

## **EXECUTIVE SUMMARY**

### ***Distinction through Discovery: Expanding the Culture of Undergraduate Research and Inquiry Florida Atlantic University's Quality Enhancement Plan - (From original QEP Proposal)***

The *Distinction through Discovery* QEP takes a multifaceted approach to improving student learning by expanding a culture of undergraduate research and inquiry at Florida Atlantic University (FAU). FAU is a comprehensive public university enrolling over 30,000 graduate and undergraduate students, with a student body that ranks as the most diverse in Florida's 12-institution State University System. Engaged in key partnerships with internationally renowned private organizations, and building upon FAU's growing strengths in research, FAU is poised to expand the culture of undergraduate research with the QEP *Distinction through Discovery*. Our faculty and students recognize "inquiry" to be a process and/or a product which encompasses intellectual traits that transcend subject matter divisions. We aspire to create an intellectual community of scholars who are engaged in questioning, exploring, and pursuing research in all their forms, and envision that engagement in discovery will distinguish FAU as a student-centered research institution.

***QEP Student Learning Outcomes (SLOs):*** *The QEP Steering Committee developed a set of six student learning outcomes which include: Knowledge, Formulate Question, Plan of Action, Critical Thinking, Communication and Ethics. The plan integrates research into all undergraduate programs and at all levels by scaffolding student development of these SLOs through exposure to research skills and content, targeted skill building practice, and intensive independent work.*

**QEP Goals:** The QEP Steering Committee solicited input from stakeholders representing university constituencies regarding institutional data, programs and best practices. Their recommendations for expanding a culture of research and inquiry integrated with a review of the scholarly literature and other institutions' best practices framed our QEP plan. Four goals were identified:

1. Establish an undergraduate curriculum which provides students the intellectual skills necessary to successfully engage in undergraduate research and inquiry;
2. Expand student co-curricular opportunities for undergraduate research and inquiry;
3. Increase support and recognition for faculty and students engaged in research and inquiry; and
4. Enrich and strengthen an institutional climate that supports undergraduate research and inquiry.

***QEP Assessment:*** *As we implement our goals, assessment of Distinction through Discovery will focus on directly measuring six Student Learning Outcomes (SLOs) within curricular and co-curricular environments, evaluating the expansion and enrichment of research opportunities and inquiry climate, and assessing the effectiveness of the initiative itself. The Committee will use the results of these assessments to continuously inform and improve the QEP initiatives. With the collaboration of FAU students, faculty, and our community, these action items are unified with the overall goal of distinguishing FAU students through the practice of discovery.*

**(February 2013)**

## Part V: The Impact Report of the Quality Enhancement Plan

The primary goal of FAU's QEP was to create a culture shift towards engaging more faculty and students in undergraduate research and inquiry (URI), and to establish this as a distinctive feature of our institution. This culture shift was achieved by creating an infrastructure which strengthened our curriculum, expanded faculty-mentored URI opportunities, offered professional development for all participants, and recognized and showcased successes. We established a broad-based infrastructure to sustain these efforts, which included a centralized office, expanded staff presence, and close collaborations with institutional (e.g., Student Affairs, Division of Research, Writing across the Curriculum), and external (e.g., Scripps Research Institute, Max Planck Florida Institute) partners. Participation included faculty, staff and student committees from all colleges and campuses. Additionally, several federal grants supporting undergraduate research were awarded to FAU faculty. URI now is an integral Platform of our Strategic Plan: *Race to Excellence* (2015-2020) and our program serves as a model for other institutions nationwide (e.g. Tennessee Technological University, University of Tampa, James Madison University). Finally, FAU was awarded a national Award for Undergraduate Research Accomplishments (AURA) by the national Council on Undergraduate Research in 2017, a significant indication of a true culture shift. The sum of all of these efforts is effectively promoting a URI culture and climate at FAU, and distinguishing FAU nationally as an institution that embraces student discovery.

### I. Initial Goals and Intended Outcomes of the QEP

The Distinction through Discovery (DTD) QEP seeks to enrich a culture and climate of undergraduate research and inquiry (URI) by engaging and supporting students and faculty in curricular and co-curricular experiences that promote student learning, faculty/student professional development and institutional identity. The QEP has become a part of FAU's strategic plan and is validated by our state's vision to promote co-curricular undergraduate research opportunities. Administered by the Office of Undergraduate Research and Inquiry (OURI), the QEP targets four main goals:

- *Goal 1: Establish an Undergraduate Research and Inquiry (URI) rich curriculum which provides students the intellectual skills necessary to successfully engage in undergraduate research and inquiry.*
- *Goal 2: Expand co-curricular URI opportunities for undergraduate research and inquiry.*
- *Goal 3: Increase support and recognition for faculty and students who engage in URI.*
- *Goal 4: Enrich and strengthen URI Culture and Climate.*

The corresponding intended outcomes for these goals are delineated in Tables 1 through 4. Benchmarks, Year 5 targets, and yearly metrics are available for each outcome.

