CI-STEP at IUPUI 3rd Year Annual Report**:** 7/1/10 to 1/1/13

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Project Summary:

The focus of the ***Central Indiana STEM Talent Expansion Program*** is to employ and assess the impact of several intervention strategies on student success, leading to higher numbers of students graduating with STEM degrees. These intervention strategies include: Summer STEM Bridge, peer-mentoring, academic advising support for transfer students, Peer-led Teaching and Learning, Just-in-Time Teaching, Career Development services, and internships. IUPUI has numerous support services already in place to assist with this initiative, making it possible to integrate research and education on effective strategies for student learning in STEM disciplines. Additionally, the evaluation plan includes effective mechanisms for measuring the impacts of the individual initiatives and the effectiveness of the program as a whole. Successful programs in student learning and retention benefit all involved. 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. The results of this project will be of interest to all who wish to increase student success in STEM disciplines, and dissemination of the project's results will occur through the web, peer-reviewed publications, and presentations to the local and national STEM community. By blending research on teaching and learning, with the participation in teaching and training by students from diverse backgrounds, including underrepresented minorities, it is anticipate that a significant increase in both knowledge of "what works" in successful college programs, as well as the successful result of these interventions - increasing numbers of talented graduates, will occur. A national conference will be hosted at IUPUI during the fourth year of the project, which will bring national leaders on STEM education, to share their knowledge of research and best practices, and for this project to showcase the work being done at IUPUI and other institutions on increasing the number of STEM degrees awarded.

Stated Goals of CI-STEP:

The *Central Indiana STEP* at Indiana University-Purdue University Indianapolis (IUPUI) is creating a pipeline to increase the number of students from the greater Indianapolis region obtaining STEM degrees. The goals are to increase the numbers of students who:

- Pursue STEM academic and career pathways;
- Participate in STEM research, industry internships, and honors activities;
- Graduate with an undergraduate degree in STEM fields; and
- Transition into industry, graduate and professional programs.

CI-STEP has set a target to increase the number of STEM graduates at IUPUI by 10% per year.

Types of Activities:

CI-STEP is developing, implementing, and expanding activities based on successful existing high impact practices in higher education, which fall under one of four broad categories:

(1) Articulation with IVYTech CC in Indianapolis (Program and Course Alignment)
(2) Student Success Programs (STEM Bridge and Peer Mentoring)
(3) Student Centered Pedagogies (Classroom Curriculum and Instruction)
(4) Career Services (Internships and Job Placement)

Achievements:

The successful aspects of CI-STEP activities under the four broad categories follow here.

(1) ***Articulation with IVYTech CC in Indianapolis:***

(1A) ***Articulation Activities with IVYTech CC*** include aligning the content and learning outcome standards of five math courses to improve seamless transition to IUPUI. This work resulted in the signing of a ***MATH Course Transfer Agreement***. The data shows a sharp increase in the number of students transferring these courses (from 6 in 2008, to 85 in 2011).

(1B) ***Articulation Activities with IVYTech CC*** include updating ***E/T Program and Course Transfer Agreements*** to re-aligning program content and learning outcomes for pre-technology/engineering AS degrees. Resulted in: new agreements being signed; an increase in students (from 2,683 in 2008, to 3,635 in 2011) and in credit hours (from 21.5/student in 2008, to 28.6/student in 2011) transferring for each of the past 3 years; and an increase in retention of these transfer students (from 61% to 70%). Data shows: a significant increase in number of transfers and credits transferred per student after articulation agreements are signed; academic quality of transfer students from CC continue to improve; IVYTech transfer students make up 24% of IUPUI's ethnic diversity; and 77% of transfer credits from IVYTech are applied to requirements (compared to 60% for all other institutions).

(1C) ***Articulation Activities with IVYTech CC*** include developing and implementing a set of foundational level math courses that are aligned and parallel in rigor to IUPUI courses. This set of courses will form the ***new Associates Degree (Math Cluster) at the CC*** and will be equivalent to the MATH minor at IUPUI. The goal is to improve the seamless transition of STEM students to IUPUI. The first cohort at IVYTech CC has 6 students. The second cohort has 12 students. The first cohort will receive their AS degrees with the math cluster in 2013.

