# Making Scholarly Activity Available to the Masses: The Scaffolding of Scholarship Throughout the Undergraduate Curriculum

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# FGCU's Quality Enhancement Plan

- Focuses on 3 learning outcomes: critical thinking, information literacy, & written communication.
- Assessed through undergraduate scholarly experiences.
- Scholarly experiences are embedded throughout the curriculum.
- By product: All students experience scholarship.

# Our Model: Scaffolding of Scholarly Activity

- Traditional undergraduate scholarship:
  - At the end of the program . . .
  - Senior thesis, one-on-one faculty mentorship
  - Few benefit; limited by faculty time; for the best and the brightest!
- Alternatively, scholarly activities occur within courses and are scaffolded across the curriculum.
- Each program identifies and modifies courses to be “scholarly focused” or “scholarly enriched”.

# Details . . .

- University faculty define the general criteria for scholarly courses.
- Programs then identify the important scholarly elements for their given discipline that meet the criteria.
- Each program identifies at least three courses: (1) gateway, methods course, (2) 2nd course(s) in the major, (3) capstone course.
- Those courses include activities that embrace some collection of the scholarly elements.
- Artifacts from the courses are assessed for learning outcome achievement.

# Criteria for Scholarly Course

1. *Inquiry.* Formulate a question, recognize a problem, or develop a purpose that the scholarship will address.
2. *Research.* Develop an understanding or appreciate the history of a problem, question, or purpose; uncover others that have identified or addressed the problem, question, or purpose in the past, and understand their findings.
3. *Creation.* Develop a plan, proposal, or design to answer the question, solve the problem, or accomplish the purpose; establish a methodology, technique, or approach.
4. *Implementation.* Conduct the study, experiment, investigation, analysis, or produce the creative piece.
5. *Presentation.* Communicate the scholarship in writing or through oral presentation; perform or exhibit the creative piece.
6. *Evaluation.* Subject the presentation, communication, or creative work to outside review and critique.

# Scholarly Elements: Marine Science

**BS Marine Science Learning Outcomes**

*Finalized: August 28, 2015*

Elements of Scholarship for Undergraduates to Achieve**:**

*Communication*

- Writing a scientific proposal.
- Composing an abstract for a scientific study.
- Composing the Discussion section of scientific paper.
- Composing and presenting a poster.
- Giving an oral presentation about research or an internship experience.
- Present data in graphical and tabular fashion.

