PRAC Report: Assessment of Student Learning
IUPUI School of Science
2014-2015 Report

Overview: The School of Science at IUPUI provides outstanding science education for all IUPUI students, education in depth for students in our School, and engages in fundamental and applied research in the physical, biological, mathematical, and psychological sciences to increase knowledge and advance the development of the life sciences at IUPUI and in the State of Indiana. Within the seven academic departments (Biology, Chemistry & Chemical Biology, Computer & Information Science, Earth Sciences, Mathematical Sciences, Physics, and Psychology) and the Forensic and Investigative Sciences and Neuroscience Programs, there are over 160 full-time faculty members. The School is the academic home of ~2,300 undergraduate majors and ~450 graduate students.

Part I: Student Learning Outcomes for Each Academic Program

The School of Science has been utilizing Student Learning Outcomes developed during the 2010-2011 academic year. A comprehensive list of SLOs for both undergraduate and graduate education and degree programs can be found in the IUPUI Bulletin, 2012-2014

Undergraduate SLOs (B.A. and B.S.)	**Graduate SLOs (M.S. and Ph.D.)**
• Biology • Chemistry • Computer and Information Science • Environmental Sciences • Forensic and Investigative Sciences • Geology • Interdisciplinary Studies • Mathematics • Physics • Psychology • Neuroscience	• Addictions Neuroscience* • Biology • Chemistry • Clinical Psychology • Computer and Information Science • Geology • Industrial Organizational Psychology • Mathematics • Physics ***Previously named Psychobiology of Addictions**

How is the School of Science assessing Student Learning Outcomes and Student Learning?

The main focus of this 2014-2015 School of Science's annual report is on the efforts undertaken in the last year to refine, measure, and improve the attainment of the student learning outcomes for our programs. The following data and information provides evidence that we are assessing our programs, that we are addressing the IUPUI Principles of Undergraduate Learning and Principles of Graduate Learning, that we have deliberate and ongoing processes in place for performing these assessments of student learning, and that we are using the results to guide improvements in our programs.

We will also report on assessment and improvement of processes that support student learning and student retention and success, as well as research on formative and summative

assessment of student learning. Several continuing grants from the National Science Foundation (NSF) that focus on undergraduate education or undergraduate student success have allowed us to commit significant resources to expanding best practices related to the academic experience in the School of Science.

Finally, there have also been some changes to the offerings for our undergraduate students that we would like to highlight. Specifically, the inter-disciplinary undergraduate program in Neuroscience is now in place, with great success. There have also been changes in the lower level math courses offered on this campus. These specific changes and their effect will be discussed.

Part II: Outline of Recent Assessment Activities and Accomplishments: Continued external funding to support course transformation and STEM curricular development

This year's report will next highlight a number of ongoing and new initiatives in the School of Science that assess student learning outcomes and student success. While this is not a comprehensive list, it details many of our major initiatives in the School of Science. Many of the initiatives mentioned in this report are continued efforts of the programs described in detail in our three previous PRAC reports (2011-2012, 2012-2013, 2013-2014), many of which are related to our ongoing NSF funded **Central Indiana STEM Talent Expansion (CI-STEP) Program at IUPUI** (Jeff Watt et al.). The focus of CI-STEP is to employ and assess the impact of several intervention strategies on student learning and student success, leading to higher numbers of students graduating with STEM degrees. This program takes a coordinated and systemic approach to increasing undergraduate success in STEM at all levels, from pre-college to the important first year experience, to the sophomore year and onto graduation, through leadership and career development. To meet these goals, the School of Science has spent the last 4 years initiating a series of new programs and funded a series of STEP mini-grants to expand, extend, or develop new programs at IUPUI based on successful existing high-impact practices. In addition, several other externally funded student success initiatives allow us to continue to make process in assessing student learning and success, including the NSF funded **Cyber PLTL (cPLTL): Development, Implementation, and Evaluation** (Pratibha Varma-Nelson et al.).

As a result, *we have met or exceeded our target goals for each year of the funding*, including a:

10% increase in the number of new and transfer students admitted to STEM majors,
10% increase in the number of minority students admitted to STEM majors
10% decrease in the DFW rates for MATH, CS, PHYS, TECH and other courses
15 additional students participating in internship and research experiences
50 graduating seniors participating in honors seminars

The current report (2014-2015) will discuss new initiatives as well as provide updates based on evidence to support continuous improvement in instruction, curriculum, assessing student learning outcomes, and increased efforts in student support and Science Career Development

Services.