(2) ***Student Success Programs:***

(2A) ***Student Success Programs*** include the development and implementation of a ***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. There were some issues that needed addressing: rapport with upper classman as RAs; promoting the program during orientation (since new students see a variety of different advisors at orientation); and a decrease in outreach to participants after the semester started (plans to increase outreach with the next cohort are being considered). A spinoff of the residential STEM bridge program was an overnight orientation for the next cohort of students. A problem that faces bridge programs is finding faculty willing to teach the experience during the summer. Thus, the non-residential STEM bridge programs will experiment with increasing the number of students served by increasing the students to faculty ratio, but lowering the students to student-mentor ratio in the third year of the grant. The number of students participating in the STEM Bridge program

has increased 32% and 22% over the past two years (65 students in 2010, 86 in 2011, and 105 in 2012). Recent data indicates that STEM 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.

(2B) ***Student Success Programs*** include reaffirming existing ***2+3 Dual Degree Program with Butler*** by funding a half-time advisor to work with Butler students to increase advising and promotion of the 2+3 engineering degree. No data has been collected and analyzed at this time to measure the effectiveness of a specialized advisor to work with these partners.

(2C) ***Student Success Programs*** include the opening of the ***Physics Learning Space (PhyLS)*** in Fall 2012, and designed to advance student success in introductory physics by providing mentoring to all students taking these courses. These courses, typically having the highest DFW rates on campus (averaging 25.1% in 2010), serve almost 1500 students each year. In order to reduce the DFW rates, PhyLS has adopted the "assistance center" model that has proven successful in Math, Chemistry and Biology. 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. This new center has an assessment plan, but limited data has been collected during the first semester of operation.

(2D) ***Student Success Programs*** include the implementation of a new ***Post Enrollment Requirement Checking (PERC***) in MATH Courses during the Fall 2012 semester. A situation that causes many STEM students to drop out of their intended major is the result of not being successful in the first math course, and then moving onto the next math course, and failing it. These students believe they can pass the next math course without being successful in the prerequisite, but they end up digging a hole they cannot climb out. Advisors find it difficult to catch this situation before it is too late - and it contributes to lowering the first year retention rate. The math department worked with the Registrars Office to develop an automatic withdrawal program that will remove enrolled students in math courses one week before the semester starts, if they do not have the proper prerequisites grade. When the Post Enrollment Check (PREC) is run one week before classes start, the identified students are withdrawn from the math course, and the student and their advisor will be automatically notified by email of the action. In the Fall 2012 semester, 47 students were identified as enrolling in math courses in which the prerequisite course was not passed. For the Spring 2013 semester, 84 students were identified and advised before the first day of class.

(2E) ***Student Success Programs*** include actively promoting the ***MATH Minor*** to students and advisors across campus as a way of setting a short-term goal in the pipeline to completing a BS degree. The department completes the paperwork and the Registrar post the minor on the transcript at the time of completion (usually in the sophomore year). This transcript documentation provides motivation to students that they have completed a component of their degree (much like an AS to BS degree). Many STEM majors will automatically have a minor in their plan of study, or will earn the minor by selecting one more math course as an elective. The number of minors awarded each year provides an indicator of the number of STEM majors in the pipeline. The number of minors have

increased each year: 32%, 14%, and 94% (44 awarded in 2008, 58 in 2009, 66 in 2010, and 128 in 2011). This rapid growth is partly due to students becoming more aware of their eligibility to obtain the minor, but it is also due to 53 students (of the 128 awarded last year), who took an additional course above their requirement (a free elective) to obtain the minor.

(2F) ***Student Success Programs*** include the implementation the ***Alliance for Retention for Multicultural Students***, a new first-year experience course for engineering and technology majors (Fall 2012). Students attend a weekly seminar in order to provide support in their studies and to discuss goals for their success. Students are required to serve in "affinity" student organizations, and are mentored by faculty and staff. The first cohort (Fall 2012) has 11 minority students who received scholarships assisting them with tuition.

(3) ***Student Centered Pedagogies:***

(3A) ***Student Centered Pedagogies*** include ***Faculty Development Workshops*** for faculty designed to disseminate best practices, through the Center for Teaching and Learning, and the E&T Lunch-n-Learn Series. The workshops are well attended and held twice a semester.

