

Infusion of data science and computation into engineering curricula

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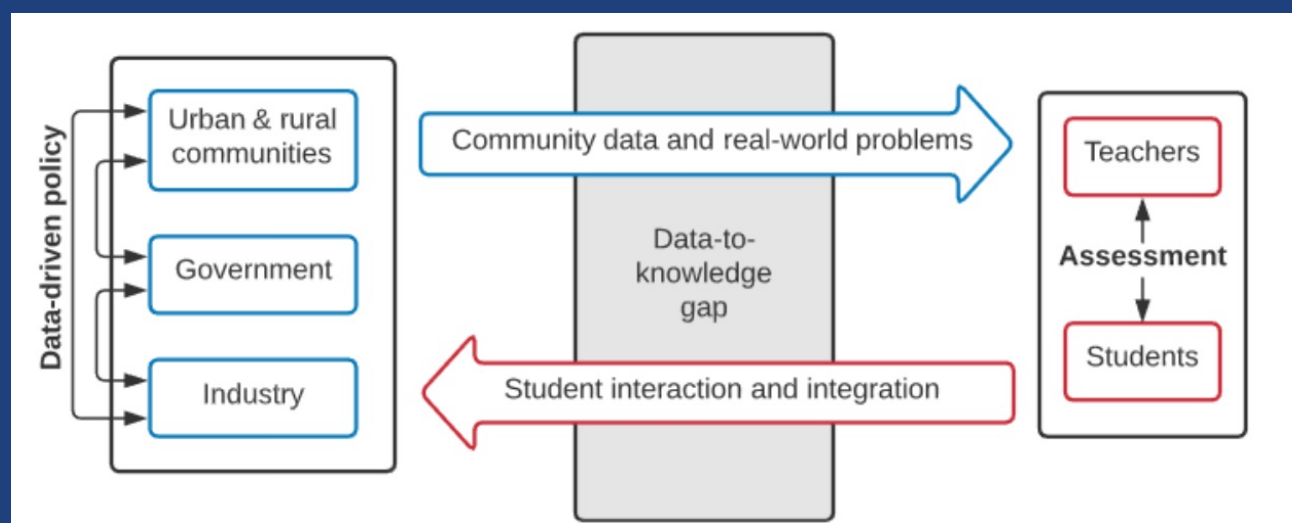
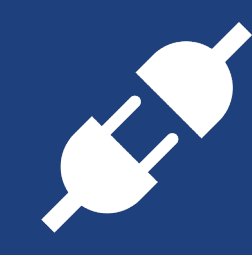


Figure 1: Schematic illustrating how the work will bridge the gap between data and knowledge. By teaching students to interact with real-world data, those students will bring transferrable knowledge to communities they eventually join.



The goal of this project is to develop a **curricular framework** for data science education and workforce development that is **transferable between diverse institutions**.



The idea is that then, STEM-related programs can “plug and play” data science lessons in existing curricula with minimal effort.



These lessons will be created in conjunction with community stakeholders and industry partners to ensure a focus on real-world problem solving.



Additionally, they will include student organizations in course development to promote flexible learning pathways.

