1) Understanding uncertainty and 2) Data Assimilation (DA)
- ii. Have 6-8 instructors testing the 2 modules.
- iii. Most testing will happen during the last week of Sept through Thanksgiving
- iv. Have pre- and post-assessments for the students - all assessments go through SERC at Carleton
- v. Afterwards, Mary will work with the instructors to get their feedback
- vi. What courses are using the modules? Is there a natural curriculum that they fit into?
 - Modules 5 and 8 are the Intro to Forecasting and Guide to Decision Making modules
 - The Intro module - Lets students know what ecoforecasting so good for intro ecology course or forecasting specific courses
 - Using forecast to guide decision making - could be used for management oriented course
 - Uncertainty partitioning and DA is being tested in environmental dynamics, environmental sensors, data analytics, freshwater ecology, environmental physiology, population ecology and dynamics - oceanography
 - Upper level modeling classes or ecosystem dynamic
 - Want the courses to be for undergrads, but have had interest expressed about it being used in grad classes
 - Haven't marketed the modules to be done in a sequence, but could see the uncertainty and DA being done after one of the intro courses
 - For grad courses, could be useful to allow instructors to let students see the code and get under the hood to look at the coding
 - Big push this semester is getting module 7 about DA done/polished in the point and click mode.
 - This module was developed was in R Shiny first, so could eventually be used to share code. It is functionalized to run enKF and then there is functions within enKF within

that wrapper so a student could see what it is actually doing for enKF.

- All the code is available on GitHub - it isn't promoted in the materials, but it is all available. So if people wanted to use the code/share the code as they are working with students, it is available <https://github.com/MacrosystemsEDDIE>
 - Leah Johnson at VT is also interested in this and will be teaching in the spring
- vii. Should we make connections between EFI and the instructors testing out the modules? Yes.
- Some of the instructors know about EFI, others may not.
 - Jody can work on email text to the instructors to let them know about EFI. Run this text by Mary to personalize
- b. Ethics in Forecasting Project Updates
- i. This manuscript will be a set of resources and questions to ask during class about different ethical issues in forecasting
 - ii. Olivia is working on a section related to fisheries
 - iii. 3rd module - being developed by Cazimir and Jason, adapted from module that Georgia Smies (Salish Kootenai College (SKC)) and Helena Kleiner (ND) used to incorporate Indigenous Knowledge into forecasting.
 - Data handling and analysis of cultural values
 - The two places this module has been deployed is at SKC for an environmental course and the other is at the Geoscience Alliance Conference which is a conference that supports Indigenous individuals in geosciences, ecology, STEM.
 - The module goes through how to analyze water for EPA reports. EPA and Tribes are interested in making water quality monitoring and assessment include the Tribal perspectives/values (these are things that are not generally publicly available).
 - For the TEK portion - wanted to rank TEK values. The values may not align with the water needs.
 - Thinking about how to incorporate diverse values of water quality monitoring.
 - Issue with this module is that it can't be cut and pasted for the values that apply to Indigenous students to classrooms with primarily white students.
 - Don't want this issue to hold up the paper
 - Frame this as something that was applied in the context of diverse student body. But highlight that we can't translate it into a majority white class easily?
 - For the manuscript we need to have templates for things people can apply in their class or give examples of problematic issues
 - Data sovereignty question can also be brought in/highlighted in this example.

- Start with something that works in Indigenous communities.
 - Take the lessons learned about things that we haven't considered previously
- Cazimir is wondering about 3 options for developing this example for the manuscript
 - Keep as is with paragraph providing an intro/overview of why the example was developed and used in the Indigenous-focused settings (SKC and GA)
 - Make it generic, make it not specifically about Indigenous communities, but the general idea of bringing in culture differences
 - Look at case studies of how data science clashes with Indigenous communities.
- Alyssa's thought - the innovative thing in Georgia's example was that it was focused on Indigenous students that was not catered to white students.
 - Purpose - get Native students better background in data science and tools in their communities
 - A related issue - have a separate exercise that allows PWI classes to recognize the issues Indigenous students are facing without asking them to assess those issues as if they were there own
 - This paper could be a place to start for this related issue:
<https://academic.oup.com/bioscience/article/52/5/432/236145>

iv. In the manuscript

- Make Jason/Caz's example applicable to a targeted Indigenous audience
- Abby's example is applicable to a broad set of audience.
- Will need to see what kind of applicability Olivia's example will have

v. Do we want to include other examples?

- The 4 topics to think about with ethics of forecasting that the manuscript is based on, comes from [this blog post](#)
 - Conflicts of Interest, Uncertainty, Unintended Consequences, Sins of Omission vs Commission
 - 1st module, flying foxes deals with uncertainty
 - Olivia's example fits the conflicts of interest and unintended consequences
 - Sins of Omission vs Commission - Could have inaccurate forecasts that people make decisions that lead to bad things happening. Or could have situations where a forecast is not shared leaving people unprepared.