(3B) ***Student Centered Pedagogies*** include ***STEM Mini-Grants*** to target DFW rates in specific STEM courses. A call for STEM-oriented curriculum-and-instruction proposals seeking field-generated ideas that have potential to positively impact the grant's scope was made to faculty. Those proposals rated most highly of having promise were funded with mini-grants. The mini-grants funded faculty to work on their proposals during the summer of 2012, and then to implement the curricular and instruction changes in the fall semester. Eight such proposals were funded. Although too early to report findings, the faculty who received these mini-grants prepared a poster session to highlight the progress they are making in developing and implementing their student-success strategies into their classroom, followed by a presentation to the CI-STEP External Advisory Board in December, 2012.

The table (on the next page) lists the various CI-STEP initiatives during the first three years, the number of students reached, and whether the initiative will be sustained after the grant. Those initiatives funded by the ***STEM Mini-Grants*** are denoted with a (*).

(3C) ***Student Centered Pedagogies*** include ***Genetics K322 Peer Recitation*** where the Department of Biology has realized the benefit of undergraduate peer mentoring on success of students in Gateway Courses. Peer mentoring is generously supported in 5 such courses each semester in the department, reaching over 2,500 students each semester. However, no corresponding peer mentoring exists for Genetics K322, the next required course for all 2,000 biology majors. Enrollment of this course has steadily increased over the last 5 years, with enrollments exceeding 130 students in a single lecture section. This past fall 2011 and spring 2012, a peer leader was hired to provide extra time to all genetics students, with up to 10 hours per week of time available for drop-in-mentoring hours. During the fall semester, at least 48 students (36%) attended one or more mentoring sessions, similar to the attendance in the spring. There was a modest decrease in the DFW rate in both the fall and spring (from an average of 16% in the previous 5 years before the introduction of mentoring to about 14% in the past two semesters with mentoring). It is difficult to say whether this modest benefit was a result of the peer mentoring, but due to the difficulty of the course, student evaluations and focus group comments were overwhelmingly positive of the benefits of the extra support.

The two faculty members teaching the course were also highly positive and have requested that the mentoring continue, both stating that they will promote the benefits of attending the peer mentored sessions to the Genetics students this coming fall and spring.

INITIATIVE	# of Students Reached	Sustainability
(1A, 1B, and 1C) Various Articulation activities with IVYTech CC	All CC students exposed to Math course at IVYTech	Yes, the articulation has been approved
(2A) Residential and Non-Residential STEM Bridge Program	286 over 3 years	Yes, School of Science has adopted initiative
(2B) 2+3 Dual Degree Program with Butler University	All advised students at Butler	Waiting for analysis of impact
(2C) Physics Learning Space	282 over 2 years	Yes, Physics department adopted the initiative
(2D) Post Enrollment Requirement Checking (PERC)	130 over 1 year	Waiting for analysis of impact
(2E) Promoting the Math Minor	300 over 3 years	Waiting for analysis of impact
(2F) Increase retention for Multicultural Students in E&T *	11 in 1 semester	Waiting for analysis of impact
(3A) Faculty Development Workshops	University wide impact	
(3B) CI-STEM Mini-Grants	8 projects	
(3C) Genetics K322 Peer Recitation *	800 over 2 years	Yes, Biology department adopted the initiative
(3D) CHEM C341 Organic Chemistry Workshop Series *	603 over 2 years	Yes, Chem department has adopted initiative
(3E) Calculus Recitation for MATH Courses	401 over 2 years	Yes, Math department has adopted initiative
(3F and 3G) Peer Mentoring in Technology and in Engineering *	475 and 480 over 2 years	Yes, respective department adopted the initiative
(3H) Using Inductive Learning Methodology in MET Course *	40 in 1 semester	Waiting for analysis of impact
(3I) Building Support and Increasing Recruitment of Transfer Students into E&T *	120 over 1 year	Initiative to be repeated in 2012
(3J) E-Mentoring in Computer Graphics Technology *	Pre-implementation	
(4A) Development of Career Centers for Schools of Science	422 over 2 years	Yes, SOS has adopted the center
(4B) Summer Industrial Projects Program *	9 in 1 semester	Waiting for analysis of impact