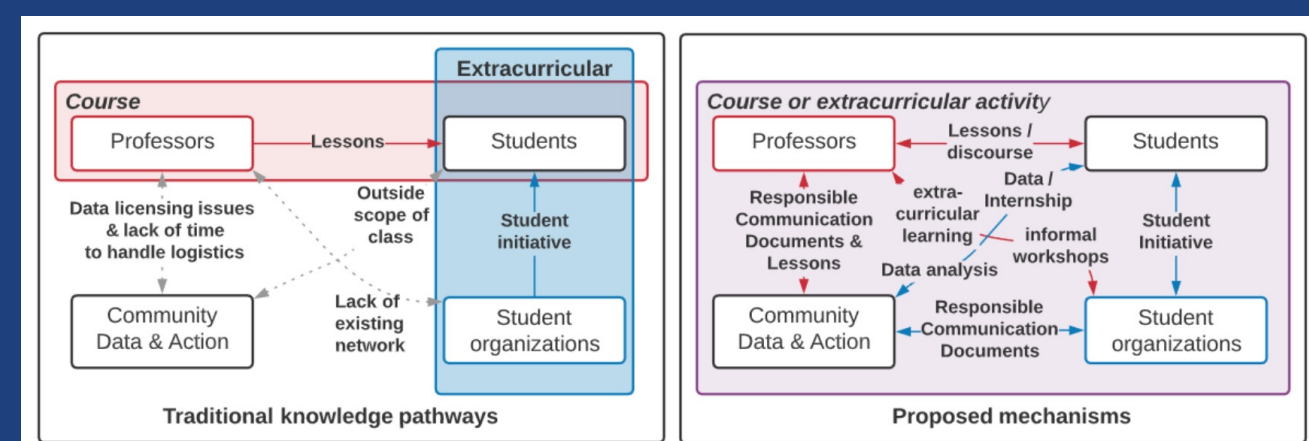
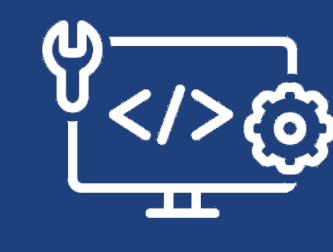
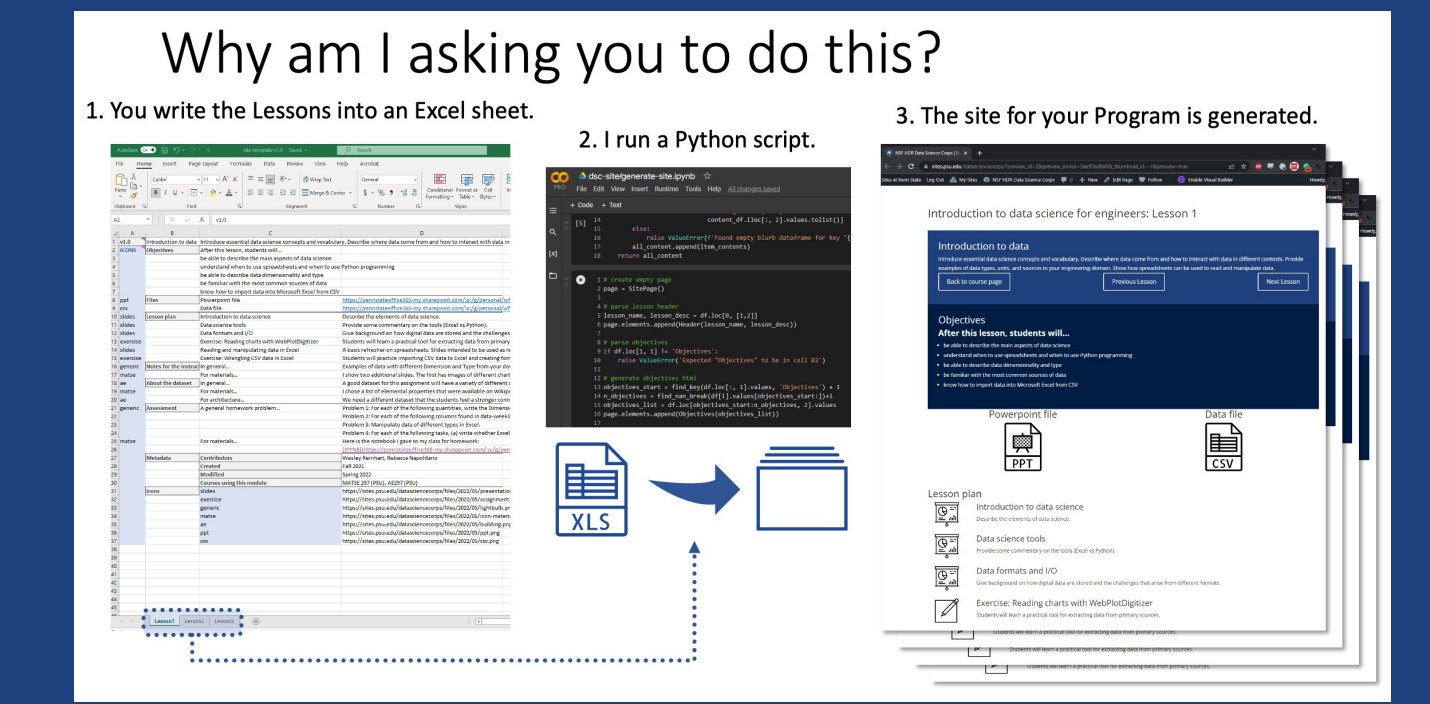


Figure 2: Schematic illustration of the highly interconnected ecosystem developed

Methods

Contributors fill out a Microsoft Excel template with their lesson details. The template is parsed in Python to convert text and filenames into formatted HTML. This keeps the site dynamic.



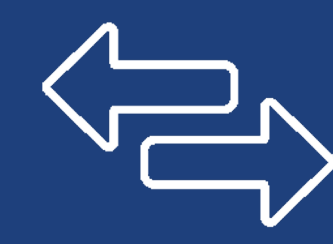
This project consists of developing digital infrastructure and a diverse curricular network.



Data science curriculum which integrates flexible learning pathways with community engagement can be integrated into existing courses. Course topics include:

- Introduction to Data Science
- Parametric Modeling
- Data Management
- Machine Learning
- Robotics
- Advanced Data Science
- Ethics of Data Science in Engineering

Summary of proposed material



The aim is that the overall framework used to infuse existing courses with data science is transferrable to other institutions and that the framework enables assessment of student learning and program evaluation.



Initially gathered curriculum will be infused into AE and MATSE at PSU and, subsequently, the materials will be infused into courses at our other partner institutions.

Impacts

These resources are intended to reduce barrier to entry for faculty seeking to incorporate data science into their instruction, as recruiting and retaining faculty to create and teach integrated introductory courses in data science has been recognized as a significant hurdle by the National Academies.



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