

Quality Enhancement Plan Proposal: Undergraduate Research and Scholarship

"Nurturing a Culture of Undergraduate Research and Inquiry at Florida Gulf Coast University"

Contributing and Supporting Faculty:

College of Arts and Sciences, Sciences & Mathematics	Charles Gunnels, Daniel Kern, and Ai Ning Loh
College of Arts and Sciences, Arts	Trent Brown
College of Arts and Sciences, Humanities	Nicola Foote
Lutgert College of Business	Daniel Rottig
College of Education	Susan Hibbard
College of Engineering	Kristine Csavina
College of Health Professionals	Thomas Bevins
College of Professional Studies	Sandra Pavelka
Honors Program	Sean Kelly
Library Services	Anna Carlin
Office of Research and Sponsored Programs	Thomas Roberts
Office of Service-Learning and Civic Engagement	Jessica Rhea
Student Support Services	Eva Sally Berg and Catherine Doyle
Whitaker Center of STEM Education	Nora Demers

1. Quality Enhancement Plan to nurture undergraduate research and inquiry

What students learn and accomplish during their undergraduate years are lighting-rod issues at both the state and national level (Market Watch Education 2011). The interest generated from ensuring that students are prepared for productive and employed post-graduate lives has placed significant demands on institutions of higher education at a time when resources to meet those demands dwindle. State universities must ensure that undergraduate students acquire meaningful content- and skill-based knowledge that prepares them for productive and meaningful careers after college. Florida Gulf Coast University (FGCU) is rapidly becoming a leader in this effort while retaining its guiding principles, such as developing students who become informed and engaged citizens. Marrying these concerns will require FGCU to educate students with the necessary knowledge, skills, and perspectives to meet challenges that confront the regional, national, and global environment.

This Quality Enhancement Plan (QEP) proposal will help FGCU reach these paired goals by transforming the undergraduate experience through original research and inquiry. Recognizing the importance of undergraduate scholarship that engages students in their field of study and creates life-long learners, we propose that FGCU nurtures a culture of undergraduate research and inquiry that provides students with significant opportunities for discovery. Through original research and inquiry, students develop critical thinking skills; become effective communicators and problem solvers; learn to identify, locate, manage, and evaluate relevant information; and collaborate with others. Successful undergraduate scholarship bridges the gap between students viewing themselves as passive learners to students viewing themselves as professionals forging new learning experiences.

Since the founding of the university, the development of undergraduate research and inquiry emerged organically among some individuals and programs. Present undergraduate research opportunities include:

- Some courses that incorporate research-based discovery, e.g. IHS 4504 Research Methods in Health Care and PCB 3460C Ecosystem Monitor and Research Methods,
- Some grant-supported research opportunities, e.g. the Whitaker Center for STEM Education's Undergraduate Research Grants and the Office of Research and Sponsored Program's Undergraduate Student Research Assistantships,
- Capstone experiences that include some faculty-mentored research and inquiry,
- Opportunity for dissemination of some research in the form of the annual FGCU Research Day.

This QEP will build on the foundation of undergraduate scholarship established at FGCU. Development of this QEP will improve student learning by 1) providing students with research-related skills and 2) expanding opportunities for undergraduate research and inquiry. Students will be provided with research-related tools and skills through their entire undergraduate career. Students will be introduced to research in course-based activities as early as their first semester at FGCU and have the opportunity to develop these skills through their graduation. At the same time, participating students will benefit from training workshops and guest-speaker research seminars. The full integration of research throughout students' undergraduate experience will improve student learning goals and outcomes: including effective written, speaking, and quantitative communication; ethical responsibility; information literacy; problem-solving abilities; and technological awareness.