### II. Changes to the QEP and Rationale

During the first two years, guidance of QEP initiatives fell under the auspices of several committees (assessment, co-curricular, communications, curriculum, executive, and faculty professional development) with diverse institutional participation. In 2015, we conducted a mid-term review by an external evaluator. Input from these sources, as well as further program assessments, produced minor operational changes and revisions within the proposed QEP initiatives. Only notable changes and rationale are presented below:

- The Summer Undergraduate Research Fellowship (SURF), projects (in Goal 2) are ten-week, intensive summer immersion research experiences. In 2014, the Co-curricular committee postponed SURF until year 3 to focus resources and efforts on improving the existing grants program and annual symposium.

- The Faculty Learning Community (FLC) program (in Goal 3), was administered by the Scholarship of Teaching Office (SOTO), to provide professional development workshops to faculty. In 2013, SOTO and the FLC program was disbanded. OURI established a Faculty Professional Development Committee (FPDC) and began offering workshops. In spring 2015, eight College Faculty Liaisons (discussed below) were selected, who now offer a variety of professional development workshops annually.
- Several committees were convened at the onset of the QEP. Additional needs were identified once the majority of the project initiatives were launched resulting in faculty oversight changes in year 3, to form the Faculty Liaison program.
- The Student Research Training Program was folded into the Student Professional Development program (Goal 3) and statistics were combined within that indicator.
- Changes in goal outcome indicators:
  - *Annual increase, and significant 5-year increase in Curriculum Grant Program (CGP) student learning data* (Goal 1). Since enrollment consisted of new students each time the course was taught, and there were an unequal number of courses and students involved each year, trend data was less reliable. The criteria was changed to minimum achievement levels (>80% competence) for all courses combined by year 5.
  - *# Students in Honors in the Major Programs and # Honors Theses* (Goal 1) was discontinued since we track the number of honor program graduates, and the university requirement for all honors programs includes a capstone, which is often a thesis.
  - *# Freshman Learning Communities Research Enhanced Undergraduate Courses* (Goal 1), was replaced with involvement in IFP courses, a requirement for all students to expose more undergraduates within their major.
  - *# of upper division (UD) and honors students completing URI focused internships, practica or clinical experiences* (Goal 2), was eliminated to focus on better collection of faculty-mentored research experiences.
  - *# Distinguished Mentor of the Year Awards* (Goal 3). The number of awards were reduced from three to one each year, and the stipend increased to be consistent with another university-wide award.
  - *# of hits to website and # of colleges represented on QEP subcommittees* (Goal 4), were discontinued in favor of more meaningful measures.

### **III. Impact on Student Learning and Supporting Environment**

The QEP articulated 4 goals with multiple intended outcomes for each goal, as reflected in Tables 1- 4 below. While Goal 4 specifically covers strengthening and enriching URI climate, it is reflected in all goals of the QEP, and is illustrated by our initiative involvement rates, and the number and nature of our initiatives. In this section, we will provide a goal-by-goal description of the QEP's impact on student learning and climate support. The summary will conclude with a discussion on unanticipated outcomes.

#### **Goal 1: Research and Inquiry Rich Curriculum**

Fostering a research and inquiry rich curriculum is accomplished through: the Curriculum Grant Program (CGP), the Honors Programs (HP), and by Research Intensive (RI) and Directed Independent Research (DIR) designations.

Curriculum Grant Program (CGP). The CGP provides support to faculty to redesign existing courses, and to create new curricular components which incorporate research and inquiry for both traditional, distance learning, and honors programs. The redesign follows three research and inquiry categories: Exposure, Skill Building, and Intensive, and targets six broad QEP Student Learning Outcomes (SLOs): Knowledge, Formulate Question, Plan of Action, Critical Thinking, Communication, and Ethics. This program impacts face-to-face and online upper (UD) and lower division (LD) courses, including the General Education-Intellectual Foundation Program (IFP).

The CGP underwent modifications based on yearly participant feedback. Changes were implemented to better support faculty, and to encourage higher quality grant projects. For example, the application process was simplified, and a pre-proposal stage was added to reduce the time-burden. Funding levels were increased. An assignment level category was added to provide faculty a gentler slope for integrating URI. Grantees complete annual reports to help them make data-driven decisions about course revision. Finally, the professional development component to the CGP moved from using the FLC (see discussion below) to group workshops, and one-on-one training sessions to better emphasize the creation and alignment of assessments with the proposed learning targets. Table 1 indicates progress on all of the CGP QEP indicators.

The UD year 2 numbers for all three CGP indicators decreased from year 1, prompting the initiative changes mentioned above. This resulted in a substantial increase in funded projects in years 3 and 4, which allowed us to exceed our benchmarks for the number of: proposals awarded, courses enhanced, and students completing enhanced courses.

The LD benchmark of 24 courses posed a challenge due to the application of performance-based assessments in high enrollment classrooms. To address this, we encouraged sub-sampling and objective-based assessment for knowledge outcomes, which resulted in modest participation increases. To date, the CGP has impacted 9339 students in 82 unique courses, across 22 unique departments, impacting students within all 8 undergraduate serving colleges, far exceeding the targets proposed for year 5.

