January 12, 2024 Education Working Group Call

Attendees: Jason McLachlan, Antoinette Abeyta, Cazimir Kowalski, Saeed Shafiei Sabet,
Rachel Torres
Regrets: Mary Lofton

Agenda/Notes:

1. Announcement: Abstracts due for the EFI 2024 conference in 3 weeks on Feb 2
   a. Details about the conference and links to abstract submissions and registration
      are on the conference webpage: https://bit.ly/efi2024

2. The "Ethics in ecological forecasting: four case-based teaching modules" paper is
   published!
   a. https://tiee.esa.org/vol/v19/issues/case_studies/lewis/abstract.html
   b. Module 1: Flying foxes and uncertainty
   c. Module 2: Marine Fisheries and conflicts of interest
   d. Module 3: Water Quality and Indigenous Knowledge
   e. Module 4: Tropical forests and data availability

3. Compilation of ideas for activities, projects, topics of discussion that came up during the
   Sept-Dec calls. Google sheet with the following activities and people's interest and
   priorites
   a. chaptGPT/AI - how to incorporate into coursework
   b. Library of case studies that are accessible to early learners which can be used to
      highlight concepts of ecological forecasting
      i. Morgan Ernest and Ethan White have a list of readings started for their
         course (each event in the schedule which is not about R has a reading
         associated with it)
         ● Paleoecology Dynamics
         ● Changes in Phenology
         ● Community Dynamics
         ● Introduction to Ecological Forecasting
         ● Uncertainty in Forecasting
         ● Forecasting using species distribution models
         ● Hurricane Forecasts
         ● State Space Models in Ecology
         ● Scenario based forecasting
         ● Ethics in Ecological Forecasting
         ● Can we (and what should we) forecast in ecology
      ii. If we spent an hour going through the topics from Ethan and Morgan's
          class and think through what would it take to get across to people

c. R packages that make the technical side of ecological forecasting easier - compile these or create them
d. Story maps, https://storymaps.arcgis.com/
    i. Step 1: Search and collect the storymaps that are available
        ● Build gallery of existing storymaps
    ii. Step 2: Identify and create
        ● Identify what is missing
    iii. Step 3: Teach and share
        ● Teach the different methodologies
        ● Show how the results connect to community and needs
e. Code Review recommendations - this was something that started as a side conversation in the Theory group and has been shared with this group. We have material for it now that could be shared as a blog post with an invitation for feedback
f. Brainstorm Data Science Networks/Organizations and who they are targeting for training student or instructor (inspired by discussion of the Emery et al 2021: Instructor Training Needs for Data Science paper)
    i. The Carpentries - Primarily Students, but there is training for instructors
    ii. QUBESHub - Instructor
    iii. Biological and Environmental Data Education (BEDE) Network - Instructor
    iv. Environmental Data Science Inclusion Network (EDSIN) - Instructor
    v. Organizations listed in the Crall et al 2023 paper
        ● Academic Data Science Alliance (ADSA) - a community of leaders, practitioners, and educators who thoughtfully integrate data science and AI best practices in higher education. Our members connect and share their data-intensive approaches and responsible applications. Mainly instructors, but there is also a job board that could be useful for students
        ● Environmental Data Science Inclusion Network (EDSIN) - dedicated to facilitating and supporting diversity, equity, and inclusion within the environmental and data science fields - instructors
        ● Environmental Data Science Innovation & Inclusion Lab (ESIIL) - instructors and students
        ● Native BioData Consortium (NBDC) - Indigenous led genetics and health research - instructors and students
        ● Atlanta University Center (AUC) Data Science Initiative - instructors and students at the HBCU partners in the Center
        ● The Carpentries - instructors and students
        ● Institute for Racially Just, Inclusive, and Open STEM Education (RIOS) - instructors, RIOS invites proposals for Working Groups with $2K budget that will function as innovation sandboxes or think tank incubators
        ● Biological and Environmental Data Education (BEDE) - instructors

      vi.   What other organizations should be included?
g. Assess the current status of the [Educational Resources webpage](#) - does anything need to be added or updated? Potential ideas
      i.   Write a blog post with recommendations for students, recommendations for instructors
      ii.   Create a 5 minute recording about the resources.
      iii.   Create a How To get started learning about forecasts set of recommendations
- Could do this from a student perspective and/or from an instructor perspective
      iv.   Current list of resources on the page
- Publications - Lewis 2023, Willson 2023
- Forecasting courses and workshop material
  - Ethan and Morgan's class
  - CEFI short course
  - Freya's NEON Forecast Challenge workshop
  - NEFI short courses
h. Are there Education resources that should be added to the compiled list of resources? This list was compiled and used for Willson et al. 2023. Assessing Opportunities and Inequities in Undergraduate Ecological Forecasting Education. Ecology and Evolution, 13, e10001. https://doi.org/10.1002/ece3.10001
      i.   Google doc
      ii.   [QUBES](#)
i. Use things like the [Open Forecasting Textbook](#) or [Forecasting: Principles and Practice](#) online books as scaffolding for developing ecological forecasting examples.
      i.   Currently the examples for the books are more business related examples. It would be nice to swap out those examples with forecasting/NEON Challenge examples
j. Collectively read recent papers on pedagogy and data science education
k. Book discussion of [Small Teaching: Everyday Lessons from the Science of Learning](#), this is a book recommended to Jason
l. Invite people to share experiences and tools to the working group calls like we had in December with Ethan, Morgan, and Cathleen
m. Invite people who have all taught ecological forecasting classes - where are we on that and what are the wishlist items
n. Look at environmental justice and data science resources together
      i.   Jason had an Environmental Justice and Data Science course last fall and Nick Record has an ocean sciences and data justice course that he teaches. Could connect with these two about their courses
o. From [Crall et al. 2023 paper](#) the idea of using scaffolded or layered pedagogy to support students in independent projects was brought up
      i.   Strength of the EFI community is that people are supportive of others. Can we promote opportunities for people who are willing to try materials

