

UNDERGRADUATE RESEARCH TRANSFORMATIONAL LEARNING OPPORTUNITY

A UNF Undergraduate Research Transformational Learning Opportunity (TLO) experience, through deeper study and exploration beyond the classroom, has the potential to expand the body of knowledge in a discipline and provide for the personal development of the student.

Undergraduate Research TLO Report ¹

March 2006

Team Members

Joe Butler (Biology)
Reinhold Lamb (Acctg & Fin)
Rebecca Marcon (Psychology)
Gerald Merckel (Comp, Engr, Constr)
K.S. Venkatasubban (Chemistry)

¹ Our report takes a process approach in describing Undergraduate Research Transformational Learning Opportunities. Each College and Department will need to shape this process to best meet their specific needs.

UNDERGRADUATE RESEARCH TRANSFORMATIONAL LEARNING OPPORTUNITY

A UNF Undergraduate Research Transformational Learning Opportunity (TLO) experience, through deeper study and exploration beyond the classroom, has the potential to expand the body of knowledge in a discipline and provide for the personal development of the student.

PROCESS CATEGORY and EXAMPLES	WHAT GETS COUNTED
1. Exposure to Research Motivation to participate in an Undergraduate Research TLO begins with student exposure to research. This can take place within the classroom, as an extension of a classroom experience, and/or as an extracurricular activity.	
<p>a. Classroom and Extension of Classroom</p> <ul style="list-style-type: none"> • Participate as Subject in a research study • Read primary sources (i.e., scholarly article) • Student class presentations of new websites/articles specializing in state-of-the-art technology or information • Class presentations by outside experts or professionals • Extra-credit assignments that require deeper examination of issue or topic • Professor shares overview of own research (i.e., Blackboard, addresses majors seminar, presentations to student clubs) 	<ul style="list-style-type: none"> ➤ Number of students participating in studies ➤ Course syllabi counts of student assignments <ul style="list-style-type: none"> ○ Reading primary sources ○ Presenting cutting edge technology/info ○ Extra-credit for deeper examination of topic ➤ Number of class presentations by researchers/experts other than assigned instructor ➤ Report on Faculty Activity Report (FAR) and/or Annual Self-Evaluation of audiences with whom research has been shared
<p>b. Extracurricular</p> <ul style="list-style-type: none"> • Attending scholarly lectures or presentations (i.e., Distinguished Voices Lecture Series especially Inquiry & Insight series, job talks by faculty candidates, departmental colloquium) • Field trips/site visits with emphasis on interactions with scholars actively engaged in inquiry or investigation that makes an original, intellectual or creative contribution (i.e., NASA, Federal Reserve, Museums, Mayo Clinic, DOH Crime Lab, Jacksonville Symphony) • Study Abroad interaction with researchers in other countries • Attending scholarly conferences within discipline (i.e., Southeastern Psychological Association) 	<ul style="list-style-type: none"> ➤ Student online requests for lecture tickets or attendance sign-in sheet for research presentations on campus ➤ Annual reports from Undergraduate Academic Enrichment Program, departments, and student clubs of field trips/site visits funded by university ➤ Annual reports from International Center noting undergraduate interaction with researchers abroad ➤ Requests to university sources for funding to attend conferences (non-presenters as well as presenters) ➤ Departmental annual reports of undergraduate attendance at conferences

UNDERGRADUATE RESEARCH TRANSFORMATIONAL LEARNING OPPORTUNITY

2. Invitation to be Involved Once student interest and motivation has been stimulated the University Community makes students aware of the range of Undergraduate Research TLOs available to them.	
<p>a. Direct Invitations</p> <ul style="list-style-type: none"> • Faculty announcements at beginning of semester to class, student clubs/organizations, orientations, etc. • Faculty member, Department Chair, and Associate Deans familiar with quality of work by a student directly invite their participation and direct students to next step in the process • Active recruitment (by faculty and Director of UNF Undergraduate Academic Enrichment Program) of students eligible for research scholarships including members of underrepresented groups (i.e., McNair Scholars Program, NSF summer research experiences for undergraduates, NIH summer internship program in biomedical research, other national scholarship opportunities) 	<ul style="list-style-type: none"> ➤ Faculty Activity Report (FAR) and/or annual self-evaluations notation of meetings with students interested in undergraduate research TLO ➤ Applications for research scholarships ➤ Applications to off-campus summer research programs
<p>b. Indirect Invitations</p> <ul style="list-style-type: none"> • Brochure distributed to students through advising offices, student life, orientations and open house events, student government, clubs • Academic Affairs monthly advertisement in <i>Spinnaker</i> listing specific research opportunities for undergraduates • Promotion and coverage of successful TLO activities in other campus publications (<i>Inside UNF</i>, <i>UNF Journal</i>, college publications, <i>Campus News</i> email) • University website for Undergraduate Research Programs • College and Departmental bulletin boards listing research opportunities with instructions for application process 	<ul style="list-style-type: none"> ➤ Students who eventually contact a faculty member because they are interested in an Undergraduate Research TLO report how they learned of this opportunity

