

HARNESSING THE POWER OF OPEN-SOURCE SOFTWARE FOR RESEARCH-INTEGRATED LEARNING AND ASSESSMENT

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ABSTRACT

Authentic tasks in undergraduate subjects, such as field data collection and analysis, allow students to explore key concepts in the context of real-world problems. In a third-year environmental sciences subject, students learn to interpret highly dynamic systems that underpin ecosystem and food security. Students conduct surveys of pollination networks, analyse and interpret their data as an ecologist would.

A challenge to implementing this task was access to specialist software to create data visualisations (bipartite graphs) for network analyses. Typically, scientists use R software; however, limited class time means we cannot teach students the programming language required. Third party graphing software is available but the yearly setup and costs became unsustainable as student numbers grew.

Our solution was to harness the power of open-source software and develop the Bipartite Network Analysis app using Shiny and Bipartite package for R (DOI: 10.5281/zenodo.1219306). This web-based app removes the barrier of the need for coding experience while introducing students to industry-standard software to create journal-quality graphs. Student feedback indicates high satisfaction with the task and students' conceptual understanding, demonstrated through assessment answers, improved after implementation of the app. Our authentic task and app facilitate students' learning of the disciplinary skills required by environmental scientists.

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