Undergraduate Research as a High Impact Practice

*Integrating Research Into the Curriculum*

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Queensborough Community College

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About Queensborough (QCC)

- Enrollment of 16,800 students
- Minority Serving Institution
- Hispanic Serving Institution
- Fall 2013 incoming students (129 countries, over 99 languages)
QCC Academies

- The Academies: STEM, Liberal Arts, Visual and Performing Arts, Health Related Sciences, and Business
- Intrusive Advisement (Freshman Coordinators)
- High Impact Practices (HIPs):
  - Writing Intensive Courses (WI), Learning Communities (LC),
  - Service Learning (SL), Common Intellectual Experience,
  - Collaborative Assignments and Projects, Global/Diversity Learning (GDL), Undergraduate Research (UR)
Queensborough (QCC) is becoming a national model for using a multiple prong approach in engaging students in High Impact activities thereby improving their retention and graduation rates at a community college.

High Impact activities like Service Learning, Writing Intensive courses and Learning Communities are used across curriculum to engage students.
Impact of Service Learning & other HIPs

<table>
<thead>
<tr>
<th>Pass Rate in EN101 over 5 Semesters</th>
<th>No HI</th>
<th>SL</th>
<th>3 HI</th>
</tr>
</thead>
<tbody>
<tr>
<td>N completed</td>
<td>8965</td>
<td>185</td>
<td>407</td>
</tr>
<tr>
<td>EN101 Pass rate</td>
<td>83.30%</td>
<td>86.50%</td>
<td>90.90%</td>
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<table>
<thead>
<tr>
<th>Pass Rate in Psyc 510 over 5 semesters</th>
<th>No HI</th>
<th>1 HI</th>
<th>3 HI</th>
</tr>
</thead>
<tbody>
<tr>
<td>N completed</td>
<td>6485</td>
<td>538</td>
<td>800</td>
</tr>
<tr>
<td>SS510 Pass rate</td>
<td>58%</td>
<td>66.90%</td>
<td>68.60%</td>
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Research Opportunities at QCC

- NIH RIMS
- NSF STEP
- NSF REU
- Howard Hughes
- DOE-JGI
- CSTEP
- Nursing Research Day
Our NSF STEP grant data shows that close to 90% of the students who have completed a research project have either graduated from QCC or transferred with 40 or more credits.
QCC's Research Model

- Honors classes
- Indep. Studies
- Research Courses

Sophomores as "PostDocs"

Research Internships
- Internal/External
- Paid/Unpaid

Participation in National Research Projects
- CSHL & JGI
Call to Action

- Report to the President “Engage to Excel” (Olson and Riordan, 2012).
In 2013 QCC decided to formally institutionalize undergraduate research as a high impact practice.

- UR FIG working committee formed
- FIG recruited small faculty cohort for UR
- FIG helped faculty integrate UR in curriculum
- FIG is developing assessment plan for UR
Faculty Inquiry Group (FIG) for UR

- Dr. Cheryl Bluestone, Social Sciences (Chair, Fall 2013)
- Dr. Georgina Colalillo, Nursing
- Dr. Nidhi Gadura, Biological Sci. & Geology
- Dr. Jun H. Shin, Chemistry
- Dr. Mercedes Franco, Math & CS (Chair, Spring 2014)
“The goal is to involve students with actively contested questions, empirical observation, cutting-edge technologies, and the sense of excitement that comes from working to answer important questions.”

UR as a HIP

Student, process centered $\leftrightarrow$ Outcome, product centered

Student initiated $\leftrightarrow$ Faculty initiated

All students $\leftrightarrow$ Honors students

Curriculum based $\leftrightarrow$ Co-curricular

“Making Explicit the Implicit: Defining Undergraduate Research” by M. Beckman & N. Hensel
UR as a HIP

Collaborative $\leftrightarrow$ Individual

Original to student $\leftrightarrow$ Original to discipline

Multi-or interdisciplinary $\leftrightarrow$ Discipline based

Campus/community audience $\leftrightarrow$ Professional audience

“Making Explicit the Implicit: Defining Undergraduate Research” by M. Beckman & N. Hensel
Student learning outcomes for UR

- **LO1 - (Collect and Analyze data)** Students will be able to follow protocol in order to gather appropriate data & evaluate and analyze data accurately to provide a solution to a problem and complete a project.