Part III: Evidence of Continuous Assessment related to Student Learning Outcomes: Research on Course and Curriculum Development or Redesign

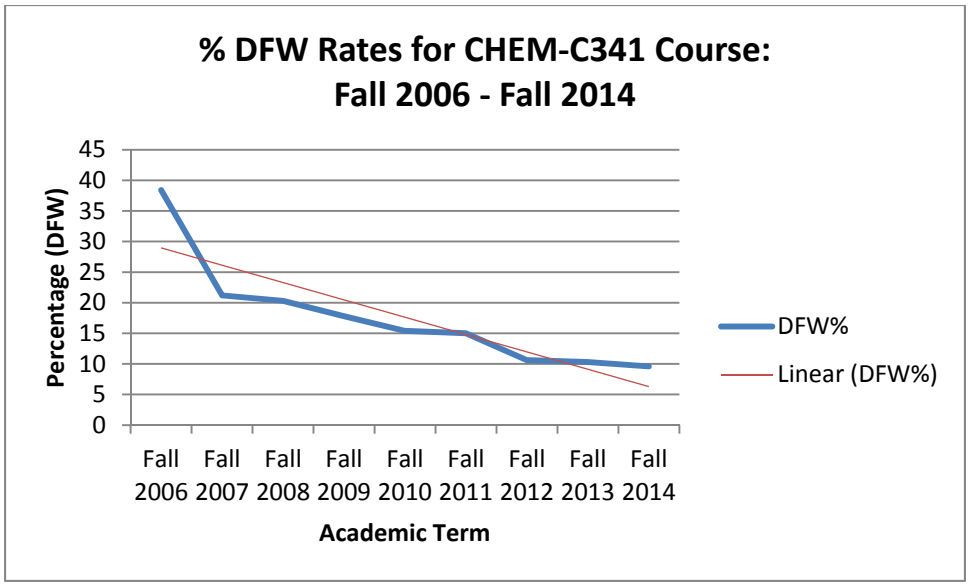
A. Chemistry C341: First Semester Organic Chemistry continues PLTL Workshop Series

Organic Chemistry is a challenging course that bring together many of the student learning outcomes for Chemistry as well as a Major Emphasis on PUL 2: Critical Thinking. To facilitate students' collaborative development of Organic Chemistry problem-solving skills, as measured by performance on an ACS Organic Chemistry Exam and survey data, a modified Peer-Led Team Learning (PLTL) workshop series was instituted as a component of the first semester Organic Chemistry course, funded by the NSF-STEP grant. The peer leaders elicit the participation of all group members, challenge students to expand their conceptual understanding through Socratic dialogue, share insights from being reflective on their problem-solving processes, and encourage students to explain their new understanding of concepts to one another in their small group during these 75-minutes workshops.

Objectives:

1. Decrease the DFW rate for C341
2. Increase performance on the national ACS Organic Chemistry final exam
3. Increase problem solving and critical thinking in the course

Results and Major findings of 2014-2015 include: To assess the curricular value of this modification, common semester exams and a standardized final exam (again developed by the ACS) were implemented. Student engagement was assessed continuously through weekly discussion leader reflections, while student perceptions were assessed through end-of-semester surveys. Each peer-led problem-solving workshop has been organized as a 75-minute (2010-2013) or 110-minute (2014) additional meeting within the 3-credit first semester organic chemistry course. Workshop sections consist of approximately 30 students organized into small groups that are facilitated by two (2010-11) or three (2011-15) undergraduate peer leaders. The two lecture sections and multiple Workshops are harmonized by means of a common syllabus, weekly collaborative selection of problems, and a weekly peer leader training meeting. As shown in the figure below, the DFW rate appears to be stabilizing at just under 10%.



B. Biology: continued evaluation of course-based undergraduate research experiences (CUREs) to enhance Student Learning in Honors Biology and Cell Biology K324

In response to national calls for transformation in STEM education to increase student engagement and persistence among undergraduate STEM majors at IUPUI, we have replaced standard labs with authentic, multi-year research programs in introductory biology honors class K102 and cell biology laboratory K325 class. These interdisciplinary Course-based Undergraduate Research Experiences (CUREs) address humanitarian challenges and establish fundamental, interdisciplinary "research habits of mind" to develop STEM undergraduate scholars who engage in science as effective researchers and discerning citizens.

In fall 2013, Honors labs were redesigned to allow students to develop original research projects investigating prenatal alcohol, nicotine and caffeine exposure effects on development of zebrafish embryos, as described in out last PRAC report. The course was also linked to a new interdisciplinary Themed Learning Community titled "From Molecules to Medicines" that involved students in a interdisciplinary CURE experience developed through an NSF-funded grant, Advancing Undergraduate Chemical Education Through Contextualized Organic Laboratories (Martin O'Donnell et al.) that integrates drug discovery aspects to a global health concern.

To continue an inquiry-based lab on global health issues and to keep IUPUI biology curricula current with the rapid rise of bioinformatics, Cell Biology Laboratory K325 was also redesigned in **spring 2014**. Students were allowed to work on their own investigatory projects and analyze zebrafish microarray data to find genes affected after ethanol exposure, and ended the semester. The project was continued in the **fall 2014** semester with a new class of K102 Honors students. The Classroom Undergraduate Research Experiences (CURE) survey, developed by David Lopatto, was administered in fall 2014 pre- and post-CURE, to evaluate the outcomes of this course. CURE survey collected students' demographic data, academic information, reasons for

taking the course, and the survey measures the level of experience with various course elements, science attitudes, and learning style. This survey asked questions about science attitudes before and after the course, and, in the post course survey, estimated learning gains and perceptions of benefits from the course. This survey instrument has widely used and this HHMI funded project provides an internet clearinghouse for all data collected.

