

# Integrating research into the curriculum: Models and Strategies

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# High Impact Practices

1. First year seminars & experiences
2. Common intellectual experiences
3. Learning communities
4. Writing intensive courses
5. Collaborative assignments and projects
- 6. Undergraduate research**
7. Diversity/global learning
8. Service learning/community based learning
9. Internships
10. Capstone courses & projects

Reference: George D. Kuh (Washington, DC: AAC&U, 2008)



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# Positive Outcomes For Students

1. Learn a topic area in depth
2. Foster independent thinking
3. Construct meaningful problem; apply knowledge to real situation
4. Improve oral and writing skills
5. Increase interaction with faculty and peers
6. Gain modestly higher GPAs

Reference: The Essential Features of Undergraduate Research, Lopatto, D. (2003). Council on Undergraduate Research Quarterly, p. 139 - 142



# Models of Undergraduate Research

- Summer immersion
- CSRCW or UROP (semester / year long)
- Research infused curriculum
- Research based curriculum
- Service Learning
- Study Abroad
- Other



# Promote & Disseminate UGR

1. Campus wide research presentations/poster sessions
2. Annual reception by the Undergraduate research office
3. Presentations at regional/national conferences (NCUR)  
[http://www.cur.org/conferences\\_and\\_events/student\\_events/ncur/](http://www.cur.org/conferences_and_events/student_events/ncur/)
4. Dissemination via radio, newspapers, trade journals
5. Posters on the Hill program  
[http://www.cur.org/conferences\\_and\\_events/student\\_events/posters\\_on\\_the\\_hill/](http://www.cur.org/conferences_and_events/student_events/posters_on_the_hill/)
6. Student authored publications (research based courses)



# Examples of UGR in the Sciences

Learner outcome: Design structural modification(s) to a selected drug and execute its /their synthesis

Structure activity studies on new antifungal and antibacterial compounds (Organic chemistry course, since 2013, research based, interdisciplinary)

Learner outcome: Conduct biological assays and select a bacterial strain for chemical studies

Inhibition of *Aphanomyces cochlioides* by *Streptomyces* extracts (organic chemistry course, research based, 2011, interdisciplinary, inter-unit): **Resulted in intramural funding**



# Examples of UGR in the Sciences

Learner outcome: Demonstrate technical competency and general laboratory skill in the following areas: isolation, staining, identification of unknowns, evaluation of metabolism and aseptic techniques.

Integrating drug discovery in a microbiology course (Microbiology course, since 2012, research infused)

Learner outcome: Apply acquired course content to develop solutions to real world problems

1. Fate and toxicity of estrogens in wastewater systems
2. Toxicity of run-off from coal tar sealed pavements

(Ecotoxicology course, since 2013, research based, co-taught)



# Examples of UGR in the Humanities

**Many humanities courses widely use research-based methods:** Introductory to advanced courses throughout the humanities ask students to research primary texts/elements with the aid of secondary scholarly materials to allow them to create a critical analysis essay. These essays vary in the level of requirements, based on course level, as well as the dissemination of the materials, from classroom to national conferences/publications.

Example: World Literature Outcome - “Respond critically to works in the arts and humanities.”

- Students choose 5 literary texts from at least 2 eras and 2 cultures and write a 7-8 page paper critically analysing a research topic of their choice within the 5 texts. Students must also use 4 secondary scholarly articles to support their analysis. Students then present to the class their paper topic in a short PowerPoint presentation.





## Other Examples of UGR in the Humanities

**Service Learning as Undergraduate Research:** Service Learning can provide undergraduate students with an experience that allows them to obtain skills in conducting primary research, such as interviewing.

Example - Composition course Outcome - “Evaluate the process of writing and writing strategies to solve particular writing problems and challenges.” - (Project with Service Learning Coordinator Lisa Logering)

- Students interviewed people who grew up on or near the land that is now the Rydell National Wildlife Refuge about the history of the locale; they then wrote short articles to help bring community awareness to this history and published the articles in a local newspaper.
- Similar projects with the Local Foods Initiative and Preservation of old buildings – Radio spots, webpage, blog.

Example - Introduction to Literature Outcome: “Understand those works as expressions of individual and human values within an historical and social context.” - (Project with Lisa Logering)

- Students interviewed residents of a local assisted living facility to discover their stories of their childhood living in a rural environment; then students wrote the story into the format of a children’s book. Then children in local 2nd grade class heard the story and illustrated the book. My students then presented the finished product to all involved.