Our main goals for this QEP include:

1. Increase the number of students participating in undergraduate research and inquiry;
2. Provide students with the opportunity to understand the fundamental role of research and inquiry by the time that they graduate from FGCU;
3. Increase the amount faculty-mentored research and inquiry;
4. Enhance existing courses and create new courses in a university-wide effort to develop a undergraduate curriculum that incorporates research and inquiry into the classroom;
5. Increase resources and incentives for both students and faculty to support undergraduate research and inquiry;
6. Expand research activities that serve the local community;
7. Create workshops for students and faculty that enhance research activities;
8. Develop a guest-speaker research seminar series;
9. Create an online clearinghouse of research-related activities and resources;

10. Build on successful avenues of research dissemination, such as FGCU Research Day, and create additional opportunities, such as the re-establishment of “Ampersand” (an electronic journal of undergraduate research);
11. Expand external funding for undergraduate research and inquiry;
12. Improve 4-year and 8-year graduation rates among first time in college students.

Together, these steps will help FGCU prepare students that possess required skills to compete successfully in a global environment. In addition, enhancement of the undergraduate experience through original research and inquiry will help FGCU attract and retain the best students by engaging them in active learning and fostering mentoring relationships with faculty.

2. Development of the proposal from data

Considerable evidence shows that undergraduate research has positive effects on a student’s ability to think critically and communicate effectively as well as evaluate information and promote creativity (e.g., Nagda, Gregerman, Jonides, von Hippel, and Lerner 1998; Kinkead 2003; Lopatto 2004 & 2010; & Pascarella and Terenzini 2005). Nurturing undergraduate research and inquiry will help FGCU develop these and other desired intellectual and academic skills among our students. Data from the most recent Higher Education Research Institute (HERI) faculty survey in 2007 – 2008 shows that FGCU faculty members prioritize skills that are developed through undergraduate research and inquiry. Every surveyed faculty member (100%) considered critical thinking “essential” or “very important” in the development of undergraduate students (HERI 2008). Results of the HERI survey also show faculty consider the mastery of discipline-specific knowledge (99.1%) and effective writing (98.2%) as well as the ability to evaluate information (98.2%) and enhance creative capacity (87.5%) “essential” or “very important” (HERI 2008). Each of these skills is a fundamental characteristic of research and inquiry (Lopatto 2010). Undergraduate students involved in original discovery must engage in types of higher order thinking sought by FGCU faculty to formulate, evaluate, and communicate their original discoveries.

Participation in undergraduate research also increases retention and graduation rates among involved students (e.g., Nagda, Gregerman, Jonides, von Hippel, and Lerner 1998; Lopatto 2004 & 2010). Data from the Integrated Postsecondary Education Data System (IPEDS) shows that the 78% retention rate of first year students at FGCU is comparable with nine-aspiration peer institutions (IPEDS 2009). Implementation of this QEP will help the university reach its stated retention goal of 80%. Graduation rates at FGCU have more room for improvement, which will be increased with the implementation of this QEP proposal. The 4-year graduation rate at FGCU is 16% as of 2009, which places the university in the bottom third of the nine-aspirational institutions (IPEDS 2009). While the eight-year graduation rate improves to 38%, this graduation rate puts FGCU at the bottom among the nine-aspirational institutions (IPEDS 2009). Nurturing a culture of undergraduate research and inquiry will help our institution increase its retention and graduation rates.

Enhancement of undergraduate research and inquiry opportunities at FGCU will also help the university fill in a significant gap in our students’ education. Data from the 2010 National Survey of Student Engagement (NSSE) indicates that only 19% of students had worked with at least one faculty member on original research outside of the classroom by their senior year, which is significantly less than comparable institutions (NSSE 2010). Further, only 39% of seniors identified the completion of a culminating experience, such as a senior capstone course or senior thesis. Evidence also indicates that these opportunities are decreasing at FGCU. Both the percentage of student participating in faculty-mentored research projects and senior capstone experiences declined between 2008 and 2010; 22% of students conducted research with faculty in 2008 compared to 19% in 2010 and 47% of seniors completed a capstone experience in 2008 compared with 39% in 2010 (NSSE 2008 & 2010). This decline correlates with an 18.9% increase in the number of undergraduate students between 2008 and 2010, as the number of undergraduate students grew from 8,659 to 10,303 students (Florida Gulf Coast University Board of Trustees Information System, Quarterly Briefing 2011). Given present resources and organizational structures, it would appear that FGCU is starting to lose its ability to maintain organically developed undergraduate research opportunities. Implementation of this QEP will reverse this trend.