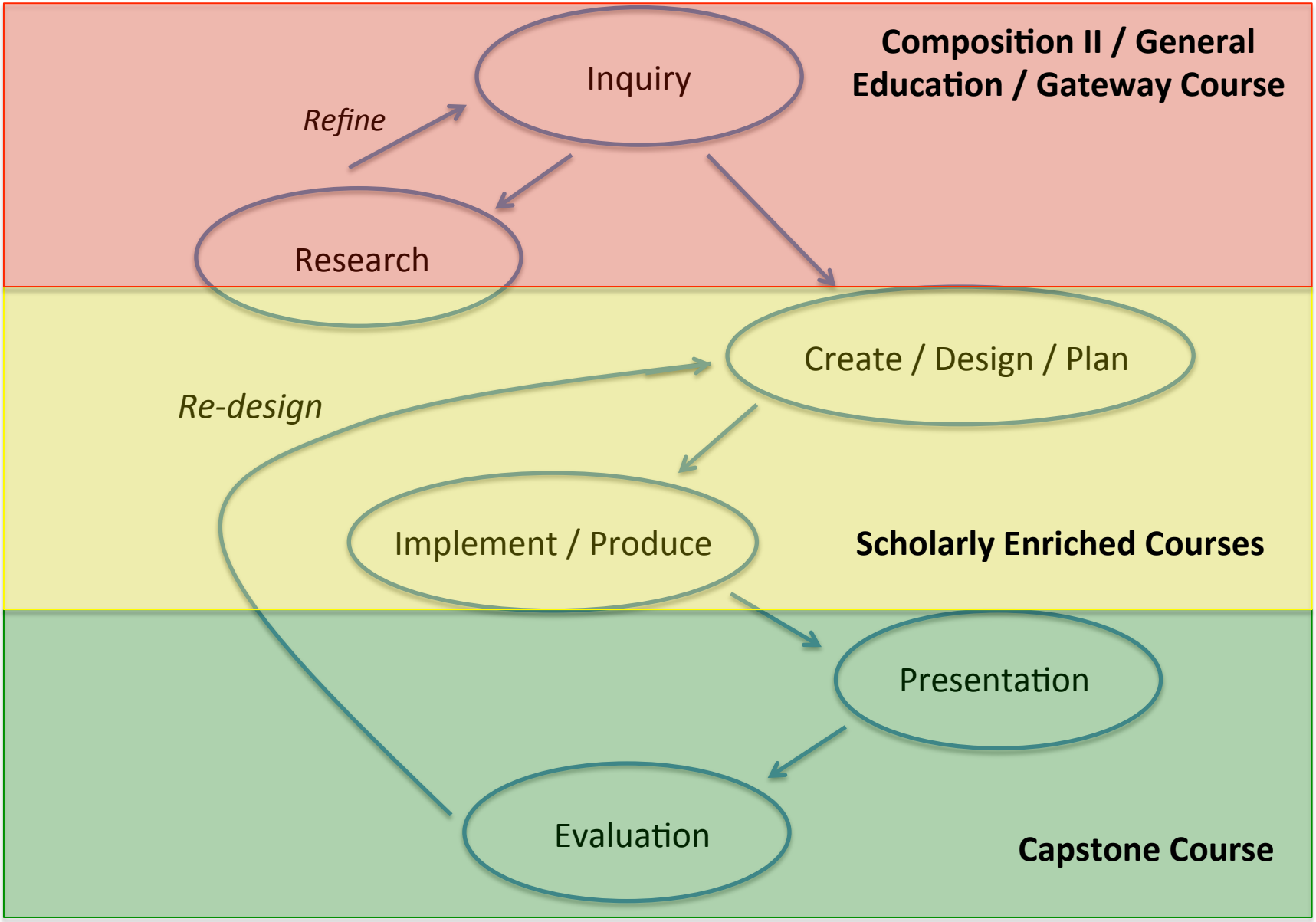
*Information Literacy*

- Ability to critically evaluate the validity and quality of a scientific paper.
- Obtain, evaluate, and synthesize primary and secondary scientific literature.
- Understand the ethical implications and incorporate ethical practices in science.

*Critical Thinking*

- Ability to analyze quantitative and qualitative data.
- Draw reasonable interpretations from existing data.
- Develop and test a hypothesis.
- Develop a study or experimental design.
- Respond to criticism levied against a student's scientific investigation.

# Scaffolding Through the Curriculum



# Example 1: BS Marine Science

- Students trained to be practitioners of science in environmental field or for graduate school.
- At Composition & General Education levels: raise questions, library research, expository writing, and credibility of secondary / internet sources.
- Gateway: “Scientific Process”.
- 2nd courses in the major: “Marine Ecology”, “Coastal & Watershed Geology”.
- Capstone: “Senior Seminar”

# Information Literacy: The CRAP Test

- Currency
- Reliability
- Authority
- Purpose

## Climate Change & Sea-level Rise:

Article published originally in *The Telegraph*, a British newspaper, but reprinted at "GlobalClimateScam.com". Article titled "Rise of Sea Levels is the Greatest Lie Ever Told." Published Aug 31, 2015.
http://www.globalclimatescam.com/science/rise-of-sea-levels-is-the-greatest-lie-ever-told/

Article published at "RealClimate.org" about sea level on Oct 15, 2013, titled "Sea level in the 5th IPCC report".
http://www.realclimate.org/index.php/archives/2013/10/sea-level-in-the-5th-ipcc-report/

*Material from: http://libguides.southmountaincc.edu/CRAPtest, South Mountain Community College Library, adapted from Molly Beestrum, Dominican University Librarian; and Vanderbilt University Library.*

# Presenting the Scientific Process

## Introducing Philosophy, Theory, Methods, and Ethics

*Mason Meers, Nora Egan Demers, and Michael Savarese*

*In a course titled Scientific Process, we introduce undergraduates to the philosophy and practice of science and initiate them into a 2-year undergraduate research track. Engaging exercises and discussions help students understand the scientific process and ultimately produce a research proposal in grant application format. Students defend their written proposal during a 15-minute oral presentation.*

Journal Of College Science Teaching 33(3):34-39 (2003)

[Poster by: Reycraft & Demers]