# Experiences with Multiculturalism as Undergraduate Research

Example: Intercultural Communication Outcome - “Design plans that facilitate the constructive transfer of meaning in diverse cultures.” (Conducted with ESL instructor Carol Simmons)

- Students from an upper division Intercultural Communication course worked with students from a campus ESL class to create a project with a humanities focus. Intercultural Communication students researched intercultural communication techniques, and then through firsthand experience creating a project with the ESL student, deciphered if their research techniques were effective or needed modification. Each student also, through the project requirements researched components of each other’s culture. Through many collaborative work sessions students from both courses partook of experiential research. Disseminated collective presentations to campus.

**Study Abroad as Undergraduate Research:** Studying Abroad can be an ideal time for undergraduate students to obtain first-hand research towards multiple topics within the humanities.

Example: Global Seminar courses to Greece and Italy - Outcome - “Recognize and articulate relationships of fine art forms to cultures and contexts.”

- Students choose research themes connected to course topic and then prepare digital stories, through the use of interviews, photographs, videos, etc. while abroad. Disseminate to campus.



# Examples of UGR in Education

## Lower division education course:

LO: Demonstrate knowledge and understanding of concepts related to technology and student learning. (BOT)

- What are the criteria for evaluating App usability and educational potential?
- How do children approach, play, and learn with touch screen devices?
- How do developmental differences impact game comprehension and play?



LO: Identify the major theories of early childhood development and learning and their implications for practice with young children and families from birth through age eight (BOT)

- What are the characteristics of children's drawing between 12mos – years?
- What are the developmental processes of learning to use a digital camera?



# Upper division education course:

LO: Understand and apply the process and necessity of collaboration with families and other adults in support of the learning of young children (BOT)

- What are the perceptions of teachers and parents on parent involvement? What are the similarities and differences in expectations between preschools, primary grades, and upper elementary grades?
- What are the support services of children with disabilities in public, private, and charter schools?



# Service learning & Study Abroad:

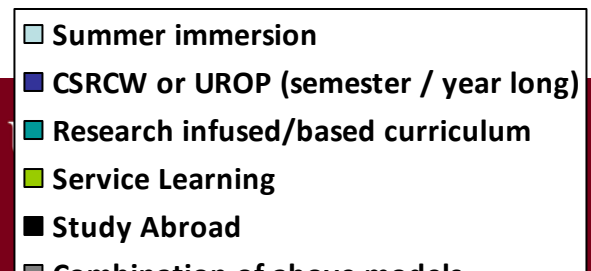
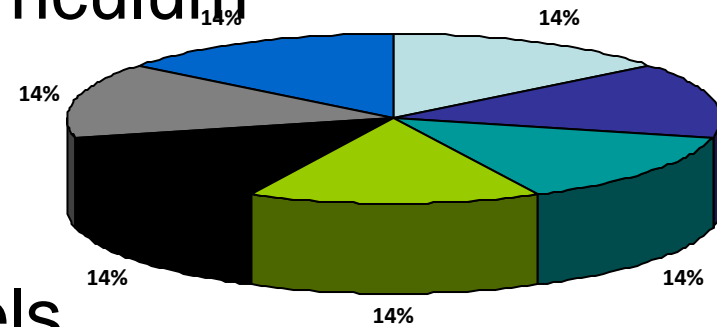
LO: Consult with parents, counselors, teachers of other classes and activities within the school, and professionals in other community agencies to link student environments (BOT)

- What kind of parent involvement activities do preschools, primary grades, upper elementary grades design, plan, and implement?
- What are the teachers' perceptions on the impact of student's learning and development with the country's one-child policy?
- What are the students' perceptions on their learning and development with the country's one-child policy?



# What model are you currently using?

- A. Summer immersion
- B. CSRCW or UROP (semester / year long)
- C. Research infused/based curriculum
- D. Service Learning
- E. Study Abroad
- F. Combination of above models
- G. Other



# Group Workshop Discussion Items

1. Do your course outcomes align with the research assignments you use?
2. If you do not currently have a research project, how can you incorporate undergraduate research into one of your courses?
3. Do you see any challenges by including an undergraduate research project into the selected course? How can you overcome this challenge?
4. Why should undergraduate research be a priority?





# Essentials of Incorporating UGR

1. Choose one learner outcome from your course
2. Provide structure to the research experience
3. Students conduct review of literature
4. Assist students to select a meaningful research question
5. Assist students to design and conduct the research
6. Students should work independently and/or as a team
7. Students should have opportunity for oral and written communication (report and dissemination)