UNDERGRADUATE RESEARCH TRANSFORMATIONAL LEARNING OPPORTUNITY

3. Filtering and Guidance

There is a continuum of research experiences that varies in time commitment as well as ability to function as an independent researcher. Undergraduates will need help selecting the research TLO that is best suited for their interests, skill level, and goals. At this phase in the process Faculty Members will offer individual guidance and direction in order to match student needs and capabilities with specific research projects and tasks within those projects. Each faculty member involved in an Undergraduate Research TLO will have his/her own criteria for selecting and placing students in the project. Students may repeat this step in the process as they gain experience and clearer understanding of their research interests.

a. Possible Criteria for Selection to Participate on a specific project

- Class performance including work habits indicating reliability
- Commitment to major as demonstrated by completion of challenging courses that indicate student will continue in the major
- Student's workload (both academic and employment)
- Requirements of project (i.e., ability to swim and operate a boat, ease in establishing rapport with preschoolers, enjoy outdoor work)

- Faculty record proportion of students selected to participate from pool of those interested

b. Research Assistant under Direct Supervision by Faculty/Staff or advanced student on an existing project (as volunteer, for college credit, paid)

- Assist in literature review
- Assist in project design
- Assist in data collection
- Assist in data coding/entry
- Assist in data analysis
- Assist in reporting of findings

- Faculty Activity Report (FAR) and/or annual self-evaluation and Alpha List reports of undergraduates involved in faculty/staff member's research program
- Enrollment in Supervised Research courses
- Number of undergraduate research assistants supported by UNF funds
- Number of undergraduate research assistants supported by external research contracts and grants

UNDERGRADUATE RESEARCH TRANSFORMATIONAL LEARNING OPPORTUNITY

3. Filtering and Guidance (continued)

There is a continuum of research experiences that varies in time commitment as well as ability to function as an independent researcher. Undergraduates will need help selecting the research TLO that is best suited for their interests, skill level, and goals. At this phase in the process Faculty Members will offer individual guidance and direction in order to match student needs and capabilities with specific research projects and tasks within those projects. Each faculty member involved in an Undergraduate Research TLO will have his/her own criteria for selecting and placing students in the project. Students may repeat this step in the process as they gain experience and clearer understanding of their research interests.

- c. Student Researcher assumes leadership role in the development of project and carries out project Under Faculty/Staff Mentorship
- Completing a Directed Individual Studies that has potential to expand the body of knowledge in a discipline through an original, intellectual or creative contribution
 - Completing a Senior Capstone research project
 - Completing a Thesis (Interdisciplinary or Honors in Major)
 - Working as an individual or team member on a student design competition (i.e., IEEE Regional Robotics competition, ASCE/AISC Southeastern Regional competition)

- Faculty Activity Report (FAR) and/or annual self-evaluation reports of undergraduate researchers mentored by faculty/staff member
- Enrollment in Directed Individual Studies where stated learning contract goal is potential to expand knowledge in a discipline
- Enrollment in Interdisciplinary Honors Thesis or Honors in Major Thesis
- Acceptance as member of competitive student design team

- d. Mentoring Others and Consulting
- Guiding novice members of research team
 - Sharing research skills in broader community (i.e., working with students PreK-12 on research projects, helping businesses develop in-house research capabilities)
 - Share research expertise through consulting with research client

- Annual faculty self-evaluation and departmental reports detailing undergraduate research activities that contribute to community

UNDERGRADUATE RESEARCH TRANSFORMATIONAL LEARNING OPPORTUNITY

4. Demonstration of Research Skills and Personal Development

At this step in the process students involved in an Undergraduate Research TLO will have found a tangible way to demonstrate what the research experience has meant to them and how their skills have grown.