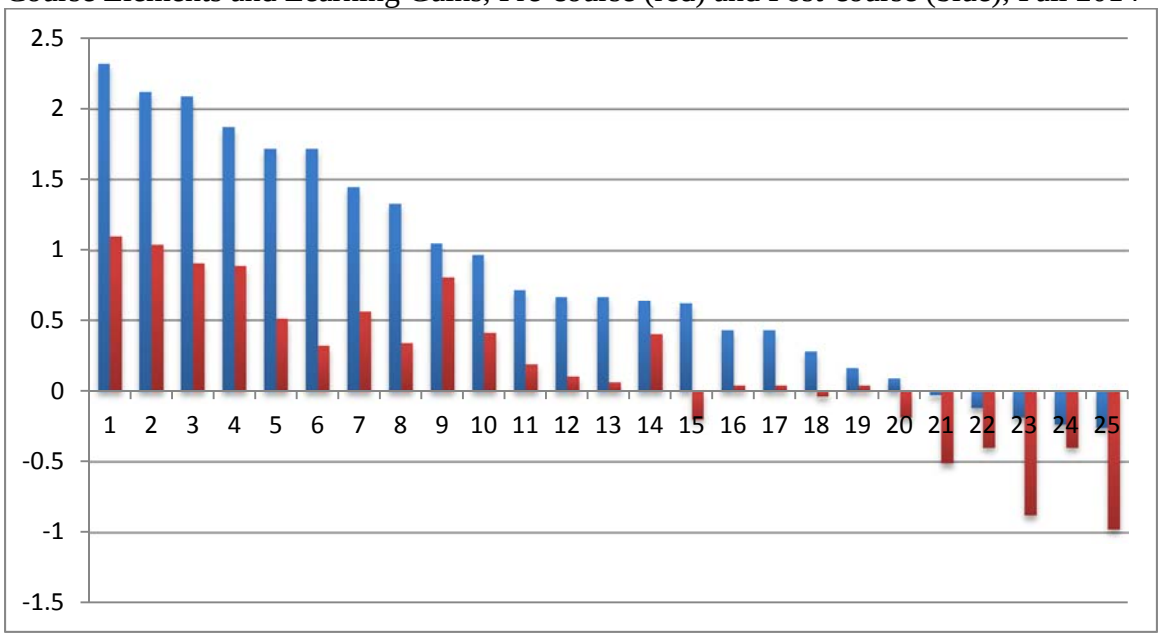
Students were asked about 25 different Course Elements and Learning Gains pre- and post-CURE. Sorted by greatest gain to lowest gain as a result of the CURE, we observed the following results, with the first ~18 items on the list showing substantial post-course gains (e.g. "Writing a research proposal" or "reading primary literature"), and items that were not emphasized as part of the CURE lab during the semester showing no gain (e.g. "listening to lectures" or "reading a textbook").

Sorted by greatest gain to lowest gain:

1. A project entirely of student design
2. Write a research proposal
3. Lab or project where no one knows the outcome
4. A project where students have input into process or topic
5. Present results orally
6. Present posters
7. Read primary scientific literature
8. Present results in written papers or reports
9. Computer modeling
10. Analyze data
11. Collect data
12. Become responsible for a part of the project
13. Lab or project where only instructor knows outcome
14. Critique work of other students
15. Work individually
16. Work in small groups
17. Work as a whole class
18. A least one project assigned and structured by instructor
19. Maintain lab notebook
20. Scripted lab or project where students know outcome
21. Listen to lectures
22. Discuss reading materials in class
23. Take tests in class
24. Work on problem sets
25. Read a textbook

Biology K102

Course Elements and Learning Gains, Pre-course (red) and Post-course (blue), Fall 2014



The model we present here successfully provided over 130 undergraduate students with an authentic CURE research experience and met the goals we described. Students generated reproducible data both in their own experimental treatments and in comparison with other lab groups. They were able to compare this with data obtained from previous semesters, and with data generated in the research sponsor's laboratory. Data can then be used in a research sponsor's laboratory to guide additional research projects. Both laboratory courses fostered high-level discussions and enthusiasm, and generated novel data that will be further analyzed in successive semesters. We are recommending this model to other courses and departments seeking an efficient means for extending research opportunities to a larger number of students than is afforded by independent study and summer programs.

