

Undergraduate-Research Skills Scaffolding: Building toward Mastery in a Capstone Research Project

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Note: A longer version of this material is published in Chapter 4 (“Building Undergraduate Research into the Curriculum” by Jenny Olin Shanahan) of *Faculty Support and Undergraduate Research: Innovations in Faculty Role Definition, Workload, and Reward*, Eds. N. Hensel and E. Paul (2012). Washington, DC: Council on Undergraduate Research.

This research-skills scaffold is one model of how a major curriculum might be structured to ensure that undergraduate students learn the content and skills necessary to complete a capstone research project. This scaffold assumes a required thesis or other capstone assignment that allows students to demonstrate undergraduate-level “mastery” of research skills. I have chosen the terms *introduce* (I), *develop* (D), and *master* (M), which are often used in educational assessments, to indicate three general levels of progress. I recommend beginning at the end, essentially employing Wiggins and McTighe’s (1998) Backward Design theory.¹ Backward Design curricular mapping encourages educators to think in terms of what they want their students ultimately to achieve. What do you want students to be able to do, particularly in terms of research, by the time they graduate from your program? If the capstone project represents students’ final stage of undergraduate learning, what are the stages that lead up to it? How does the curriculum, from the first year to the capstone project, constitute a meaningful, consistent initiation into a culture of inquiry in the discipline?

The answers to such questions about the end goals of a program or major help faculty design curricula that build research skills in deliberate ways. The basic curricular outline is, first, to *introduce* research expectations in 100- or 200-level courses such as First-Year Seminar and General Education courses, as well as in introduction-to-the-major or “gateway” courses; then to help students *develop* the skills in content-rich major courses (often taught at the 300 level); and, finally, to facilitate *mastery* of the skills in theory courses, research methods courses, and senior-level seminars.

Each objective of the Capstone project is introduced (I) and developed (D) in previous coursework, to be mastered (M) in senior-level assignments.

Content Mastery in Senior Thesis or Capstone Project	Research/ Theory 400-level courses	Seminars/ 400-level Major courses	300-level Major content courses	200-level Intro/ Gateway courses	100-level & Gen Ed courses
1. Define a topic/question of appropriate scope and significance in the discipline.	M	M	D	I	
2. Use evidence/data convincingly to support findings or main argument.	M	M	D	D	I
3. Analyze results or evidence in ways consistent with a disciplinary approach.	D	I	I		
4. Show awareness of a disciplinary audience, the context, and purpose.	M	D	D	I	
5. Explain the significance of the research/study.	M	M	D	D	I
6. Acknowledge and respond to limitations or counter-arguments.	M	M	D		I

Research-Skill Mastery in Senior Thesis or Capstone Project	Research/ Theory 400-level courses	Seminars/ 400-level Major courses	300-level Major content courses	200-level Intro/ Gateway courses	100-level & Gen Ed courses
1. Use timely, peer-reviewed, scholarly sources and be able to explain why each is utilized (such as in an annotated bibliography).	M	M	D	D	I
2. Consult with professors, reference librarians, and/or other experts while maintaining self-sufficiency.	M	M	M	D	I
3. Read closely and critically the related research literature and/or primary texts.	M	M	D	D	I
4. Formulate an understanding of the academic discourse surrounding the topic.	M	D	D	I	
5. Order points from your research in logical structures by creating outlines, flow charts, or other organizing plans in early stages of the project.	M	M	D	D	I
6. Keep track meticulously of bibliographic information; cite every source correctly.	M	M	D	D	I
Dispositional Mastery in Senior Thesis or Capstone Course	Research/ Theory 400-level courses	Seminars/ 400-level Major courses	300-level Major content courses	200-level Intro/ Gateway courses	100-level & Gen Ed courses
1. Participate in iterative research-writing process with flexibility and patience.	M	M	D	D	I
2. Think creatively and analytically to write a compelling report/essay.	M	M	D	I	I
3. Engage intellectually with the topic by reading everything you can about it and giving time daily to the research as well as the writing process.	M	M	D	D	I
4. Use self-discipline in terms of time management, commitment, and initiative.	M	M	D	D	I
5. Present the argument with clarity, thoroughness, and confidence at a defense/symposium/conference.	D	I			

ⁱ Wiggins, G. & McTighe, J. (1998). *Understanding by design*. Alexandria, VA: Association for Supervision and Curriculum Development.