

Embedding coding and project management skills into the economics curriculum - reflections from a Python for Economics course

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Thursday 2 September, 11:30-13:00 BST

Employer surveys highlight the need to broaden the skills developed by Economics students over the course of their degree, ranging from data analysis and coding skills to communication and presentation skills. Group work has been found to be effective in preparing students for the graduate job market by offering opportunities for students to develop such skills. At the same time, a growing number of universities are offering students access to coding courses, though these are rarely designed for economics students.

Given the rich array of online resources geared towards developing certifiable coding skills, a key challenge is how to embed and deliver coding training within an economics degree in a discipline-specific way. This paper reflects on the design and implementation of a Python for Economics non-credit bearing short course. The course was delivered in two modalities: in-person and entirely synchronously in 2019-20 and virtually and part asynchronously in 2020-21.

Why a Python for Economics course?

Python is the fastest-growing coding language, with a growing community of economists embracing its use for economics research. As Python is free and involves relatively simple syntax, it is easy to learn and share, making it versatile and broadly applicable.

Inspired by feedback from the National Student Survey (NSS) and from student representatives, the Python for Economics course was designed to support two priority areas. First, to embed economics research practices into the educational experience of economics students, and second, to engage student and alumni communities and empower students to take ownership of their skill development.

Design and modes of delivery

The course introduced students to the Python programming language and to techniques useful for economics research. In 2019-20 the course was delivered in person, intensively over a weekend; two sessions were run, each with around 30 students drawn from all years of study. In 2020-21, the course ran virtually with synchronous sessions through Zoom, and student collaboration within Teams; it was only available to Years 2 and 3 students. To be eligible to participate, students were required to complete an online pre-sessional Python course and to score above a threshold on a diagnostic test.

Developments in Economics Education Conference 2021

Students were split into groups of around 5 and assigned an economics project and coach. Coaches were mainly students with extensive Python knowledge and were required to attend a specially designed training session. Students were randomly assigned to one of six projects, and provided with a reading list, brief description, and a set of relevant datasets. Of these, four were applied economics projects and two were simulations.

A mix of exposition of taught content (GitHub and version control, data cleaning, analytics, and visualisations) and activities were designed to guide teams through their project. The course culminated with each group presenting their findings to all participants. In doing so students developed project management, collaborative, communication, and coding skills, always applied to economics themes, and informed by research into related literature. Upon completion students received a certificate of attendance. To course concluded with a panel discussion by economics alumni who use Python in their work.

Insights and conclusion

In both academic years participants were invited to complete a survey with responses to evaluative questions measured on a Likert scale and opportunities to comment. Pooling across academic years, there were 71 respondents, with mean responses ranging from 3.8 to 4.4 (out of 5), with the highest scores attributed to the format of the course and the value of the student coaches. 63 students would recommend the course to others (and the rest responded Maybe). Comments from 2018/19 informed delivery in 2020/21

A student who attended in both 2020 and 2021 commented: *“The Python for Economics events...made me consider tech and data as a career and I talked about the experience and the group work so much in my interviews. Even now, I am using the data cleaning techniques I learnt from the event every day at my internship!”*

Several insights emerge. First, the design and timing of the pre-session course is key; students must be challenged by their project but from an appropriate knowledge base. Second, Python code must be driven by the underlying economic rationale – as opposed to methods for their own sake. Third, some knowledge of econometrics proved important, so restricting to Years 2 and 3 led to more balanced groups and an improved overall student experience. Fourth, running the course over a week offered more time for review of related literature and led to higher quality presentations. Fifth, scheduling ‘milestones’ over the course of the week helped students manage time, as did imposing a degree of structure on the length and scope of the final presentation. Finally, the virtual model is easily scalable with any number of teams running at the same time; the asynchronous nature allows coaches to work with multiple teams, though a concluding in-person networking social with alumni adds value.