C. Changes in Math Offerings

There have been some significant changes in the courses offered to students on this campus from the Math Department. As these changes are being implemented this Fall, the math department will be carefully assessing how these changes impact student's progression through the curriculum and gen ed requirements. Below is a listing of those changes:

1. MATH 00100 (Intro to Algebra) was offered for the last time in Summer 2015.
2. Students with the following ALEKs Placement scores should take the following course:
    a. 0 – 13 Take Adult Basic Education Pre-Algebra course
    b. 14 – 24 Take IVYTech MATH 023 (Intro to Algebra)
    c. 25 – 49 Take IUPUI MATH 11000 (Fundamentals of Algebra)

    d. 35 – 49 Take IUPUI MATH 11100 (Intermediate Algebra)
    e. 50 – 100 Take IUPUI MATH course required for intended major
3. Students (~50) placing into IVYTech MATH 023 (Intro to Algebra) can take a FYE pilot course, that will review first year algebra topics. [Details TBD]
4. MATH 11000 (Fundamentals of Algebra) will be redesigned for Fall Semester 2015, to be a stretch course for preparation into MATH M118, M119, 13000s, and STAT 30100.
5. MATH 11000 (Fundamentals of Algebra) will contain the following concepts:
    a. 25% Intro to Algebra concepts (11 of 45 days) (1/4th of old MATH 00100 course)
        i. Properties of Exponents, Finding Slope, Graphing Lines, Solving System of Two Equations and Two Unknowns, Algebra of Functions, Solving a System of Linear Equations by Substitution, Multiplication of Polynomials, Factoring Trinomials and Perfect-Squares, and Factoring Difference of Squares.
    b. 50% Intermediate Algebra concepts (20 of 45 days) (1/2 of old MATH 11000)
        i. Solving System of Equations with Three Variables, Solving Systems of Inequalities in Two Variables, Solving Compound Inequalities, Solving Polynomial Functions, Applications of Polynomial Equations, Applications of Variation, Simplifying Radical Expressions, Rational Numbers as Exponents, Multiplying and Dividing Radical Expressions, Quadratic Equations and Quadratic Formula, and Business Applications Involving Quadratic Equations.
    c. 25% College Level concepts (14 of 45 days) (1 chapter each of M118 and M119)
        i. Complex Numbers, Graphing and Problem Solving with Quadratic Functions, Domain and Range, Composite Functions, Inverse Functions, Exponential and Logarithmic Functions, Business Applications of Exponential and Logarithmic Functions, Simple and Compound Statements, Conditional and Bi-conditional Statements, Truth Tables, Valid Arguments, Tautologies, and Predicate Calculus.
6. MATH 1100 (Fundamentals of Algebra) cannot be used as a prerequisite to MATH 15300 (College Algebra).
7. MATH 11100 (Intermediate Algebra) is second year high school algebra, which is required for high school graduation, it will have a higher required placement score (35 – 49) for Fall Semester 2015, no other changes will be made to this course, and it is the only prerequisite for MATH 15300 (College Algebra).
8. Starting Fall Semester 2015, MATH 11000 (Fundamentals of Algebra) can be used for general (free) electives in the 120 credits for a bachelors degree at IUPUI, provided the faculty of the department and school awarding the degree approves this course for their degree.
9. Starting Fall Semester 2015, MATH 11100 (Intermediate Algebra) due to the higher required placement score (35–49), can now be used for general (free) electives in the 120 credits for a bachelor's degree at IUPUI, provided the faculty of the department and school awarding the degree approves this course for their degree.

D. **Assessment of Introductory Psychology B110**. Historically, Introductory to Psychology was taught in a two course sequence focused on the social aspects of behavior and the biological

aspects of behavior (B104 and B105 respectively). Around 2007, the DFW rates for this course were close to 50% (47% for B104; 32% for B105). At this point the department made considerable efforts through course modifications to better engage students and the rates improved (dropped) to 27% by AY 12 for B104 and 23% for B105.

In 2012, Drs. Contino and Neal-Beliveau received a course enhancement grant through CTL and developed B110 (which combines the material in B104 and B105). This new course was offered for the first time in Fall 2012. Changes to the course included our new departmentally written interactive eBook, an improved course format that allowed for more face-to-face time with the instructor than B104 offered, more hands-on collaborative in-class activities, and a new critical thinking personal reflection assignment that required students to apply course themes and concepts to their own lives. The course also relies on undergraduate peer mentors who offer support in the classroom and help for students in the Psychology Resource Center. We have a steady group of faculty, consisting mainly of lecturers and long-time adjunct instructors, who teach the course. Over the summer of 2015 the course was modified again to fit the new Canvas platform. The major changes include altering the previous homework exercises to pre-class quizzes and end of unit chapter quizzes. The text, personal reflection assignment, and collaborative in-class activities remain the same.

Given the large enrollment in this class, it was important to develop a mechanism by which to ensure that students were achieving the important critical thinking skills we hope they gain. The final personal reflection assignment is a way to assess this aim. The course coordinator, Dr. Debbie Herold has developed this assignment, plus a highly descriptive grading rubric to ensure continuity of grading across course sections.

We enroll approximately 1630 students per year in B110 which is a drop from enrollment rates we saw with B104/B105. The cause of the reduced enrollment may be due to changes in the student body (e.g., more students coming in with AP credit for Intro Psych) or changes to the General Education requirements which now provide students with many more options to satisfy their Social Science requirement. However, DFW rates have remained low since the start of the course. The average rate since 2012 is 18% (range 15-24%). These rates are some of the lowest of all Gateway courses and the lowest of Gateway courses in the SOS.

