Integrating Research in the Classroom
Across Disciplines

Joan Petersen (QCC), Sharon Avni (BMCC),
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Benefits of Undergraduate Research (UR) in the Classroom

For the Student:
- Application of concepts to answer real research questions
- Interact with faculty member/other students on a more personal level
- Can provide opportunities to present work at conferences - networking!

For the Faculty Member:
- UR in the classroom can generate pilot data
- Students are more engaged when the project is theirs!
- Opportunity to inspire future generation of researchers
Community College Undergraduate Research Initiative - CCURI

What is CCURI? [https://www.ccuri.org/](https://www.ccuri.org/)
- Focused on research in the classroom model
- Use part of the laboratory or other classroom session to teach discipline-specific content through an authentic research experience

Does CUNY work with CCURI?
- QCC has partnered with CCURI since 2016. LaGCC and other community colleges also have CCURI teams.

What does CCURI provide?
- Offers faculty development (training sessions), funding for supplies, conferences for students and faculty, access to assessment tool.

What disciplines does CCURI support?
- Primary focus is in Biology, however CCURI also supports other disciplines.
Joan Petersen  
Queensborough Community College  
Environmental Science  

- Course is Writing Intensive and includes Service Learning Project  
- Students participate in Authentic Research Experience in Microbiology (AREM) project.  
  o NSF-funded to Theodore Muth (Brooklyn College) and Avrom Caplan  
  o Uses Next generation sequencing to study the Urban microbiome  

- Fall 2017: class also characterized soil parameters from Oakland Lake Wildflower Meadow (currently undergoing restoration); isolated Actinomycetes from soil samples  

- Fall 2018: class provided baseline data to NYC Parks for Vernal Pool restoration site- included water and soil quality measurements, odonate survey
Environmental Science Students Studied Oakland Meadow’s Soil

• Students decided where to take soil samples.

• Developed hypothesis about microbial community structure based on soil appearance and soil parameter testing.
Assessment of UR in Environmental Science at QCC

- Classroom Undergraduate Research (CURE) survey and Survey of Undergraduate Research Experience (SURE survey)
  - free to use, available at Grinnell College website
- Undergraduate Research Student Self-Assessment (URSSA) survey (available through CCURI collaboration)
- Reflection questions given after completion of the project/end of the semester
- Results show that students self-report several gains, including:
  - Their understanding of science
  - Their understanding/appreciation of what a scientist does
  - Their own ability to be a scientist
Challenges and Hints

Challenges
– Students may not know the skills needed to conduct the research
– Students have trouble with experimental design, what to measure, etc..
– Unpredictable outcomes for experiments that have not been done before
– Budgetary concerns- different supplies needed for each experiment

Helpful hints
– Start small- consider developing UR component over a few semesters
– Look for partners that could benefit from the data your class generates
– Keep student learning outcomes in mind when developing your project
– Be flexible with your plans
Sharon Avni
Borough of Manhattan Community College
Linguistics 100

- Each student choose a religious site to investigate and were required to:
  - Do 2-3 observations at their chosen site during the semester
  - To take field notes at each visit
  - To code and analyze their notes
  - To interview at least one religious leader and one member of the community
  - To transcribe one interview
  - To photograph at least 10 images that make up the site’s linguistic landscape (e.g., billboards, posters, handwritten notices, prayer books)
Learning Outcomes:

- Students worked collectively on developing the interview protocols and designing the templates for observing and taking field notes.

- Students were given guiding questions for analyzing field notes, interview data and corpus of photographs.
Assessment:

I. Grading Rubrics
At the end of the semester, students were required to:
- Present their case studies to class (including a slide show to be posted online)
- Write a research paper discussing their case study and findings (6-8 pages)
- Complete a reflective piece about the research process (2-3 pages)

II. Survey
- Students were asked to complete a survey at the end of the semester that measured their sense of learning and engagement, and provided baseline data for measuring their learning gains and transferability of knowledge and skills.
Challenges

• 25 students doing mini-ethnographic research in 25 different sites: what could go wrong? Funding transportation and finding time for students to do research
• Assumed that students were first time qualitative researchers. Underestimated the time/effort to teach about: research compliance and ethics inductive data analysis, transcribing and analyzing spoken language, coding and categorizing data, and writing up findings.
• Aligning the content with the curriculum of LIN100 (covering the material)
• Students were very concerned about doing research on religion
Successes

- Students gave positive evaluations about the class
- They appreciated the opportunity to interview, and many took opportunity to interview relatives
- The Linguistic landscape project was most successful
- Presentations were informative: They covered a wide range of topics: translation practices in churches for Spanish speakers in Harlem; speaking in tongues in Pentecostal churches in Brooklyn, the use of Latin in Catholic churches; language policies in Buddhism; Varieties of Arabic used in Muslim mosques
- ELLs could do the project (use of L1)
My Takeaways

• Too ambitious; If I were to do something like this, students would work in groups of 3-4 and/or all do the same research site.
• A course like this has a lot of merit but needs to be paired with a research methods course and/or needs to have a teacher assistant or have fewer students
• Made me appreciate the “small” types of research I have always done in this class: interviews, transcribing, linguistic landscape, ethnography that better align with the course content
• Students were willing to “roll with it” and were willing to be experimental.
• Scaling up this type of project would need departmental and college support as well as significant funding
Holly Porter-Morgan  
LaGuardia Community College  
Environmental Science Capstone Course

• Students conduct semester-long, individual research projects as part of an ongoing effort to monitor the nature and level of contaminants in New York City waterways.

• Projects are in collaboration with a citizen's science organization.

• Sample sites are located in waterways across New York City.
Students learn laboratory methods to test for the presence and abundance of trace metals, nutrients, and bacteria.

Each student collects weekly samples at one site and compares them with the samples from a second site, identifies a hypothesis, conducts chemical tests, and analyzes the data.

**Sample projects:**

- Does the presence and quantity of heavy metals in water samples vary with precipitation at my two sites?
- Do metal levels vary in samples collected at sites in residential versus industrial neighborhoods?
- Are metals levels higher in samples from Superfund sites versus non-Superfund sites?
Assessment

Low Stakes:
- Drafts
- Database
- Surveys

High Stakes:
- Scientific paper
- Oral presentation symposium
- Reflections

“I felt like a scientist”
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