**Table 1.** QEP Outcome Tracking for Goal 1: Research and Inquiry Rich Curriculum.

Indicator	Baseline	Yr 5 (17-18)	Year 5 Target	Accomplished
<i>CGP</i> : # Curriculum Grant Proposals submitted, and (funded)- (UD/LD Combined aggregate totals)	8	109 (52)	64 Submitted	✓
<i>CGP</i> : # students completing RI enhanced courses (UD/LD Combined aggregate totals)	UD =113 LD =1928	UD=3788 LD=5550	+10% from baseline +10% from baseline	✓ ✓
<i>CGP</i> : # RI enhanced courses (UD/LD Combined aggregate totals)	UD=11	UD=82	UD=52	✓
<i>HP</i> : # Honors in the Major Programs ( aggregate total)	AY12=13	31 (23)	23 (50% of all programs)	✓
<i>HP</i> : # of students graduating Honors Programs	AY12=150	209	300 yearly	
<i>RI</i> : # students enrolled for RI Designation	AY16= 104	557	+15% from benchmark	✓
<i>RI</i> : # RI courses approved (aggregate total)	n/a	44	n/a	✓
<i>DIR</i> : # of unique colleges (courses) (aggregate total)	n/a	5 (91)	n/a	✓
<i>DIR</i> : # of students enrolled (aggregate total)	n/a	133	n/a	✓

**Honors Programs (HP).** Three university-wide tracks exists for Honors students: Honors in the Majors (HIM) program for upper division, University Honors Program (UHP) for lower division, and Wilkes Honor College (WHC). Benchmarks were exceeded for number Honors programs, many of which were supported by our curriculum grants program. However, we overestimated the growth of students graduating within these programs, and the institution has revisited the thesis requirement of Honors in the Major. In 2017, the first non-thesis, research intensive honors program was approved. We anticipate that this honors alternative will increase future enrollments.

**Research Intensive Designation (RI) and Directed Independent Research (DIR).** Since, enrollment in honors programs did not expand as anticipated, we worked to establish systems by which we could better track student engagement in research intensive activities. This was accomplished through RI and DIR. RI designation baseline was established in AY2016. This mechanism allows additional tracking of students engaged in curriculum based research intensive activities, beyond Honors students and including face-to-face and online modes of delivery. DIR was also established in AY 2016, and tracks department level co-curricular activities (number of courses and enrollment offered by college) through a course-based option. With the inclusion of RI and DIR, more students are engaged in URI through these programs. Students engaging in RI in the curriculum also present their findings at URS (see Goal 2).

## **Goal 2: Expand Co-curricular URI opportunities**

OURI supports and tracks a variety of internal and external co-curricular initiatives designed to support students engaged in faculty mentored URI (see Figure 1 and Table 2). Measures of expanded co-curricular opportunities currently include increases in students who participate in funded research, present and publish their findings, and receive awards for their research efforts.

Funded Undergraduate Research: Internal. Internally funded undergraduate research opportunities provide support for students from all disciplines to participate in URI in collaboration with an FAU faculty member. There are seven primary internal undergraduate research grants programs at FAU, the first three support students on all campuses, and the remaining are targeted to partner programs:

1. Undergraduate Research Grants program (URG). This program supports faculty-mentored academic year research (e.g., independent study, honors thesis). Funds can be used for materials and supplies.
2. Summer Undergraduate Research Fellowships (SURF). SURF projects are intensive summer research experiences. Each SURF award allocates \$4,000 in support of each chosen project.
3. FAU Wave Program. This undergraduate research and entrepreneurship competition fosters student entrepreneurship, research, innovation and ideation. This program was launched in 2015.
4. Broward Undergraduate Research Grants Program. Eligible students come from the five colleges (A&L, DSI, Education, Engineering, and Science) located on the Broward campus. Many of these externally funded grants support students from colleges not traditionally applying to OURI grants. This program is not included in the original QEP outcome benchmarks or targets. When funding was discontinued in AY 2017, students were encouraged to apply to the UGR program discussed above.
5. Harbor Branch Oceanographic Institute Research Program (HBOI). FAU's HBOI campus also offers SURF fellowships for graduate and undergraduate students engaged in research in Marine Science.
6. John Nambu Fellowship. This is offered to FAU Jupiter students engaged in Neuroscience research.
7. Wilkes Honors College Summer Fellowships. This is offered to Wilkes Honors College students.

While all of these programs are internally tracked (see Figure 1), only the OURI led initiatives (originally identified in the QEP) are included in Table 2. We have exceeded our 5-year goals for OURI grants awarded internally. Additionally, we demonstrate an overall increase in the number of grants awarded over the past 6 years, as seen in Figure 1.

Undergraduate Research Presentations, Competitions, Exhibitions, etc. - Internal. OURI internally tracks student participation in five major initiatives:

1. The Boca Raton Undergraduate Research Symposium (URS), coordinated by OURI.
2. The Broward Research Symposium, offered on one of our partner campuses.
3. The Wilkes Honors College Symposium offered on one of our partner campuses.
4. The Business Plan Competition, hosted by the College of Business.
5. The Engineering Senior Design Showcase hosted by the College of Engineering and Computer Science, which was established in year 2.