E. Neuroscience Program and e-Portfolio Grant

This program is an interdisciplinary program including faculty from biology, psychology, physics, chemistry, computer science, and mathematical sciences, with the nervous system as a common focus. Students may pursue concentrations in behavioral, cellular/molecular, or computational neuroscience, culminating in a capstone research experience. This program has grown very quickly to a total of 168 majors after just 2 years. We had anticipated 50 majors after the first two years and this growth, while exciting, has presented the faculty with challenges that we are addressing.

This program is extremely rigorous and the students in the program are also very strong. Currently, 51 (30%) of the majors are participating in the IUPUI honors program and another 22

(13%) are participating in the School of Science honors program (73; 43%, total in honors). Additionally, 45 (27%) of the neuroscience students have a cumulative GPA of 3.50 or higher, and 90 (54%) have cumulative GPA's above 3.00 (80% of students above a 3.00). These students have the highest major GPA in the school of science.

To complete a Bachelor of Science degree in Neuroscience, a 3 credit hour capstone experience must be completed in the senior year. Up until now, this capstone requirement has been fulfilled by an honors research project or other faculty-mentored research (some outside the School of Science), or through existing capstone courses in one of the departments in the School of Science. However, the number of majors needing to complete a capstone is about to exceed the capacity of the Neuroscience Program to accommodate them. Thus, the faculty needed to identify capstone opportunities outside of the School of Science. In addition, they needed to ensure that the outcomes achieved in these capstone experiences met the standards of the Neuroscience curriculum.

To address this issue, a new capstone course is being proposed to facilitate that increasing number of students. In addition, an electronic portfolio project is being piloted this fall to assess the course as well as the feasibility of an e-portfolio assessment with these students. Specifically, to meet the needs of a wide variety of faculty, mentors, and students, this new Neuroscience capstone course would be taught every semester, and utilize differing forms of professional and career development that would be incorporated into a professional/career electronic portfolio. We envision following the format of the Life-Health Science Internship (LHSI) Program that utilizes an electronic portfolio, as well as published examples of how an electronic portfolio can be successfully incorporated into a senior capstone course. There would be a set of learning outcomes that would be common across all sections of the capstone course, as well as additional learning outcomes specific to each of the sections. The common learning outcomes could be assessed using the electronic portfolio. In addition, the students would have a place to both reflect on their capstone experience and a place to put artifacts of what they did in their capstone in Neuroscience. Students would meet as a group at least twice a semester for course mentoring, electronic portfolio instruction, and public presentations by the students at the end of the semester, in part using their e-portfolios.

Cindy Williams (Neuroscience Advisor) has received a grant to run a pilot test of the e-portfolio with the Neuroscience majors currently enrolled in Psy B499 (Honor's Capstone Research). Assuming this pilot is successful, a full roll-out to all Neuroscience students will take place in fall 2016.

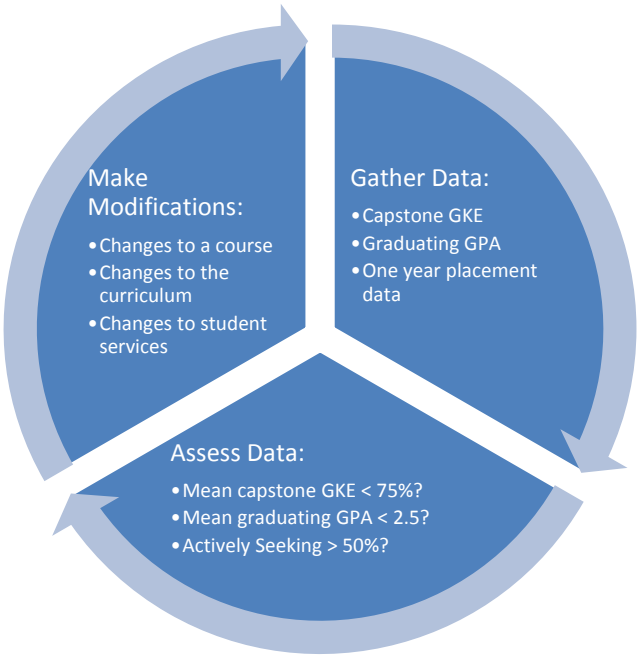
F. Assessment in Forensic and Investigative Sciences

Forensic and Investigative Science (FIS) recently completed their self-study to support the external program review occurring this academic year. In the self-study they outlined the extensive assessment procedures they have in place. A summary of these activities is below.

