August 10, 2022 Education Working Group Call

Attendees: Abby Lewis, Anna Sjodin, Jason McLachlan, Gerbrand Koren, Antoinette Abeyta, Jody Peters, Alyssa Willson, Mary Lofton
Regrets: Olivia Tabares

Agenda/Notes:

1. Poll for monthly calls in September to December
   a. Make sure your time zone is selected

2. Updates
   a. Ethics in Forecasting Project Updates
      i. Olivia has been working developing info on ethics in marine forecasting for the manuscript
         ● Has been thinking about it as very contextual - where you are creating the forecast, who the partners are, etc
         ● There are useful papers for this section,e.g. Hobday et al which is focused ethics in marine forecasting
         ● The other is on forecast visualization to review with students
         ● Thinking of breaking it into 2 parts - first is discussion based. Second part would be more hands on and playing with an operational forecast
      ii. Cazimir and Jason working on a module that includes indigenous perspectives in assessing water quality
         ● Don't want to use the real data from the tribe since the tribes do not want to share their data. But have developed something
         ● Want figures and tables that students can look into real data
         ● The point is data sovereignty and the ethical issue of who has access to the data
         ● Send the journal (TIEE) a quick note letting them know about one of the example has data sovereignty, check to make sure this would be okay
         ● Use this as an opportunity for a thoughtful critique piece of established as best practice with open data and a situation where it is not the best practice
      iii. From TIEE website, the figure/data need to be published.
         ● For Jason's module will say we are using published data for Abby's module and Olivia's module
         ● We can check with TIEE
         ● If we do have issues, then are there other journals to submit this to?

- There are a lot of Science Education journals that could work. Jason was thinking about a journal at some point - he can go back and look at it.
          - CBE Life Science Education
        - Would it work to put Jason's module on QUBES and would that be counted as published? Or perhaps publish the figures on FigShare?
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  b. Antoinette's learning goals and concepts - brainstorm case studies
  c. Olivia's Population Ecology Class
  d. Alyssa - Ecoforecasting Educational Resources and Gaps Manuscript - Submitted!
  e. Anna - Forecasting, Prediction, Projection Vocabulary Manuscript
      i. Shared the updated figure with Abby since Abby has been involved
      ii. Gretchen is not available until mid-September. Anna will continue to work on this
  f. Jason - Geoscience Alliance workshop
      i. GA conference did 3 things that are hard to do
          - Open and inclusive
          - Was very serious
          - Was very honest
      ii. The conference was focused on Data in Indian Country
      iii. Cazimir (grad student at ND) worked with Jason to adapt module developed with Georgia at Salish Kootenai College to think about data sovereignty and thinking about how Indigenous voices can be heard in the forecasting cycle
      iv. Gave the module a test drive in the workshop and got feedback from the 20 people
      v. Jason will also be presenting this at ESA next week. Will catch up with Olivia there.
      vi. Anotinette has been thinking about it from getting students the fundamental tools to learn the abstract concepts. After seeing Jason/Georgia's example at the workshop, it wasn't about the coding but was about what the data means.
      vii. Georgia is an instructor in the Natural Resources Division and has students from many tribes. Students are interested in land management of native lands. Georgia is also a consultant for tribes in the region mainly on water quality. From this she saw it from the technical side where tribes need to provide reports to the government to monitor water. But people in tribes don't have the analytical background to create the reports and they have to hire consultants who can rip off the tribes. So this was the argument to get Native students with the skills to do the analyses and create the reports.

     viii.   The government reports do not have anything that recognizes or takes advantage of the wisdom of the community. So want to make exercises to make communities feel represented and have the tribes more in control of their data.

     ix.   At the workshop - did promise the students would code in R and did that, but had a range of backgrounds (teachers of 7th grade vs engineers that code every day).

     x.   Set up the workshop so people worked in teams and focused on the big ideas. Wanted to make people feel included. For people who have R experience could teach others. For people who didn't have R experience their wisdom, experience still was important.

     xi.   For the future want to have a constellation of things that overlap so everyone feels included and it isn't privileging people with experience with coding. Don't want it to feel like the people with the math skills control what happens. But also want to get coding/math skills to more people.

     xii.   For UNMG experience - resource issue. It is hard to get computer labs and students don't always have devices to download R/R Studio. You can do R on a phone, but it is really buggy and will be frustrating for a student
- Like the idea of having a dataset and values and being able to combine them.
- For the future - if Jason et al can develop the exercise more, keep thinking about ways you get more advanced on the analysis side, how to constantly reinforce people's values and the communities role in all stages and

g. Mike Dietze's workshop for Flux Course on a carbon cycle forecast - https://github.com/mdietze/FluxCourseForecast

h. From Gerbrand: We wrote something about the disadvantage of open science for developing countries and underrepresented groups that Jason mentioned (see e.g. "unequal resources" in Fig 1 of

i. https://agupubs.onlinelibrary.wiley.com/doi/epdf/10.1029/2021EA002119)

     i.   Example from Brazil - have researchers who are research, technician, etc. They have multiple roles. It is problematic for them to share the data they have collected openly and having groups in US/Europe to do analyses

     ii.   Anna has also seen this for early career individuals.

j. Mary - Macrosystems EDDIE

     i.   NSF funded program project to Cayelan Carey and Quinn Thomas at Virginia Tech

     ii.   EDDIE is multi-institutional program that is designed to create and train instructors to create educational modules to enhance reasoning skills and overcome math phobia

     iii.   Modules that the grant is focused on ecological forecasting
- Intro module
- Uncertainty in ecological forecasts

- - Using data to improve forecasts
    - Using forecasts to improve decision making
    - iv. All are implemented in R Shiny - this could be a format that doesn't require coding for the students.
    - v. Benefits for R shiny is also nice because it gives you the point and click option, which could then complement coding activities that do the same thing the Shiny does
    - vi. The modules focus on the how tos and
    - vii. If people are interested in moving other materials/modules to Shiny Mary/Macrosystems EDDIE team can provide input on the pros and cons
    - viii. R Shiny could be run locally. There are multiple ways to do it. At some point you would need to download things from the internet. If an instructor could do that ahead of time before the students then would be able to
    - ix. But students would need to have internet to pull up R Shiny and click Run and then would get to the point and click option to that. Would need to download materials. So this would be a barrier.
    - x. Modules 6 and 7 that Mary is testing now are the two that are most advanced. She is navigating which types of classrooms those modules would be best for.
    - xi. Mary is working on herding cats to find what courses professors are teaching that can test the modules.
    - xii. The Macrosystems EDDIE code is all available online, but it has the additional code that puts it into the Shiny format which is not useful for students
    - xiii. Jason was able to hack the code for teaching students at ND and it worked really well
  - k. Gerbrand has started working on developing materials and is using Jupyter notebooks. Has found this has been an easy way for students to modify code

3. 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 Abbyt o 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.

4. 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