For OURI's symposium (URS), a common evaluation rubric is used which aligns with the student learning outcomes rubric established for the curriculum grant program (see Goal 4 for results). While all of these programs are internally tracked (see Figure 1), only the URS initiative (originally identified in the QEP) is presented in Table 2. The year 5 benchmark was exceeded in the pilot year (AY12-13), and participation increased substantially in subsequent years. Additionally, we demonstrated an overall increase in number of students presenting at all symposia over the past 6 years, as seen in Figure 1.

Undergraduate Research Publications - Internal. OURI tracks six primary internal undergraduate research publication opportunities at FAU:

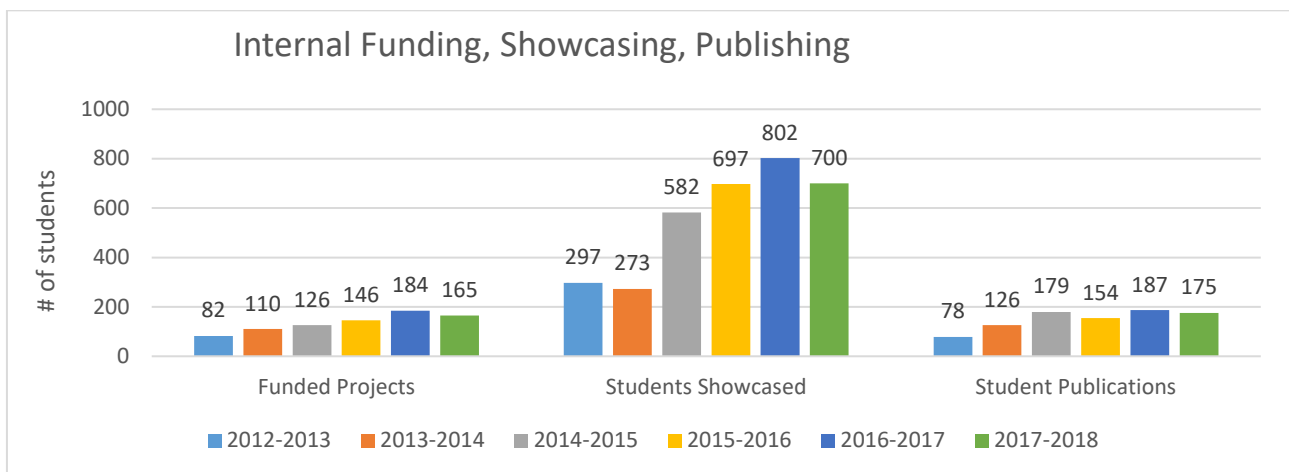
1. *Florida Atlantic Undergraduate Research Journal (FAURJ)*: An interdisciplinary, peer-reviewed journal that showcases high quality faculty-mentored research in all fields. Manuscripts are peer-reviewed by faculty and graduate students using a common rubric aligned with the SLO rubric established for the CGP. Table 2 presents the QEP baseline, year 5, and QEP target statistics. Broad-based participation by all colleges has increased from the pilot year.
2. *Coastlines Literary Magazine*. Coastlines annually publishes the fiction, creative non-fiction, and works of translation, graphic narrative, and artwork of students (graduate & undergraduate).
3. *Remarque*. Remarque is a visual magazine that features the work of students enrolled in Broward-based Architecture, Communications Multimedia, Graphic Design and Studio Arts programs.
4. *FAU Law Journal*. Publishes undergraduate legal scholarship through the College of Business.
5. *Athene Noctua: Undergraduate Philosophy Journal*. This journal publishes selected research papers from their “Senior Seminar in Philosophy” course.
6. *CompOWLation*: FAU’s own record label, Hoot/Wisdom Recordings, publishes original musical works of FAU students and faculty. All genres and musical styles are represented.

FAURJ has seen a decrease in submissions, but an increase in acceptances (Table 2). Early on, many of the submissions were not legitimate manuscripts (e.g., power point presentations, no research compliance). OURI began offering professional development for students (and faculty) related to submitting tenable manuscripts. Submissions became fewer in number, but higher in quality. With this one exception, we have exceeded all other 5-year targeted benchmarks. Overall we have demonstrated an increase in students publishing internally within all venues at FAU (Figure 1).

**Table 2.** QEP Outcome Tracking for Goal 2: Opportunities for Students Who Engage in URI.

Indicators	Baseline	Yr 5 (17-18)	Year 5 Target	Accomplished
<i>URG</i> : # of students applying for Undergraduate Research Grants, (aggregate)	AY11=84	130	+50% from baseline=126 per yr	✓
<i>URG</i> : # students funded, per year	AY11=59	118	96 per year	✓
<i>URS</i> : # of student presentations, per year.	AY11=49	263	96 yearly	✓
<i>SURF</i> : # SURF projects submitted, per year	AY14=13	21	20 per year	✓
<i>SURF</i> : # SURF projects awarded, per year = # students	AY14=10	19	10 per year	✓
<i>FAURJ</i> : # of students (submitting), publishing to the FAURJ, by college and program	AY12=(27) 8	(11) 11	+20% apps (32) +10% pub (9)	✓