1. Student Learning Outcomes (SLOs) have been established for the undergraduate curriculum and they are continually updated as needed. The current SLOs for the B.S. Program are:

1. Forensic Science System - Understand the general overview of the forensic science system.
2. Ethics - Understand the importance of ethics in the practice of forensic science
3. Forensic Science and the Law - Understand how criminal and civil laws and procedures are applied to Forensic Science
4. Pattern Evidence - Understand pattern evidence in forensic science and the appropriate analytical techniques
5. Forensic Microscopy – Understand how a variety of microscopes are used in the analysis of different types of forensic evidence, including physical, chemical and biological evidence
6. Forensic Chemistry - Understand how chemical and instrumental techniques can be applied to forensic chemical evidence
7. Forensic Biology - Understand how to identify and analyze forensic biological evidence
8. Research - Understand how to conduct forensic science research

2. FIS has developed a process to monitor the achievements of current FIS students as well as recent graduates. The figure below nicely captures this dynamic process.



a. Capstone Assessment. The Program Coordinator oversees the capstone class in which students are assessed in three ways:

1. Job Search Skills: Resume, cover letter, mock interview and technical interviews are all completed and assessed. Students are given written and verbal feedback on their performance for 25% of the course grade.

2. Research: A scientific research paper and presentation are completed for approximately 40% of the course grade.
3. Forensic Science Knowledge Assessment: Students prepare for a forensic science general knowledge exam created by the FIS faculty, which covers a wide array of topics. Students complete five graded quizzes and a final exam similar to the ABC Exam. This portion of the course equates to approximately 30% of the grade.
4. If the mean score on the general knowledge exam falls below 75%, the Program will review the curriculum, including SLO data and the extent to which topics are covered.

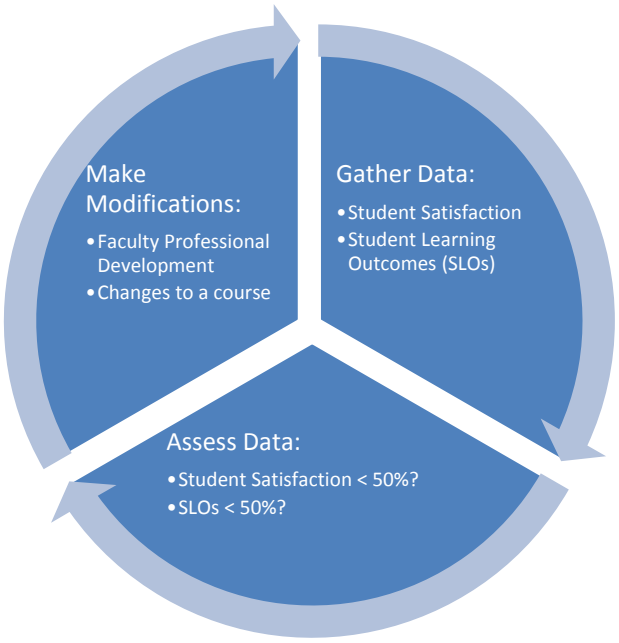
b. GPA. The Program Coordinator keeps a record of the IU program GPA of all FIS graduates and compiles that information, by year, for annual monitoring and posting on the web site. If the mean graduating GPA falls below 2.5, then the Program will institute a review of the courses in which students are performing poorly, examine the pre-requisites for all courses and review the degree maps and sequencing for graduating students.

c. Graduation Survey Data. The Purdue School of Science Pre-Professional and Career Preparation (PREPs) Office collects data from all SOS students upon graduation. The FIS program coordinator obtains the FIS data to identify where students are going after graduation. The PREPs Office continues to follow up with students for at least five years to track student success. This data is reviewed by the Program Coordinator to measure the success with which FIS graduates are entering graduate and professional school as well as obtaining jobs. These data are monitored by faculty and staff to determine if there are substantial declines in student placement. If there is, this issue will be discussed with the PREPs office, Board of Visitors and School of Science.

3. Board of Visitors and Survey

The FIS program has engaged a Board of Visitors made up of individuals in the community who work in occupations that are likely to hire FIS graduates or who currently employ FIS graduates. Annually, they meet with the FIS faculty and SOS Deans to review the status of the program, learn about faculty research, and provide feedback about the program. In addition, the Director and Program Coordinator regularly conduct a survey of the Board of Visitors, with a particular focus on those board members who employ large numbers of FIS graduates. The expectations and satisfaction of these employers with respect to FIS graduates is monitored and any systematic deficiencies are noted and addressed via curriculum changes.

4. Assessment of Teaching. Similar to the dynamic model used to assess students, FIS employs a similar model to assess teaching.



a. Student Satisfaction Surveys

Each FIS faculty member specifies in their syllabi that if at least 75% of the students respond to the student satisfaction survey, then all students will receive a 1% increase in their final point total for the course.

The results of all student satisfaction surveys is maintained and reviewed by the Director each semester. In the event that the student satisfaction scores for a given faculty member fall below 50% (e.g., below 3.0 out of 6.0 (global)), the Director meets with that faculty member and arranges for additional professional development in the area of teaching. This policy also applies to the Director, who must disclose any global scores below 3.0 to the FIS faculty and seek professional development.

b. Student Learning Outcomes (SLO)

Each FIS faculty member specifies in their syllabi that if at least 75% of the students respond to the SLO survey, then all students will receive a 1% increase in their final point total for the course. All FIS faculty must review the SLO data for their courses after each semester and make adjustments if necessary. If the class average on any SLO is below 50% (e.g., 2.5 out of 5), a change in the course is expected. If the response on the same SLO is still below 50% after a change in the course, then this should be discussed with Director and a plan of action put into place.

c. Peer Review of Teaching
Every full-time, FIS faculty member (lecturer, senior lecturer, assistant professor, associate professor, full professor) is reviewed by another full-time FIS faculty once per year. Adjunct faculty teaching required FIS classes are reviewed once per year, by the Program Director.