- **LO2 - (Create a product)** Students will present the data in an appropriate format (particularly: correctly make and label relevant figures, tables, or graphs) to submit an analytical product to support/refute different points of view on a topic.

- **LO3 - (Present product)** Students will accurately present his/her product at an appropriate venue. The venue may be a class meeting, a club, a departmental conference, a QCC conference or any regional or national conference.
Professional Development Plan

For faculty across HIPs, offered by CETL:

1. **Backward Course Design**

2. **Reflection**

For UR faculty, offered by FIG:

3. **Designing a research intensive course:**

   **Our premise:** faculty members are well equipped to conduct research in their disciplines. FIG assists in developing and embedding research into regular class in a manner that is pedagogically sound & executable within the timeframe of a semester.
Stipends recognize time and effort spent on PD activities

FIG members mentor UR recruits after workshop

Blackboard site serves as repository of course design documents, reading materials, templates

FIG members review and approve UR course designs
First Cohort of UR Faculty

Spring 2014:

Dr. Nidhi Gadura – BI 356 Principles of Genetics

Dr. Areti Tsimounis – BI 421 Human Physiology Lab

Dr. Mercedes Franco – MA 336 Computer Assisted Statistics

Dr. Rommel Robertson – PSYC 240 Social Psychology
First Cohort of UR Faculty

- **Fall 2014:**

  Dr. Monica Trujillo – BI 461 General Microbiology

  Dr. Lakersha Smith – PSYC 230 Abnormal Psychology

  Drs. Georgina Colalillo, Regina Cardaci & Barbara Blake-Campbell – NU 204 Nursing and Societal Forces
MA 336 – Computer Assisted Statistics

- Intro to probability & statistics for non-majors (class size: 24).

- Mandatory Research “Examining Human Rights with the Lens of Statistics” aligns with other HIPs: Common Read, SL and WI.

- Students work in groups; collect quantitative data about a human right issue of their choice; design and conduct correlational analysis with the data.

- Students present to a general audience (High School; QCC students, faculty & staff) and write an statistical analysis report.
Join CSHL DNA Barcoding Project (Honors)

Students work in teams of 3 to come up with a testable hypothesis.

Students extract Genomic DNA, PCR amplify barcoding region, send out for sequencing, use DNA Subway to analyze the sequence and identify species, make phylogenetic trees to understand evolutionary relationships.

Make a presentation at the end of the semester.
Students will frame a researchable question and gather evidence to answer the question.

- Collect quantitative data on the teen pregnancy rates in NYC by zip code utilizing appropriate resources.
- Research and review the literature on teen pregnancy reduction interventions.
- Hypothesize (question) possible causes for persistence of problem despite intervention.
- utilize the PICOT framework to conduct evidence-based research
- Develop a poster presentation and research paper (WI, SL, GDL).
(Tentative) Assessment Plan

- Self-reported benefits collected from UR students via (pre & post) surveys.

- Assessment of student work (papers and oral presentations) using a rubric developed by the FIG. The rubric recognizes 5 levels of performance (0 through 4; 1 is not passing) for each one of the UR LO.

In addition, the college will assess impact of UR on retention and graduation rates, enrollment in STEM program, and student satisfaction.
LONG TERM GOALS:

• Increased number of faculty engaged in research.
• Increased number of courses with UR component built in.
• Increased number of students engaged in research.
• Increased number of student presentations at conferences.
• Increased retention rates and transfer rates to higher education degrees.
Thank you!

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