**Figure 1.** Growth in Internal Funding, Showcasing and Publishing Opportunities.



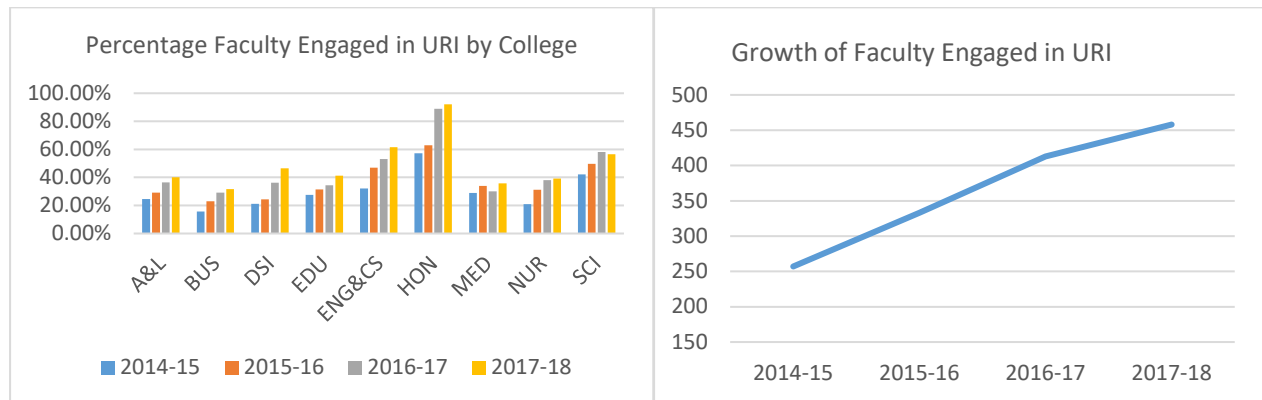
**External Undergraduate Research Involvement.** External research involvement includes external meeting/conference attendance and presentations, and external publications. Since this was not a formal metric, the committee suggested the inclusion of external presentations and publications to garner a more complete picture of undergraduate student accomplishments. In year 2, OURI surveyed College Deans to inventory co-curricular activities (both internal and external to FAU). In year 3, the result was the establishment and distribution of an annual faculty survey, which inventories faculty reported UG research products listed above, which include undergraduates as authors or co-authors on peer-reviewed manuscripts. In years 4-5, with the inclusion of URI efforts in Promotion and Tenure, FAU has purchased data management system (Interfolio) to automate this data request. To date, we have tracked 889 external presentations and 132 peer-reviewed publications from 2012-2018 which includes undergraduate as authors/presenters or co-authors/presenters.

### Goal 3: Increase support and recognition for faculty and students

**Faculty Professional Development (FPD): Faculty Learning Community (FLC), Faculty Workshops and Travel.** As mentioned earlier, the FLC was discontinued when the SOTO office was disbanded and OURI began offering its own workshops and one-on-one training to CGP grantees. Additionally, OURI partnered with the Writing Across the Curriculum office, and the Center for e-learning, to offer two brownbag lunches on topics related to research and writing, and technology and research. While operating, the FLC had faculty participants from all colleges (A&L=11, Bus=2, DSI=3, EDU=9, Engineering=6, Hon=3, Nursing=1, Science=10, UG=1). In spring 2015, the FPD committee selected eight College Faculty Liaisons (discussed below) who are charged with offering university-wide professional development workshops each fall and spring. The committee also established a process for distributing OURI travel and professional development funds to faculty who mentor UG students. With the additions/modifications to the FPD, we have exceeded our benchmarks for year 5 both for internal offerings and support for external development.

**Faculty Undergraduate Research Involvement (FURI).** This is a measure of faculty involvement by college in all DTD undergraduate research initiatives and efforts. While not an original QEP metric, FURI is a clear measure of culture shift at FAU, as it demonstrates annual increases in faculty involved in URI each year, by college (See Figure 2).

Figure 2. Faculty Involvement in Undergraduate Research and Inquiry (FURI) Initiatives.



**College Faculty Liaison (CFL).** One faculty per college serving undergraduates is selected to serve in this capacity. The program promotes the culture shift within individual colleges, including: 1) offering yearly faculty development opportunities; 2) conducting an annual target analysis (strengths/needs) in the college; 3) providing support for faculty submitting CGP grants, and 4) facilitating communication between colleges and OURI. Results are reported by # of workshops offered, and # of faculty attendees. In year 5, two additional liaisons were added (FAU High School & College of Medicine). In doing so, we met our 5-year benchmark.

**Faculty Award Program: Distinguished Mentor of the Year (DMOY) - Excellence in Undergraduate Research and Inquiry.** One yearly university-wide award is given, along with a \$2,500 award, at the annual Honors Convocation. In year 5, the guidelines were revised to ensure diversity among awardees.

**Student Professional Development (SPD).** A variety of student workshops target students interested in engaging in URI. In fall 2014, OURI expanded its offerings to include formal monthly workshops facilitated by the Peer Mentors and OURI staff. In spring 2015, all OURI workshops included videoconferencing to the partner campuses, including summer workshops associated with the SURF program. Additionally, OURI offers presentations (e.g. in-class, advising, admissions etc.) which far exceeds our targets.