in their classes and provide feedback? Are there ways we can strengthen the community of practice? Can we use working group meetings to challenge or break products to help diagnose/troubleshoot/identify ways to improvise? Can we get opinions about revised versions and if the revisions are working?

    p. Explore educational assessment methods (this has connection with Macrosystems EDDIE and Sloan work) and with the previous point on scaffolding

4. The group spent time reading through the options listed above and adding comments about topics they are most interested in on this Google sheet. Below is a compilation of thoughts.

5. Jason
   a. Very interested in this - his class last fall worked on R modules (rather than packages) did this and Rachel just started on the project to work on this. This is something that will be ongoing
   b. chatGPT/AI is very timely. Jason will be talking about it during the first class of his course starting next week. Interested in learning about sharing policies and how to use it or not use it in class. Could put down principles and best practices to create a blog post or paper
   c. Environmental justice courses - this is of interest and would be good to connect with Ryan Emanuel at Duke
   d.

6. Jody:
   a. Think a low hanging fruit is witing a blog post about Code Review and willing to lead/co-lead this. But want to make sure to brign in the Theory working group
   b. Since Jody manages the EFI website, the Educational Resources page is something that she works on updating - would like feedback from the group about what is missing and thinking about a video/blog to provie a summary of what is available to the EFI community
   c. Reading papers has been very valuable and would like to continue to do so. Do not want to do it every meeting, but would like to do it once in awhile

7. Antoinette:
   a. Think many of them overlapped - environmental justice class, assessment, creating R modules are related.
   b. Antoinette's experience with students - they have a hard time knowing what data is and how to collect data. When do you need to be consistent and when is inconsistency acceptable
   c. AI - came up for Antoinette recently exploring chatGPT being abel to translate from Spanish to Niwot. AI copy and mimics. People who write AI do it from extraction not from perspective of reciprocation, love, awareness of culture. What we put into AI is often used out of context.
   d. Like paper discussions

8. Caz:
   a. Liked the library of case studies. THink they are a good motivator for people who aren't sure how to apply ecoforecasting

b. Code review did this for lab
c. Like paper discussions
9. Saeed:
   a. read and discuss papers
   b. chatGPT - interested in learning about and ways to educate students
   c. educational assessment methods
10. Rachel:
    a. chatGPT - think it is a hot topic and has avoided it until now. Think it would be useful to read paper about it. Interested to learn about students perspectives about it
    b. R packages - loves R and still working on figuring out what it means for ecoforecasting but like the idea of helping students new to R learn about packages
    c. Environmental justice courses are really interested. Hearing about classes that incorporate data science is
11. R packages vs R modules
    a. Morgan/Ethan class is grad class, Mike's class is grad class. R packages are used at the grad level. There is a lot of people writing R packages at the grad level but those aren't aimed at expanding out the diversity of people gaining R experience (early career/undergrad and minority students)
    b. Olivia is now teaching at high school level and wants to teach students about population biology at that level with a forecasting perspective
    c. May be useful to pull pieces together at a level earlier than what has been developed for grad level
    d. Big question everyone should be asking when teaching - what assumptions are you making about the prior knowledge of the student. I think that's missing in a lot of data science training
    e. Start at where students are now and build up - we are doing that with the modules Jason and Rachel are working on now
    f. Define the links of where people are coming at from basic data science and training adn how that contributes to model and moving toward forecasting
12. Next steps
    a. Lots of interest in reading papers on AI/chatGPT
    b. Also interest in having the group give Jason and Rachel feedback on the R modules that Jason's class had developed and identify the gaps
    c. Starting where people are and identifying the gaps - do self reflection - when did you learn what data is. Did you learn how to collect data or was it assumed that you knew how to collect data.
    d. To prep for the next call - Jody will send out a Google doc for people to share their reflections on how they learned about data, what it is, how to collect it, etc. Also ask people to look for papers on chatGPT/AI and pros/cons for its use in the classroom, best practices, perspectives of students using it

e. Then on the next call Jason and Rachel will lead the discussion sharing the modules that Jason's class developed during the fall semester and get feedback about gaps or next steps