

December 4, 2023 Education Working Group Call

Attendees: Ethan White, Morgan Ernest, Cathleen Torres Parisian, Cazimir Kowalski, Diana Dalbotten, Jason McLachlan, John Zobitz, Cayelan Carey, Saeed Shafiei Sabet

Agenda/Notes:

1. Poll to schedule calls for January to May: <https://www.when2meet.com/?22666386-v9Tif>
2. Introductions
3. Morgan Ernest and/or Ethan White from the University of Florida will be sharing their experience with their ecological forecasting class
 - a. "Ecological Forecasting and Dynamics: A graduate course on the fundamentals of time series and forecasting ecology"
 - b. Teaching the class since 2015/2016. There were no models at that point for how to start teaching students.
 - c. Based on students's at UF - there was a strong desire for quantitative skills. Not necessarily interest in forecasting at that time, but interest in R which drew them in. And interest in time series.
 - d. Believe in the open education concept to make it easy for others to make their materials available to other instructors and students
 - e. Next steps and what are things that the EFI Education working group or Macrosystems EDDIE can help with?
 - i. Over the past year have added a number of things that aren't on the online course.
 - ii. Getting closer to having students be able to use stuff. Initially had been at the survey level. Students could understand the concepts. Have been trying to move to gradual progression so students end the course and feel they can fit a realistic time series model and do actual work from it.
 - This is possible because of new R packages coming out that make it easier for students.
 - Having packages that get students faster to being able to do the analyses instead of figuring out the environment to do it.
 - iii. Finding reading material - finding primary materials that are useful for teaching. Spend a lot of time finding papers that are accessible for entry level students
 - **Would be great to put together a paper library for teaching forecasting**
 - **yeah that would be great! If you look at basically anything without R on this page and following the link you'll see a Reading link with what we're using <https://course.naturecast.org/schedule/>**
 - **would be great if we could collate some case studies that could be used to teach particular concepts**

- f. Balance between coding/tech and the need for discussion about inference, design, cultural context - any advice for how to balance both in one course?
 - i. The balance is difficult
 - ii. Students don't want to just push buttons, they want to see how it is applicable to their lives.
 - g. Role of chatGPT and other sources. John has seen homework directly from chatGPT
 - i. Tricky, because hopefully AI will be able to write code faster and easier than we are doing currently
 - ii. Is it important to write code and know what you are doing so you know what AI is doing
 - iii. Jason allows his class to use chatGPT, but they have to defend it. They share their code in whatever way they generated it and then the code has to be defended for why it was used and created that way
 - iv. Show examples which show when algorithms can be really wrong. Use this to show that you have to know what is going on with the algorithms.
 - v. Showing these example has pedagogical value
 - vi. Thinking about bias in the models and the code and how algorithms can increase bias is useful for students
2. Cathleen Torres Parisian from the Polar Geospatial Center will share her experience with story maps
- a. Story maps are more than stories and more than mapping
 - i. Can bundle mixed methodologies
 - ii. There are maps - you don't need to integrate maps
 - iii. Can integrate photos, videos, exploratory data visualization
 - iv. Useful for many different audiences
 - Science communication and mainstream academia rely on science publications. Storymaps provide a way to develop a narrative or cultural knowledge
 - Can integrate cultural knowledge by enabling actionable science. Not doing science for the sake of science, but taking the next steps and communicating your results in a meaningful way
 - Plug and play platform that lets students/researchers share info with their own community and public
 - v. Examples -
 - Build Context & Culture - week of using story maps at Tribal Youth GIS summer camp.
 - Allowed Native youth to use story maps
 - PGC's Digital Elevation Map - used to help general public understand this product from the Polar Geospatial Center
 - <https://storymaps.arcgis.com/stories/6c058b5e770c4a1abdc5d655e23f0ae>

- Has swiping tools to show how the data has changed with explanation of how
 - Use for a way of instruction and presentation for students
 - Example from U of MN to build tutorial on canopy height model & land cover classification
 - It is basically a paper put into this platform
 - Can be an alternative for websites - example from PGC's users from the Arctic Urban Risks and Adaptations to share materials in a more inclusive way than through scientific papers
 - vi. Ideas about story maps for EFI Education
 - Steps used by PGC that could be used by EFI
 - Step 1: Search and collect the storymaps that are available
 - Build gallery of existing storymaps
 - Step 2: Identify and create
 - Identify what is missing
 - Step 3: Teach and share
 - Teach the different methodologies
 - Show how the results connect to community and needs
 - vii. Storymaps are open source product from ESRI. You do not need to have a GIS license
 - <https://storymaps.arcgis.com/>
 - For the Youth Camp, needed parental consent for students under 13 that do not have their own personal emails
 - Seems to have similar functionality with R Shiny, but also seems more intuitive and easier to learn and be able to use compared to R Shiny app
 - viii. From Diana's experience with REU students and Indigenous elders people have been able to learn how to use storymaps within a day.
 - ix. Has a lot of plug and play capabilities
4. Not for the December call, but for future conversations - Brainstorm Data Science Networks/Organizations and who they are targeting for training student or instructor
- a. This follows up on the October call discussion of the Emery et al 2021: Instructor Training Needs for Data Science paper and can be informed by the Crall et al paper in point 2 above
 - b. The Carpentries - Primarily Students, but there is training for instructors
 - c. QUBESHub - Instructor
 - d. [Biological and Environmental Data Education \(BEDE\) Network](#) - Instructor
 - e. [Environmental Data Science Inclusion Network \(EDSIN\)](#) - Instructor
 - f. Institutions from the [Crall et al 2023 paper](#)
 - i. [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
- ii. [Environmental Data Science Inclusion Network](#) (EDSIN) - dedicated to facilitating and supporting diversity, equity, and inclusion within the environmental and data science fields - instructors
 - iii. [Environmental Data Science Innovation & Inclusion Lab](#) (ESIIL) - instructors and students
 - iv. [Native BioData Consortium](#) (NBDC) - Indigenous led genetics and health research - instructors and students
 - v. [Atlanta University Center \(AUC\) Data Science Initiative](#) - instructors and students at the HBCU partners in the Center
 - vi. [The Carpentries](#) - instructors and students
 - vii. [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
 - viii. [Biological and Environmental Data Education](#) (BEDE) - instructors

5. Not for the December call, but for future conversations - What resources need to be added/updated on the [Educational Resources webpage](#)?
- a. Can we write a blog post with recommendations for students, recommendations for instructors?
 - b. Can we create a 5 minute recording about the resources? What would go into such a video?
 - i. Facts sheets, simple graphs of the steps needed for the process
 - c. Freya's workshop tutorial
 - d. CEFI short course material
 - e. Syllabi
 - f. Do we want to record a short 5 minute video to update the WG page with information about the Education working group and what kind of resources are available?
 - g. A how to get started learning about forecasts set of recommendations?
 - i. Could do this from a student perspective or from an instructor perspective
 - h. Are there Education resources that should be added to the compiled list of resources?
 - i. Google doc
 - ii. [QUBES](#)

6. Notes from a long time ago, that may be good as a reference. But doesn't need to be discussed on this call. 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