# 2nd Course: Coastal & Watershed Geology

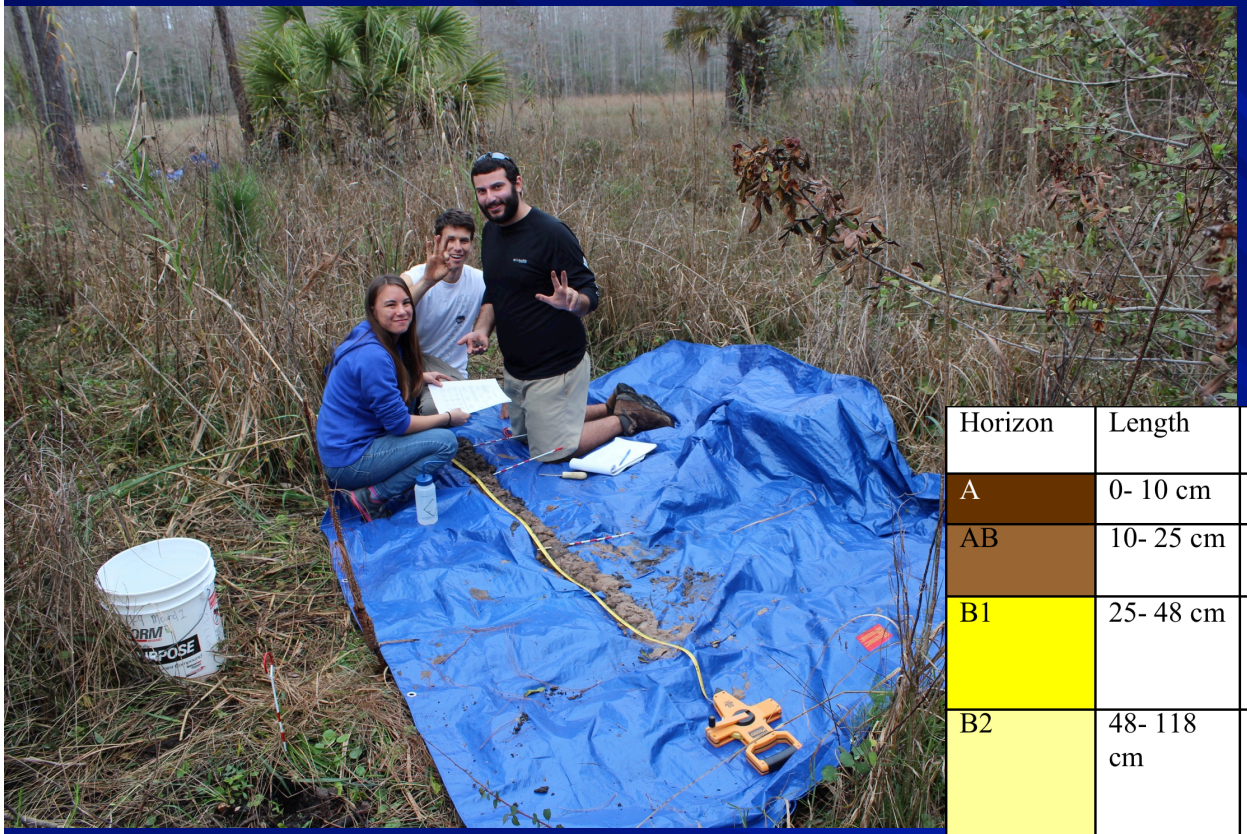
- Students work on 4 small research projects. Can be / should be(?) community engaged.
- Students posed with hypotheses for testing, develop a study design, then implement it.
- Collect and analyze data; interpret results.
- As groups, write a Discussion, Abstract, or produce a poster.

# Example of a Project

Situation: FGCU attempted to create wetland prairies by reducing elevation through the scraping of soil. Vegetation on these engineered prairies has not done well. Is this a function of inadequate soil development?

$H_1$: The prairies that were scraped in 1996 and 2002, where topsoil was removed, have had sufficient time to develop hydric wetland soils.

Students design a field investigation involving pristine and engineered prairies, sample and describe soil profiles, and compare the state of soil development.



# Sampling a Pristine Prairie

## Soil Profile

| Horizon | Length | Color | Sediment Type |
|---|---|---|---|
| A | 0- 10 cm | 5Y 4/1 Dark Gray | Sand |
| AB | 10- 25 cm | 5Y 3/1 Very Dark Gray and 5Y4/1 Dark Gray | Sand |
| B1 | 25- 48 cm | 10 YR 4/2 Dark Grayish Brown | Sandy Loam |
| B2 | 48- 118 cm | 10 YR 4/3 Brown | Sandy Loam |
| C | 118- 185 cm | 2.5 Y 6/3 Light Yellowish Brown | Loamy Sand |

# Capstone Course: Senior Seminar

- Culminating scholarly experience.
- Concludes with students giving an oral or poster presentation of their research or internship.
- Posters presented in a College STEM-wide symposium held on campus.

# Example 2: BA Music Performance

- Students trained to be performance artists and to appreciate the historical / cultural context of their material.
- Gateway: “Junior Recital”
- 2nd course in the major: “Form & Analysis”
- Capstone: “Senior Capstone in Music”

# 2nd Course: Form & Analysis

- Students:
  - Examine major musical genres.
  - Read full scores.
  - Analyze & critique performances.
- Written communication emphasized.

# Senior Capstone in Music

- Preparation for Senior Recital.
- Generate materials supporting the musical decisions made in performance: historical considerations of music, reflections on the performance preparation process.

*Thanks . . .*
*Time for questions.*
*Next steps . . .*


## Acknowledgments


- Thanks to FGCU's Office of Undergraduate Scholarship & Faculty Scholars
- Faculty within the Department of Marine & Ecological Sciences, Biological Sciences, and the Bower School of Music & the Arts

# Workshop Activity . . .

- Use the remaining time to help you conceptualize the adoption of this approach.
- Divide the group into:
  - Those of you interested in imposing course-level changes.
  - Those of you interested in program-level changes.

# Workshop Activity . . .

- For those working on course-level change:
  1. What course would you like to focus upon?
  2. What scholarly elements does or could the course review?
  3. How could the course curriculum be modified to accommodate these elements?
- For those working on program-level change:
  1. What are the critical scholarly elements that all your students should achieve?
  2. In what parts of your curriculum should these elements be presented?
  3. Are these elements already presented? If not, how can they be incorporated?

# Challenges

- What challenges do you anticipate encountering?
- The challenges we've encountered at FGCU.

# Action Items

- Before leaving . . .
  - Identify a short term action item, something to be done immediately upon your return.
  - Identify a long term action item, something to accomplish over the next 6-12 months.