Part IV: Evidence of assessment and changes made towards continuous improvement in student success initiatives and student support services.

A. Continuation and Expansion of Summer residential STEM Bridge program
designed for students who will be residents on campus. There were several positives to the residential STEM bridge program. Students living in the same buildings had an opportunity to get to know one another before the semester began and there was more interaction as the semester continued. The number of students participating in the STEM, Science and Psychology Bridge programs continues to increase each year. Recent data indicates that STEM and other bridge participants have higher GPAs compared to non-participants; students participating in Summer Residential STEM Bridge have lower DFW rates compared to non-participants; and minority students (especially African Americans) participating in Summer STEM Bridge obtained higher GPAs, lower DFW rates and higher Fall-to-Fall retention rates compared to non-participating AA students. Based on an end of the semester assessment for Science Bridge participants, students are meeting the stated IUPUI Bridge Learning Outcomes:

- Develop a perspective on higher education
- Develop a community of learners
- Develop communication skills
- Develop critical thinking skills
- Develop study skills
- Develop college adjustment skills
- Understand the demands and expectations of college
- Understand information technology
- Understand and use university resources

B. Continuation of the Physics Learning Space (PhyLS)
In order to reduce the DFW rates in Physics, PhyLS has adopted the "assistance center" model that has proven successful in Math, Chemistry and Biology. Since its opening, the PhyLS or "Phyllis" as it is known, has proven to be a popular destination for many students. Students are able to interact with mentors and faculty in small groups or one-on-one, focus on the areas that cause them the most trouble, receive individual support, guided access to computer simulations, video analysis software, and other online tools that support learning in physics.

During its first three semesters of operation, visits to the PhyLS typically number 800-1000/semester, with the mean stay being over one hour. Initial assessment showed that students' are highly positive about almost all aspects of PhyLS, based on a Likert scale survey was conducted in May 2013 by a campus evaluator.

In response to this, the Department of Physics has expanded the hours (the PhyLS is now open 42 hours/week), and has made an attempt to increase physical space by adding an "overflow whiteboard" to the corridor outside (unfortunately, no larger rooms are available) and by adding a second mentor during peak hours. Students, faculty and tutors have all had positive reactions to the PhyLS. Typical student comments focused on the "peer" aspect, fining that the help they get from other students is often more accessible than that from faculty.

C. Walk in Tutoring Service for Computer and Information Science

For fall 2015, the department of Computer and Information Science has begun a tutoring service for students in CSCI N200 – Principles of Computer Science, N201 – Programming Concepts, N207 – Data Analysis Using Spreadsheets, and N211 – Introduction to Databases, to supplement faculty and TA support for these courses. These services are free and time is made available Monday – Friday.

D. School of Science PREPs (Pre-Professional and Career Preparation for Science Students):

The Science Career Development Services moved to the new University Tower space (HO 200) in July 2013, launching their name as "PREPs" Pre-Professional & Career Preparation for Science Students" (SciencePREPs.iupui.edu), which has positioned the center as a key resource for Science students. One of the initial goals of the new Director was to increase the awareness of the center, its location, and services provided. The center was promoted through various programs and methods. Although only two employees initially staffed the center, outreach to hundreds of undergraduate and pre-professional students, has been successful. As of fall 2015, the office has 4 full-time staff and several part-time student workers.

There were several goals in the SOS Strategic Plan that are directly related to the PREPS office

1) Increase PREPs usage by 10% each year. Usage increased by 19% with 909 individual appointments in 2014-2015.
2) Increase SOS undergraduate internships to 25 each year. In 2014-15 we had 54 Life and Health Science Internships, 20 additional internships for credit and 20 internships for no-credit.
3) Provide internships in all seven departments (2014-2015; 6/7 departments offered internship

PREPs brought 141 employers and graduate/professional school representatives to campus to engage with our students. They had 75 events across the academic year and engaged with at least 10% of the majors from each department (range was from 10%-nearly 60%). Considering that this office did even exist 10 years ago, the impact they are having on students is tremendous.

This coming Fall, the office will have several employer and graduate school expo's, is bringing on several organizations (i.e., Interactive Intelligence) as well as hosting several workshops on being a professional, and science jobs in government.

Part V: Graduate Program Assessment

A. Program Overview: Graduate programs at the Ph.D. and M.S. level are advanced fields of study that provide new knowledge in areas unique to the specialization of particular faculty members within research disciplines. At the graduate level overall, however, there are generally similar educational outcomes that are usually independent of the specific field of scientific study. IUPUI has a series of Principles of Graduate Learning (PGLs) that form a conceptual framework that describes expectations of all graduate/professional students at IUPUI. Virtually all graduate students in almost all disciplines are assessed on:

(a) Ability to undertake appropriate research, scholarly or creative endeavors, and contribute to their discipline;
(b) Demonstrating mastery of the knowledge and skills in an advanced area expected for the degree and for professionalism and success in the field
(c) Thinking critically, applying good judgment in professional and personal situations
(d) Behaving in an ethical way both professionally and personally"
(e) Ability to teach, often at the undergraduate level; and
(f) Communicating effectively to others in the field and to the general public
(g) Success in finding employment in a field related to their graduate work.