a. Research Skills

- Presentation of completed research project at a poster or paper session
 - Campus-wide research conference
 - Undergraduate regional or national conference
 - Professional and/or academic conference
- Presentation of project at a competitive event
 - Events involving case analysis (i.e., SIFE Regional and National Finance Case Competitions)
 - Juried shows/performances
- Presentation of project to a research client or stakeholder group
- Preparing a manuscript for submission to be published
 - Locally in *The Osprey Journal of Ideas and Inquiry*
 - Nationally in other undergraduate research publications (i.e., *Psi Chi Journal of Undergraduate Research*)
 - In conference proceedings
 - In peer-reviewed academic/scholarly journals
 - In published books (i.e., chapters, monographs)
- Preparing completed research project for other forms of dissemination typical of a particular discipline (i.e., technical reports to clients, patent submission)

- Number of research conference presentations in which undergraduate was author or co-author
- Number of undergraduates participating in academic competitive events (individual or team) and awards won
- Number of professional presentations made to research clients or stakeholders based on TLO work
- Number of manuscripts submitted/accepted for publication in which undergraduate was author or co-author
- Number of technical reports and patent submissions/awards in which undergraduate was included

b. Personal Development

- Writing a reaction paper that identifies what the experience has added to their education and personal development
- Sharing in an exit interview with research mentor
- Expansion of career options and identifying future professional goals

- Student satisfaction with the Undergraduate Research TLO formally assessed using instrument created by university
- Alumni survey regarding impact of research TLO

UNDERGRADUATE RESEARCH TRANSFORMATIONAL LEARNING OPPORTUNITY

Recommendations by Undergraduate Research TLO Team

To Increase Student Participation in Undergraduate Research

- **Marketing**
 - Include TLO in UNF Catalog and add Undergraduate Research link on website
 - Mass email to all undergraduates each semester alerting them to the TLO
 - Preparation and distribution of Undergraduate Research brochure available to advising offices
 - Announcements at each student club
 - Academic Affairs monthly *Spinnaker* ad
 - Increase Undergraduate Academic Enrichment Program budget for extracurricular exposure to research, in particular field trips/site visits

- **Resources**
 - Research assistantships
 - Funds for registration, transportation, lodging expenses to professional conferences to present TLO paper/project

- **College Credit**
 - Add *Supervised Research* courses to curriculum (variable credit hrs, P/F)
 - Increase number of departments offering *Honors in Major*

- **Recognition**
 - TLO awards banquet
 - Recognition at graduation

To Increase Faculty/Staff Participation in Advancing Undergraduate Research TLOs

- **Establish Expectations**
 - Administrative endorsement of TLO
 - Appoint Council on Undergraduate Research (CUR) faculty liaison (*UNF is CUR member but has no liaison*)
 - Mentoring of new faculty by experienced research faculty

- **Resources**
 - Lab space/renovation
 - Provide appropriate and adequate physical facilities to carry out TLO – these facilities can often meet both teaching and research needs – more undergraduates could be involved in faculty research with renovation and upgrading of facilities
 - Biology is particularly in need of additional renovation (bldg 4- rooms 2227, 2236, 2241) , conversion of space to faculty research labs (bldg 4- rooms 2203, 2211, 2245, 2253, 2261), and creation of mouse lab (bldg 4- room 2436)
 - Psychology is in need of renovation to its rat lab (bldg 10- room 1359)
 - Provide more state-of-the-art instrumentation and equipment in sciences and engineering – this not only enhances teaching, it allows faculty to pursue preliminary experiments necessary to be competitive for external funding

UNDERGRADUATE RESEARCH TRANSFORMATIONAL LEARNING OPPORTUNITY

- **Resources (continued)**

- Increase DSRT support for grant proposal development (i.e., RUI grants and others that include undergraduates)
- Workshops on inquiry-based teaching to assist faculty in transforming courses to reflect an invitation to the research experience
- Travel grants to faculty to attend TLO-related conferences/competitions where students present TLO paper or demonstrate TLO project
- Additional graduate programs (i.e., M.S. in chemistry, physics, engineering; PhD in applied science/clinical area that serves First Coast community needs) – graduate education also increases research opportunities for undergraduates

- **Workload Compensation**

- Expand 'Banking System' across university so faculty become eligible for course release or overload compensation with each 15 banking credits accrued (earned by involving UNF students in research, DIS, practica, etc.)
- Increase Undergraduate Academic Enrichment Program research stipends (both number and amount) to faculty involved in Undergraduate Research TLO
- Increase amount of Academic Affairs awards for summer research to assure compensation is equivalent to teaching a summer course

- **Recognition**

- Include Undergraduate Research TLO in the Faculty Activity Report (FAR) and Annual Evaluation
- Include Undergraduate Research TLO activities in criteria for merit-based salary increases