**Council for Scholarship and Inquiry (CSI) and Student Professional Development (SPD).** CSI is a student organization established by the Student Council for the QEP, open to all FAU students. CSI established and maintains the FAURJ, provides student input for QEP initiative changes, and hosts workshops where faculty showcase their research to solicit student engagement. QEP tracks the number of student members (see Table 3). CSI student participation has far exceeded our 5-year targets.

**Peer Mentor Program.** Peer Mentors guide undergraduate students interested in pursuing URI. Each year, ten undergraduate and graduate students from all FAU's colleges are selected to serve a one-year term. Mentors are active researchers who assist their peers in getting involved in URI by hosting workshops, and giving classroom presentations on all of FAU's campuses, working closely with CSI. The number of workshop attendees are tracked annually. We have exceeded our benchmark.

**Undergraduate Researcher of the Year (UROY).** Nominations accepted from all FAU students and faculty. A committee selects three student nominees from each college. Colleges select the final awardee, who is recognized at Honors Convocation. Our benchmark was exceeded in this category.

**Table 3.** QEP Outcome Tracking for Goal 3: Support & recognition for faculty & students in URI.

Indicators	Baseline	Yr 5 (17-18)	Year 5 Target	Accomplished
<i>FPD-FLC</i> : # faculty participants, by college and department	AY12=16	35	24 per yr, each yr	✓
<i>FPD-FLC</i> : # and types of PD (e.g., workshops) opportunities	AY13=6	5	5 opportunities/ yr	✓
<i>FPD</i> : # faculty awarded travel money for external PD, by college and department	AY12=n/a	11	10 per year	✓
<i>CFL</i> : # faculty mentor by college	AY14=8	10	10 mentors	✓
<i>SPD</i> : # of student professional development workshops offered	AY13=6	56	5 each year	✓
<i>Peer Mentor Program</i> : # classroom/outreach presentations and (students impacted)	n/a	68 (3704)	n/a	✓
<i>CSI</i> : # student participants by college and program	AY12=15	284	50 and all colleges represented	✓
<i>SPD</i> : # of students attending Peer Mentor and SPD (including CSI events) workshops.	AY13=55	271	+10% above baseline/year	✓
<i>(UROY)</i> : # students awarded by college.	AY14=8	9	8 per year, all colleges	✓

#### **Goal 4: Enrich and strengthen URI Culture and Climate**

Annual direct student learning achievement of SLOs occurs through assessing student learning in CGP courses, evaluating URS presentations, and rating submissions to FAURJ. These all use the same six SLOs to permit a compilation of SLO evidence from multiple perspectives. Indirect student learning achievement of SLOs occurs through the UGR post-awardee survey (see Figure 5). The Graduating Senior Survey (GSS), and the National Survey of Student Engagement (NSSE) serve as general culture and climate indicators (see Tables 4 and 5).

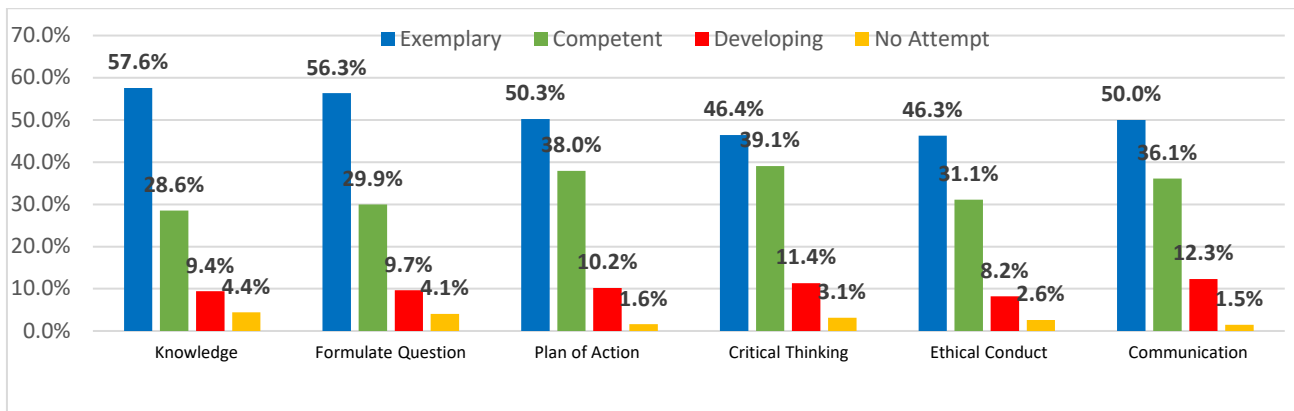
**CGP Student Learning.** Figure 3 presents the aggregated data for each outcome for all courses for all years and represents the total number of students reaching or exceeding the performance levels for attaining each outcome. Figure 4 shows the by-year SLO competence level statistics. Data disaggregated by