Together, these PGLs are expectations that identify knowledge, skills, and abilities graduates will have demonstrated upon completing their specific degrees.

B. Program Outcomes: In general, graduate programs in the School of Science assess M.S. and Ph.D. students through comprehensive written and/or oral examinations by a committee related to their field of study, and regular committee meetings to discuss research progress and mastery of skills and knowledge. Graduate students often teach in the department, and they are assessed on their ability to teach by the campus Student Satisfaction of Teaching survey that all faculty receive. Depending on the department, the Teaching Assistants may receive peer evaluation, if teaching. Their record of presentations at meetings, invited talks, publication and submission for grants or fellowships is also a means of assessment, and contributions to the scholarly literature both during and several years immediately after graduation similarly have are used as a form of program assessment.

Evaluation of these undertakings by committees of graduate faculty remains the ultimate assessment standard of student success at the graduate level. These metrics are generally found to be an academically acceptable method of capturing most of the information necessary for graduate student assessment. In terms of final numbers, over 200 students earned the M.S or Ph.D. in the School of Science in 2014-2015.

Part VI: Assessment Plans for 2014-2015

A. Assessment Committee Plans For 2014-2015: The creation of cohorts and tracking their performance through the pipeline to graduation has proved to be a challenge, but with the progress the School has made as a result of the STEP grant, we have been better able to track cohorts and chart their progress towards graduation, as well as gather data necessary to determine whether our students are not only meeting the standards set by the PULs but also developing the skills needed for graduate or professional school or a career after college. Currently, are collecting the following data on each cohort for both first-time freshman and transfer students (by gender, race, FT/PT, etc.):

1) Average GPA each year for cohort
2) Track those who attended a STEM or other Science Bridge, First year Experience or Themed Learning Community, and assess the impact of student persistence and retention
3) Track number who changed major, but dropped STEM major each year
4) Track students in each cohort involved with each student resource center (BRC, CRC, MAC, PhyLS), and compare their DFW and retention rates as well as graduation rates to others in cohort
5) Track number who use Career Development Services (see below)
6) Track the number of students who complete 2 or more RISE experiences (191 in 2014)

We will also continue to assess the effects of course development and course transformation efforts in the School of Science such as Chemistry PLTL workshops, Math, Biology, and Physics Recitations, CUREs in Biology and Chemistry, and Psychology.

B. Peer Review of Teaching in the School of Science

The SOS Steering Committee is committee run by a faculty elected president and secretary and membership from each academic unit. This committee has oversight of the SOS bylaws and acts as a conduit between the faculty and school administrators. Last year the Dean's office and the School P&T committee asked the steering committee to review best practices regarding peer assessment of teaching and develop a common protocol. Two members of the Steering Committee worked with individuals at the Center for Teaching and Learning and to develop a common peer assessment tool. This tool is currently under review by individual departments and when approved by the faculty will be the tool used for peer assessment in the school. Peer review of teaching is required for individuals submitting dossiers for promotion and/or tenure. In addition, the steering committee will make suggestions regarding how often faculty should be reviewed, although some departments and programs (e.g., math and FIS) require peer review annually for all faculty. When the tool is finalized it will be submitted in a subsequent assessment report.

C. SOS Strategic Plan

The School of Science introduced a 5 year strategic plan in Fall 2014. Several goals and initiatives identified in the plan are relevant to this report. Below are listed some that we believe

are important markers of our goal to provide the highest quality education possible for our students.

1) Expand and increase collaborations with CTL. In 2013-2014 the SOS had 138 contacts with CTL, including 48 unique contacts. In 2014-15 the SOS had 147 contacts with CTL, and 82 unique contacts.
2) Develop a Science Honor's program. The program graduated its first student in Spring 2015 and has 69 students participating. Over the next year, the school plans to increase the programming available for these students.
3) Increase retention and persistence of First Time – Full Time students to 70%. This was at 62% in Fall 2014.
4) Increase STEM graduates by 10% each year. As evidenced by the C-STEP grant, we are achieving this goal.
5) Increase 4 year graduation rate to 35%. We are progressing towards this goal. In 2013 the rate was 28%, and in 2014 the rate improved to 31.7%.
6) Establish Independent Graduate Programs. Seven proposals will be going forward this year for approval of independence from ICHE. Two departments (Biology and Chemistry) were site-approved by ICHE to independently award the doctoral degree at IUPUI. The other five proposals are in the pipeline and will be reviewed during the 2015-2016 academic year.
7) Develop innovative and novel graduate programs. The Applied Social and Organizational Psychology program (an IU doctoral program) is currently waiting approval at ICHE.