

# Integrating Research into Undergraduate Courses: A Review of Two Essential Books

Table 1: *Course-Based Undergraduate Research* (Hensel 2018)

Title of Chapter	Course/Discipline and Project	Educational Context
Comgen: Developing the Pedagogy for Classroom-Based Undergraduate Research Experience Courses	ComGen: The Community College Genomics Research Initiative; elective course, then scaled up to cell biology course for biology  <i>Sequencing the genome</i>	Community College
Starting the Research Process with Information Literacy in Introductory-Level Earth Science Courses	“Introductory Earth Science” courses for science and nonscience majors  <i>Focused on information literacy</i>	Penn State, Brandywine  (Branch Campus)
Editing the Public Domain with Undergraduate Students: Studying Literature with Collaborative Annotation and Digital Publication	“Introduction to English” course to “Common Read” to “Encoding” lab for undergraduate students in humanities  <i>Collective annotation of texts</i>	University of New Haven  (Private University)
A High-Throughput Model for Course-Based Research Experiences for the First Two Years of Chemistry and Biology	CUREs used as a pathway for students; initially “Atoms to Ecosystems,” first-year chemistry and biology students to build skills for future classes, but has evolved to “Interdisciplinary Investigations (Lab and Classroom)” which hopefully lead to stand-alone research courses  CUREs used as a pathway for students; initially “Atoms to Ecosystems,” first-year chemistry and biology students to build skills for future classes, but has evolved to “Interdisciplinary Investigations (Lab and Classroom)” which hopefully lead to stand-alone research courses  <i>Culminates in a research poster presentation to the campus community</i>	North Seattle College  (Public Community College)
Research Strategies in Theater Studies	“Script Analysis” course available for undergraduate students; Honors, three inquiry seminars targeting first-year students  <i>Dramaturgical analysis of plays</i>	Northeastern University  (Private University)

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Learning That Lasts: Action Research in the Classroom	<p>Education: Action research (a process of reflective thought, discussion, decision, and action by ordinary people experiencing common problems) in the first pedagogy course on lesson planning (teacher preparation program, field/clinical experience)</p> <p><i>Challenge(s):</i> clinical partnership between the school and college; providing opportunities to practice research and inquiry</p>	<p>Manhattan College (Private, Liberal Arts College)</p>
Diving into Research at the Ocean Research College Academy	<p>First-year course: experience integrating three STEM classes; explore the process and nature of science part of Ocean Research College Academy (ORCA)</p> <p>Collect data to assess the health of Possession Sound, part of Puget Sound</p>	<p>Everett Community College (Community College)</p>
Experience is Education	<p>Second-year experience of ORCA: "Composition II" course focuses on research writing</p>	<p>Everett Community College (Community College)</p>
Using Mystery to Encourage Undergraduate Historical Research	<p>History Mystery: A Descent Into the Macabre, a Journey Into the Unknown Mystery solving project, two substantial research papers:</p> <ol style="list-style-type: none"> <li>1. for researching a mystery pertaining to family history</li> <li>2. for following a thread of mystery encountered in the course materials</li> </ol>	<p>Valparaiso University (Private University)</p>
Implementing a Course-Based Undergraduate Research Experience in an Introductory Biology Course	<p>CURE in an introductory biology lab course; analyzes how streams are impacted by urbanization and land use</p> <p>Students have a number of different assignments but culminates with a scientific manuscript and symposium presentation to peers and faculty</p>	<p>St. Edwards University (Private University)</p>
Course-Based Research in Introductory Psychological Science	<p>Introductory-level psychology research method course Authentic research experience in 3 units:</p> <ol style="list-style-type: none"> <li>1. identifying the area in psychology to research</li> <li>2. voting on the specific research question and hypothesis</li> <li>3. independent study by group</li> </ol> <p><i>Challenge(s):</i> Collect data from authentic human subjects; limiting content coverage; time management; teach tech skills, encourage dissemination and ownership</p>	<p>California Lutheran University (Private University)</p>

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DNA Barcoding Undergraduate Research Tool can be Scaled from Traditional to Course-Based Research Project with Ease	<p>Discussed three contexts that this occurred:</p> <ol style="list-style-type: none"> <li>1. Course based authentic research (genetics course)</li> <li>2. Research internship and peer-lead authentic research experience</li> <li>3. Partnership with Cold Spring Harbor DNA Barcoding Lab</li> </ol>	Queensborough Community College  (Community College)
Student Outcomes and Impacts of Discovery-Based Research in the First Two Years of Undergraduate Education	<p>Focuses on the Science Education Alliance-Phage Hunters Advancing Genomics and Evolutionary Science (SEA-PHAGES) program of which their institution is a partner; focuses on bioinformatics and genomics research</p> <p>SEA-PHAGES is imbedded in a biology and biotechnology sequence of courses for majors and nonmajors. Students present their work at regional American Society of Microbiology meeting or on-campus research day.</p> <p>Also discusses Prevalence of Antibiotic-Resistance in the Environment (PARE) and Small World Initiative (SWI). SWI is a CURE that examines effective delivery of antibiotics in the world. PARE is a CURE that focuses on examining antibiotic-resistant microbes in soil.</p> <p>Discusses a Summer Undergraduate Research Experience</p>	Del Mar College  (Community College)
Undergraduate Research and Applied Business Statistics	<p>Applied Business Statistics, a required course for all first- and second-year business students</p> <p>An authentic research project using big data from public databases (Integrated Public Use Microdata Series, US Census, US Bureau of Labor Statistics, etc.)</p> <p><i>Challenge(s):</i> limited time; the only statistics course for business students</p>	Carthage College  (Private college affiliated with the Evangelical Lutheran Church)
“Pride in the College Experience” Course	<p>The “College Experience” is a success course focused on self-empowerment, academic excellence, collegiate experiences, career exploration, and community engagement.</p> <p>Students complete the Passion in Action project, “Passion, Research, Inquiry, Design, and Engagement.”</p>	Raritan Valley Community College  (Community College)
Course-Embedded Research in the Lower Division at Montana State University	<p>Discusses two examples of courses in which Core 2.0 Research Requirement was integrated</p> <p>First-Year Research Experience (FYRE): one-credit seminar with a research internship</p>	Montana State University  (Public Land Grant University)