- This could be the 4th module in water quality
 - Could use Whitney's EDDIE module on decision making could be a starting point
- vi. The Journal wants a real life figure/table that can be discussed during the class
 - Abby will send email to the editors to check in about that one of the ethical issues is data sovereignty so not using actual water quality data from Tribal land
- vii. Timeline - will be helpful to have deadlines. Jason and Caz will come up with a timeline that works for them
 - Once the group gets the chunks included then have the authors go over the full draft.
 - Abby will do a first pass to make sure the structure is the same across modules.
- viii. Author list discussion - there are people who were important on the brainstorming of the manuscript and there are people who are involved with the writing
 - Abby will put together a draft of the authorship guidelines before the next meeting
- c. The following are projects related to people who were not available for this call. Jody is leaving this list in for future calls when these individuals are available
 - i. Antoinette's learning goals and concepts - brainstorm case studies
 - ii. Olivia's Population Ecology Class
 - iii. Anna - Forecasting, Prediction, Projection Vocabulary Manuscript
 - iv. Mike Dietze's workshop for Flux Course on a carbon cycle forecast - <https://github.com/mdietze/FluxCourseForecast>
 - v. Gerbrand updates

2. Forecasting Ethics material (Jody is leaving this in the notes for reference)

- a. Here is an overview of what was developed: start with a think-pair-share to discuss the [Ecological Forecasting Ethics: Lessons from Covid-19](#) post in Dynamic Ecology. This would then be followed by 3 topics presented in the post, 1) uncertainty, 2) unintended consequences and conflict of interest, and 3) sins of omission vs commission. The material provides a hypothetical ecological example with questions and real-world examples/news stories. There are also a couple of examples of further readings and suggestions for the next steps forward.
- b. Idea from Mike on Slack: One other thing we always talk about in my class when we cover forecast ethics (and which might build well off the "sins" example in the slide deck) is the question of which forecasts should be public goods and which are appropriate for private investment. If all forecasts have to be public goods, there will be a lot less forecasting and possibly less

innovation than if the private sector invests, but on the flip side there may be forecasts where there's a moral obligation to disclose the prediction to everyone.

- c. Update from Abby: I actually put a bit of work into this last semester and drafted the start of a formal resource that we could publish
 - d. The core group that worked on this project (Abby, Sydne, Ryan, Quinn) were potentially interested in trying to publish it at Teaching Issues in Ecology and Evolution. Sydne had suggested this journal, but Abby is open to others. Think about putting it up on QUBES to get DOI, but make sure that uploading to QUBES won't affect submission to a journal.
 - i. Looking for people to help write one of the examples. If there are 1-2 people who are motivated this can be helpful. Abby can't work on this for the next 2 weeks
 - ii. If anyone is teaching an interested in trying this out, or reviewing it from a pedagogical perspective
 - iii. Short workshop during EFI meeting to walk through as a group as an activity or collaboratively write one of the case studies. Is there anyone in the education group willing to lead this?
 - Talk about discussion questions for each case study
 - iv. Sydne is happy to provide some rubrics for assessment of student learning to this document once the examples are nailed down
 - v. Jason willing to include in his course next fall
 - e. Is there a model that was connected to the example?
 - f. Put in context about decisions people are making about the model have ethical challenges that people need to consider
 - g. Could talk to Georgia about the drinking water example and check in with Abby to see. Would be a nice one to emphasize that the communities affected by environmental decisions - how are they involved with the decisions that are made.
3. Open Book Project to keep in mind and mash up of notes from previous calls
- a. There is potential to use the educational materials developed for the Sloan grant or with Olivia's class to start providing content for this that other EFI members could contribute to.
 - i. This is a book you would read before you read Mike's Forecasting book
 - ii. If we start to develop modular materials they could be included in such a book
 - iii. Can start to develop a list of the components that would be useful to include in a book and think about how to make it applicable to a wide range of students from many different backgrounds
 - iv. Think about developing slides/materials that provide context

- v. Running list of who has expressed interest at one time or another
 - Jason McLachlan, Shannon LaDeau, Elva Escobar
- vi. Has anyone seen the [Open Forecasting Textbook](#) (does exist as a [paperback](#) as well)
 - In the Preface this is for a 3rd year undergrad intro master's course
 - Interesting template. Success in part due to free online and R packages are nicely user friendly
 - This is a bookdown format where R code is integrated and is a living document
 - Wouldn't get the credit of something like an AGU Monograph, but would be more broadly available.
 - Could do something that are RMarkdowns that could be combined as a book
 - Loop John Zobitz into this. He is also writing a book for his courses. Mike has used some of his chapters in his 300 level course.
 - Do this in the context of NEON data and walking through all the steps of forecasting. Could get long, but would be a nice resource.
 - A self-contained book to walk through. Could reference other books.
- vii. This sounds like a strong potential for a proposal for NSF Education Directorates, especially if we could bring in an education evaluator who evaluates the open source, collaborative textbook.
 - If we structured it well it could have a strong educational research component