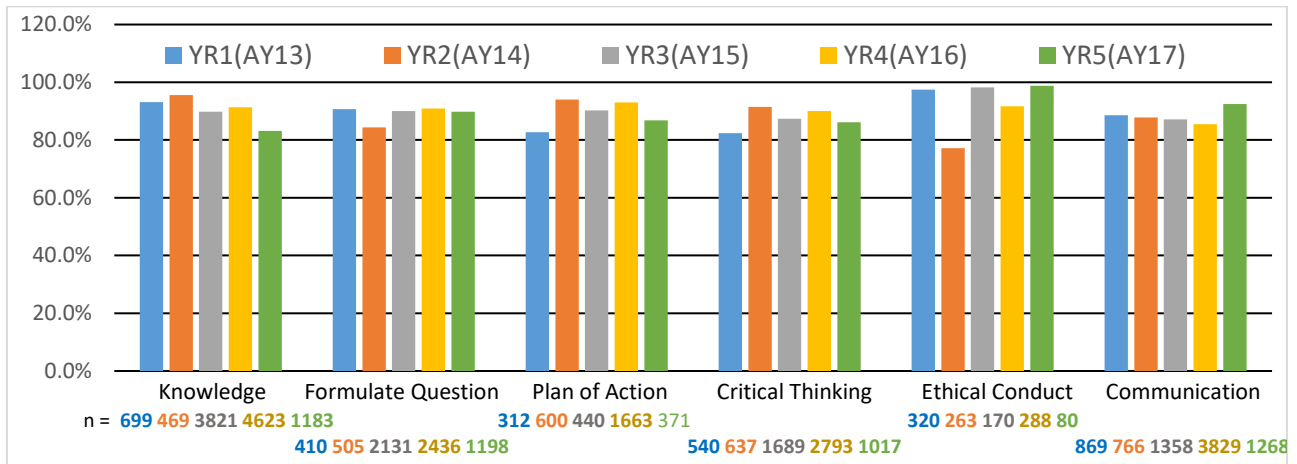
individual course, grant year or sub-outcome are available upon request. All results are from summative evaluations. Student performance is evaluated by a common DTD rubric. Course instructors are guided in ways to operationalize the rubric factors through benchmark examples relevant to their discipline, and consistent with the performance task and SLO. Our year 5 Target is to achieve 80% competence level (or above) yearly, aggregated across all courses and all years, as illustrated in Figure 4. This has been accomplished for all outcomes, for all years, with the exception of Year 2 for the “Ethical Conduct” SLO.

FAU Research Journal (FAURJ) Student Learning. Manuscripts submitted to FAURJ were subjected to an evaluation rubric aligned with the CGP DTD student learning outcomes. This allowed us to triangulate group performance between these two measures by identifying upper and lower extreme cutoff scores for each SLO, within each initiative. Results indicate students had most difficulties with aligning evidences to generate strong conclusions, and placing their research within an appropriate theoretical framework.

**Figure 3.** CGP Student Learning Rubric Data by SLO: All Courses and All Years Combined.



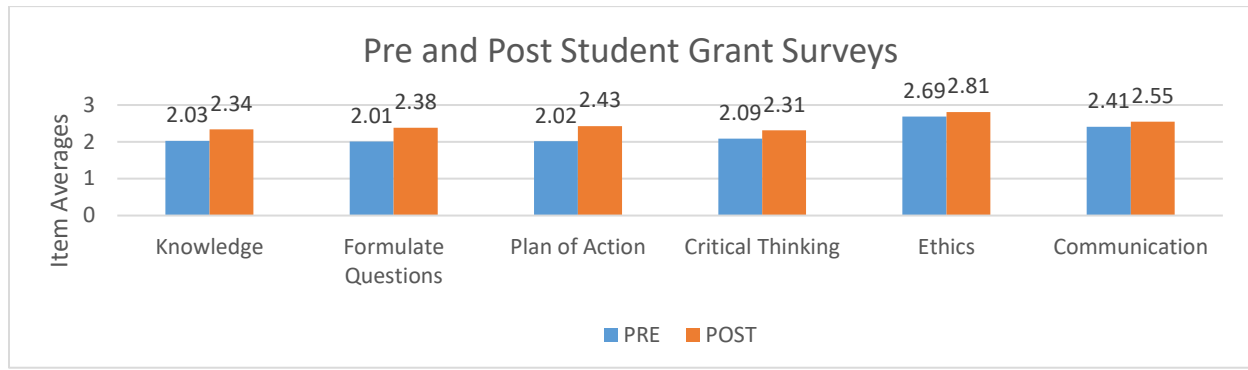
**Figure 4.** Percentage of "Competent or Above" Rubric Ratings by SLO: All Courses Combined by Year.



Undergraduate Research Symposium (URS) Student Learning. The URS oral and poster presentations are scored by judges using a multi-point rubric also aligned with the six CGP DTD student learning outcomes. Results from the URS are triangulated with the CGP and FAURJ student learning results for each learning outcome. For example, in the areas of Communication related to the Symposium (Clarity and Organization in particular), additional emphasis needs to be placed on establishing theoretical frameworks within the research areas, and interpretation of data as well as identifying sources of error within the faculty-mentored research arena.

**UGR Student Learning.** Research grant awardees are surveyed pre-post experience on their perceived level of knowledge across all 6 DTD SLOs (see Figure 5). Students rated themselves as “exemplary (3),” “Competent (2),” or “Developing (1)” on each SLO. Our 5 year target is to achieve an annual positive increase on individual items, which has been met.