Development of this QEP will also benefit faculty and the larger community by providing improved opportunities for scholarship through mechanisms, such as class-based and faculty-mentored research. The opportunity for scholarly pursuits ranked lowest among all aspects of the job that faculty described as feeling “satisfied” to “very

satisfied” (HERI 2008). Only 28.8% of faculty felt “satisfied” or “very satisfied” by their opportunities for scholarly activity. Development of this QEP will help faculty engage their scholarly goals by including students in that effort. Although the ability to conduct research appears to be limited at FGCU, faculty members are using their research activity as a form of civic engagement; 61.6% of faculty made a point to address local community needs in their research (HERI 2008). As a result of faculty interest and with the support of the Office of Service-Learning and Civic Engagement, implementation of this QEP will provide students additional opportunities for community awareness and involvement that translates into significant, academically meaningful civic engagement.

With the projection of additional student population growth at FGCU, we are at a critical time during the maturation of the school. This provides the university with an ideal opportunity to implement a strategy that will ensure the highest quality education for students that choose to attend FGCU. Nurturing a culture of undergraduate research and inquiry is the strategy that will best help our institution reach its full potential.

3. Definition

We have modified a definition of undergraduate research from the Council on Undergraduate Research to fit the FGCU environment (Council on Undergraduate Research 2012).

Undergraduate research and inquiry at Florida Gulf Coast University describes any opportunity for active learning based on the systematic investigation of a subject that makes an original intellectual, academic, creative, and/ or artistic contribution to the discipline.

This definition recognizes the many different forms of original research and inquiry that can take place across each college and program at FGCU. In addition, this definition of undergraduate research and inquiry ensures that programs determine the discipline-specific nature of original work and discovery as it applies to each particular field of study.

4. Proposed Implementation and Projected Timeline:

The successful implementation of this proposal will allow the university to expand on the organically developed culture of undergraduate research and inquiry that has been a bedrock goal of the university since its founding. To ensure that undergraduate research and inquiry reaches lower- and upper-level students during the first year of the QEP, we will coordinate our activities with programs that reach across all colleges at the university, such as the Honors Program, the Office of Service-Learning and Civic Engagement, Student Support Services, and the Whitaker Center for STEM Education. During following years, we will work with each college to identify and enhance curricular efforts that incorporate course-based research, expand opportunities for faculty-mentored research, and ensure that students will understand the societal role of research and inquiry. This plan ensures that all colleges will take advantage of benefits associated with undergraduate research and inquiry by the end of the QEP.

(Used Abbreviations: LL = Lower-level; OUR FGCU = Office of Undergraduate Research at FGCU; QEP = Quality Enhancement Plan; STEM = Science, Technology, Engineering, and Mathematics; UL = Upper-level; and URG = Undergraduate Research Guild)

Planning Years 1 – 2 (Fall 2012 – Summer 2014): Establish an Office of Undergraduate Research at FGCU (OUR FGCU) and choose a QEP Director. Hire QEP staff, including an executive secretary and computer support specialist. Form a QEP Team to develop the QEP and identify faculty engaged in research across all colleges that also associate university-wide programs, such as the Honor’s Program, the Office of Service-Learning Civic Engagement, Student Support Services, and/ or the Whitaker Center for STEM Education. Survey faculty, students, and staff to collect data from each college. Identify undergraduate research activities across the university, including courses-based research, mentored-research activities, and other opportunities to learn research skills. Develop a web presence through both traditional websites and social media. Recruit first cohort of lower-level (LL) student researchers in the newly created Undergraduate Research Guild (URG). URG will create a forum for the exchange of research ideas and experiences that fosters a community of undergraduate scholars. Provide student research scholarships and grants. Develop workshops and mentorship opportunities to enhance research-related skills. Start a guest-speaker research seminar series. By the second year, work with QEP Team and faculty from the first college to increase and develop research-based courses in both LL and upper-level (UL) classes as well as faculty-mentored research. Provide faculty appropriate resources and incentives to support undergraduate

researchers. Work with QEP Team to identify, modify, and formulize assessment tools to evaluate progress and effectiveness of the QEP.