* Initiative funded by CI-STEP Mini-Grant

(3D) ***Student Centered Pedagogies*** include ***Chemistry C341 First Semester Organic Chemistry Workshop Series*** the department continued their development of the workshop series into the organic chemistry course in order to lower the DFW rate. The goal is to facilitate students' collaborative development of Organic Chemistry problem-solving skills,

as measured by performance on the ACS Organic Chemistry Exam. 303 undergraduate students were impacted during the first year, with DFW rates of 15.5% (Fall) and 18.6% (Spring), as compared to DFW rates ranging from 23-30% prior to the workshops being implemented. Moreover, 50% (Fall) to 66% (Spring) of students state that the workshop discussions aided understanding, while 40% (Fall) to 60% (Spring) of students perceived an increase in their problem-solving ability. The grant enabled smaller group sizes, thus better matching the PLTL model, increasing the impact of the workshops on their learning, and bolstering performance on the ACS final exam. In addition, the 16 peer leaders cited an increase in their understanding of concepts and more than 25% of the peer leaders expressed an interest in teaching as part of their career as a result of their participation. *Major findings include*: (1) the DFW rates have decreased about 10% after workshops were implemented, (2) 6 to 10% increase in positive student perception of problem-solving ability, (3) 25% of the peer mentors expressed an interest in teaching after this experience, and (4) study findings to date suggest that faculty have been successful in using the PLTL approach to lower the failure rates. Reduction of DFW rates for the course and training of discussion leaders to decrease the number of students in each workshop are positive interventions for increasing the success and number of STEM graduates.

(3E) ***Student Centered Pedagogies*** include redesign of the ***Calculus Course with Recitations*** were developed and implemented into the large lecture section of MATH 16500 (fall semesters) and 16600 (spring semesters). Recitations became a required component of the course and graduate students were trained on how to facilitate discussions using peer-mentoring techniques used in the Mathematics Assistance Center. Students in all sections of the course are required to take a departmental final exam with fixed grading curve. The DFW rate in sections with recitations have an average DFW rate of 23% compared to those that do not with an average rate of 34%. *Major findings include*: (1) despite the larger class size, sections of calculus with recitation sections have a significantly lower DFW rate, ~20%, than other sections of the course. (2) Students in sections of calculus with recitations perform 10 percentage points better on the departmental final exam.

(3F) ***Student Centered Pedagogies*** include implementing ***Peer Mentoring in Technology*** into 8 gateway technology courses (~475 students), with the intent to create a peer-mentoring program that will create the foundation of a departmental culture in the future. The peer mentors are intended to become personal links in the scaffolding of each student's education with the overall purpose to retain these students and see them through to graduation. There is funding for 19 peer mentors per semester, they will be trained by the Bepko Learning Center to begin during the Spring 2012 semester. It is too early for any data about this activity.

(3G) ***Student Centered Pedagogies*** include implementing ***Peer Mentoring in Engineering*** into the Intro to Programming Concepts course. This is a required course for all engineering majors. There are 8 sections of 30 students each per year, with a DFW rate of 37%. Two peer mentors with strong programming and communication skills have been identified, they will be trained by the Bepko Learning Center and begin mentoring students in-class and out-of-class during the Spring 2012 semester. It is too early for any data about this activity.

(3H, 3I, and 3J) ***Student Centered Pedagogies*** include ***Using Inductive Learning Methodologies in MET Courses, Building Support and Increasing Recruitment of***

Transfer Students in E/T, and E-Mentoring in Computer Graphics Technology are three recently funded mini-grant initiatives. It is too early to provide any details on progress.