**Figure 5.** Mean Ratings (1-3) of Self-Perceived Knowledge Gains on Six DTD Student Learning Outcomes.



**National Survey of Student Engagement (NSSE) and the Graduating Senior Survey (GSS).** The NSSE was administered in 2010, 2013 and 2017. Two student engagement items related to intensive practice and research experience were chosen as indicators of improvement. Results show a slight, but non-significant, gain in students who report working with faculty members on research grants, and completing a senior capstone experience (see Table 4). These values are still lower than the Carnegie peer group institutions, however we have demonstrated an increased annual trend towards the Carnegie level results.

**Table 4.** 2010 - 2017 Percentages of Senior Student Responses to Selected NSSE Student Engagement Items by Group.

Item	2010			2013			2017		
	Carn	NSSE	FAU	Carn	NSSE	FAU	Carn	NSSE	FAU
Work w/faculty member on research project	16	19	11	25	23	15	25	23	17
Complete a culminating senior experience	29	33	13	44	45	22	45	45	22

**Table 5.** Graduating Senior Survey Responses to Selected Student Engagement Items.

(n=total respondents to question)	Fall 14	Spg 15	Fall 15	Spg 16	Fall 16	Spg 17	Fall 17	Spg 18
% responding “Yes” to: Have you participated in any of the following: undergraduate research, creative or scholarly projects within a course or with a faculty mentor?	18.06% n=1905	23.43% n=2266	20.22% n=1679	21.12% n=2157	18.23% n=1755	22.47% n=2158	18.7% n=1838	25.2% n=2086
% who also responded Extremely, Very or Moderately Important to: “How important was this research experience in determining your PRIMARY post-graduation activity	81.10% n=279	76.84% n=408	80.20% n=339	73.74% n=457	77.80% n=320	85.6% n=484	75.3% n=344	75.3% n=526

As a supplement to NSSE, the GSS survey was administered twice a year beginning in fall 2014 with a series of inserted questions developed by OURI. Table 5 outlines the results of two of the research climate related questions. This data shows student involvement ranging between 18 -25%, which is higher than similar NSSE results, and further supports evidences of student growth.

## Unintended Consequences

In addition to what was anticipated and proposed within the QEP plan as discussed above, there were other positive outcomes which ensued as a result of our QEP efforts. Several of these are presented below:

- FAU faculty have submitted and received federal grants affiliated with URI, and focused in STEM. FAU received an NSF-LEARN grant in AY 2015, and two NSF-REU grants in AY 2016. Several of these grants targeted the under-served student population, and highlighted OURI's efforts to support URI university-wide.
- In 2017, FAU was selected as hosts for the Regional Florida Undergraduate Research Conference (FURC) which showcased undergraduate researchers from across the state.
- In 2016, FAU increased OURI's annual budget from \$500,000 to ~\$700,000.
- In 2017, FAU received the National Award for Undergraduate Research Accomplishments (AURA) from the Council on Undergraduate Research.
- In 2017, FAU included URI in Promotion and Tenure Guidelines.
- We have streamlined tracking student engagement in research through RI, DIR, and annual reports.
- We established a formal research curriculum committee who reviews RI designation syllabi, and we instituted two support programs to incentivize faculty who teach these courses.

### IV. Conclusions and Implications: What Have We Learned?

The curricular, co-curricular and faculty and student support initiatives are expanding in breadth and depth at FAU. We have met or exceeded nearly all of our QEP outcome targets, and have implemented additional initiatives and programs. The accomplishments occurred with learning some valuable lessons:

Curricular change cannot outpace professional development and faculty resources. Faculty are at varying levels of readiness in implementing curricular changes. While workshops are a staple component of any curricular initiative, individual training sessions are essential to improving student learning, and promoting accuracy in its measurement. This is time intensive, yet most rewarding, and such trainings will be sustained.

Assessment must be flexible. We faced challenges in meeting the benchmark for the number of CGP lower division courses because performance assessments are prohibitive in large classes. Having provided alternative sampling (e.g., subsampling) and assessment (e.g., objective-based) strategies, we hope to encourage more faculty participation.

Defining and measuring research across campus. Even though we spent several years discussing what constitutes "research," the conversation needs to be ongoing so that it can remain relevant to each of the colleges and to individual faculty. Faculty need flexibility to define what it means for their discipline and for their students. Departments and Colleges need to decide which activities serve as the best "temperature points" to gauge their success, since they do not have the resources to measure all indicators.

Data management and collection tools. Effective curricular and co-curricular data management applications are expensive, difficult to adopt institutionally, and lack tailored functionality. We continue to pursue more effective solutions to better track and measure our effectiveness.

A true culture shift takes time, patience and cooperation. OURI has continuously balanced the quality of the teaching/learning opportunities with the expanding number of our various initiatives. As the QEP progresses, more courses and faculty are being supported, and the co-curricular model is expanding. Achieving a culture of URI means that individual colleges, departments and faculty must value the enhancements, internalize the activities, and collect and use data in their collegial dialogue. Our efforts with the QEP has forged ahead with our ultimate goal of distinguishing FAU as an institution that is known for undergraduate research opportunities, and we will continue to build on this success with unbridled ambition. Go Owls!