Year 1 (Fall 2014 – Summer 2015): Expand and enhance opportunities that come through the OUR FGCU. Identify and recruit the next cohort of URG students so that URG is composed of LL and UL undergraduate researchers. Include previous recruits as part of enrollment effort. Create discipline specific groups within URG, which will allow students to benefit from peers and faculty that conduct research using similar skills, tools, and techniques. Develop a mentoring program between graduate, UL, and LL researchers. Establish work-study undergraduate research internships. Increase opportunities for students to disseminate their research, e.g. establish a fall semester Research Day and run selective poster sessions outside of Board of Trustees meetings. Expand student-faculty research workshops and increase frequency of guest-speaker research seminar series. Work with a second college to increase and develop research-based courses and increase faculty-mentored research. Increase student and faculty support for course development and faculty-mentored research through scholarships and other incentives. Assess planning years and first year progress of QEP, including transition of URG students from LL to UL years. Implement a survey mechanism to track student retention, graduation, and alumni activity. Revise where appropriate.

Year 2 (Fall 2015 – Summer 2016): Continue activities from previous years. Work with third college to increase research activities and curricular efforts. Re-establish and publish the undergraduate student online research journal, "Ampersand: The Science of Art and the Art of Science". Assess QEP progress, including transition of URG from LL to UL and work-study research internship program as well as track retention, graduation, and alumni activities. Make revisions where appropriate.

Years 3 – 4 (Fall 2016 – Summer 2018): Work with remaining colleges to enhance curricular activity, mentored-faculty research, and other research-related activities. Continue to expand the OUR FGCU so that research opportunities increase throughout all colleges. Continue research seminar series and student-faculty research workshops. Continue to disseminate research throughout multiple means, including multiple Research Days and "Ampersand". Assess all colleges as well as track student progress and alumni activity. Revise where necessary.

5. Needed Resources:

Implementation of this QEP will require FGCU to increase undergraduate research and inquiry opportunities across the university and to dedicate resources to this effort. To accomplish this QEP, we propose the creation of an Office of Undergraduate Research at FGCU (OUR FGCU) led by the QEP director. The QEP director will coordinate, assist, and enhance undergraduate research and inquiry opportunities throughout all colleges. A QEP team, made up of faculty, staff, and administrators, across all colleges will advise the QEP director and facilitate OUR FGCU activities. *Undergraduate Resources:* Undergraduate students will require access to research-based courses in both LL and UL levels. In addition, students will require mentors that can facilitate their research activity. Students will also require peer mentoring and research-related workshops that address research-related skills, such as critical thinking, effective communication, and problem-solving skills. *Undergraduate Incentives:* Incentives for undergraduate students include participation within a community of scholars; ability to pursue undergraduate research and inquiry from their first year through graduation; access to scholarships, grants, and internships; opportunity to disseminate and publish their research; and possibility for additional university recognition and rewards. *Faculty Resources:* To support this QEP, faculty will receive best-of-practice workshops designed to help them integrate original research and inquiry into courses and mentor students throughout all stages in the academic ontogeny of undergraduate researchers. *Faculty Incentives:* Incentives for faculty include compensation (e.g. stipends, supply budget, and/ or reallocation time) for mentoring undergraduate researchers, opportunity to compete for competitive internal grants, allocation time and/ or stipend to develop new courses that incorporate research and inquiry into the classroom, as well as university-level recognition and awards for superior mentoring of undergraduate researchers.

6. Assessment:

Based on the stated goals described above, we have identified and will assess the following student learning outcomes (SLO):

- SLO 1. Students will be able to formulate a reasoned research question, problem, and/ or creative interest;
- SLO 2. Students will be collect and utilize foundational principles and concepts related to their research question, problem, and/ or creative interest;
- SLO 3. Students will be able to develop and implement a systematic plan to address their research activity;

- SLO 4. Students will be able to gather and interpret data and information to evaluate their research question, problem, and/ or creative interest;
- SLO 5. Students will be able conduct and understand the ethical implications of their research;
- SLO 6. Students will be able to understand the role of research and inquiry in the community and society;
- SLO 7. Students will be able to present results of their research in written, performance, quantitative, and/ or oral form.

Student Learning Outcomes that result from a QEP that nurtures a culture of undergraduate research and inquiry translate directly into university-level Student Learning Outcomes as outlined in the table below.

Undergraduate Research and Inquiry Student Learning Outcomes	Florida Gulf Coast University Student Learning Outcomes					
	Effective Communication	Ethical Responsibility	Information Literacy	Problem-Solving Abilities	Technology Literacy	Community Awareness and Involvement
Formulate a reasoned research question, problem, and/ or creative interest	X			X		
Collect and utilize foundational principles and concepts related to their research question, problem, and/ or creative interest	X		X	X	X	
Develop and implement a systematic plan to address their research activity				X	X	
Gather and interpret data and information to evaluate their research question, problem, and/ or creative interest	X			X		
Conduct and understand the ethical implications of their research		X	X			
Understand the role of research and inquiry in the community and society	X					X
Present results of their research in written, performance, quantitative, and/ or oral form	X		X		X	

Our assessment plan will combine direct and indirect instruments to evaluate QEP program goals and student learning outcomes. We will modify the Undergraduate Research Student Self-Assessment to determine the effectiveness of the QEP (URSSA 2009). To assess how undergraduate research affects the educational experience of students, we will use the Survey of Undergraduate Research Experiences (SURE; Lapatto 2004). To determine how QEP student learning outcomes translate into university-level student learning outcomes, we will also modify VALUE Rubrics developed by AAC&U’s VALUE (Validated Assessment of Undergraduate Education) project to fit the specific nature of the program (Association of American Colleges and Universities 2012).

7. Bibliography:

Association of American Colleges and Universities (2012) Value: Valid Assessment of Learning in Undergraduate Education. <http://www.aacu.org/value/>

Council on Undergraduate Research, CUR (2012) <http://www.cur.org/about.html>

Florida Gulf Coast University Board of Trustees Information System, Quarterly Briefing (2011) [BOTIS 9-2011.pdf](http://www.fgcu.edu/planning/Assessment/external.asp). 11, 1-24.

Higher Education Research Institute at UCLA (2008) <http://www.fgcu.edu/planning/Assessment/external.asp>

Integrated Postsecondary Education Data System (2009) <http://nces.ed.gov/ipeds/datacenter/SelectVariables.aspx>

Kinkead, J. (2003) Learning through inquiry: an overview of undergraduate research. *New Directions in Teaching and Learning* 93, 5-18.

Lopatto, D. (2004) Survey of Undergraduate Research Experiences (SURE): First Findings. *Cell Biology Education*. 3, 270-277. <http://web.grinnell.edu/sureiii/>

Lopatto, D. (2010) *Science in Solution*. Tucson: The Research Corporation.

Market Watch Education, Fort Myers News Press (2011) <http://www.news-press.com/section/EDUCATIONSUMMIT/Education-Summit>

Nagda, B. A., Gregerman, S. R., Jonides, J., von Hippel, W., and Lerner, J. S. (1998). Undergraduate student-faculty research partnerships affect student retention. *Review of Higher Education* 22, 55-72.

National Survey of Student Engagement Mean and Frequency Reports (2010) <http://www.fgcu.edu/planning/Assessment/external.asp>

National Survey of Student Engagement Mean Comparisons Report (2008) <http://www.fgcu.edu/planning/Assessment/external.asp>

Pascarella, E. T., and Terenzini, P. T. (2005). *How college affects students: A third decade of research*. San Francisco: Jossey-Bass.

Undergraduate Research Student Self-Assessment (2009) <http://www.colorado.edu/eer/research/undergradtools.html>