(4) ***Career Services:***

(4A) ***Career Services*** include the planning and implementation of the ***School of Science Career Development Services (CDS) Center***. Space on campus was secured (located adjacent to the Math Assistance Center), and the first Director was hired. One of the initial goals 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 staff the center, outreach to hundreds of undergraduate and pre-professional students, has been successful. The number of students utilizing career services increased from 95 students in the first year to 327 students in 2011–12; and one-on-one advising went from 95 to 327. Educational programs include: resume development, class presentations, workshop series, social media networking, and etiquette lunch. Strategic and intentional efforts were undertaken to acquaint faculty with CDS staff and services. *Graduation Survey of Science Majors* reported: 86 students filled out the survey in Spring 2012, students' plans following graduation were: 17% accepted a position; 27% currently searching for a job; 24% attending graduate school; 19% attending professional school; and 13% other. The survey also reported 43% of graduates completed an internship. *Science Careers (powered by CSO):* is a comprehensive site that provides web access for employers to post positions including part/full-time, volunteer, and internship for science majors. Students can view these postings, upload resumes, and apply within the system. During the first year, 722 new jobs were posted. During the second year, 850 new job postings with 605 employers in the system. The following are companies that have built relationships with the CDS: Roche, Theoris Scientific, Develop Indy, Appriss, ChaCha Inc, WorkOne Indy, and Biostorage.

(4B) ***Career Services*** include ***Engineering Technology Summer Industrial Projects Program*** that will provide internship experiences for 10 undergraduate students in industrial settings to complete projects with engineering and technology mentors. Two of the students have already been hired on a part-time basis as they finish their degrees. All 10 students are on-track for earning their degrees.

Progress on Primary Goal to Date: Number of STEM BS/BA Graduates at IUPUI

CI-STEP set a target of increasing the number of STEM graduates at IUPUI by 10% per year. Appendix A contains a table of STEM departments in this project comparing the number of degrees awarded by the departments each year to the CI-STEP goal for that year. The chart below contains the number of majors in each area based on the NSF crosswalk table.

	Number of Majors				Number of Graduates			
Year	2008-9	2009-0	2010-1	2011-2	2008-9	2009-0	2010-1	2011-2
Science	804	892	981	1,099	112	131	148	165
Technology	(Tech numbers included in Engr)				181	185	189	185
Engineering	1,342	1,419	1,418	1,462	87	96	99	132
Math/CS	806	824	904	997	37	28	37	42
Total	2,952	3,135	3,303	3,558	417	440	473	524

Note: the Number of Majors for Math/CS includes the School of Informatics, which is not part of the CI-STEP initiatives, but the Number of Graduates does not include Informatics majors.

Challenges, Adaptations, Assessments, and Sustainability:

CI-STEP had to narrow its focus on initiatives with other institutions, which was spreading the resources too thin. Therefore, Vincennes University (a feeder to IUPUI) initiatives were dropped, and initiatives with Butler University (has a dual engineering articulation with IUPUI) was scaled back. It was clear that the biggest feeder to IUPUI was IVYTech CC Indianapolis; thus, resources were re-aligned to focus on high impact activities with IVYTech.

Since CI-STEP was focused on implementing best practices and not inventing new strategies, the number of challenges was small, but nevertheless present. The most difficult challenge was recruiting students for surveys and voluntary assessment activities. Other challenges included: project staff encountered difficulty in collection of data that was not systematic throughout the first three years of the project and across different initiatives (complexity of data collection); difficulty recruiting additional project staff (PLTL and summer Bridge); and low survey response rate for student feedback surveys. Some challenges for specific initiatives include:

The ***Summer Industrial Projects Program*** where the funding was spent before completion of the project, and in order to continue with the project, additional funding was needed. An additional $10,000 from AMG Engineering was used for 3 additional students to participate.

The ***Transfer Student Recruitment and Support Program*** where the attendance in some of the seminars was low, and new methods to advertise the benefits of the program were needed to attract more transfer students. This is a problem that CI-STEP will continue to work on.

The ***From Studio to Student: E-Mentoring in Computer Graphics Technology*** where it has been difficult to find, hire and fund industry professionals for the course.

As Indiana develops its community college system (started about 12 years ago), many challenges are being faced by IUPUI. For STEM education, the primary issue is the elimination of associate degrees (many in technology, and some in science) from IUPUI. The number has been dropping for at least 8 years and will continue to drop, this is also causing a drop in the number of BS degrees in technology, as industry prefers the AS degree for many types of jobs – a challenge for IUPUI in recruiting technology majors from the CC to continue for a BS degree.

The Number of AS Degrees Awarded at IUPUI

Year	2008-09	2009-10	2010-11	2011-12
AS Degrees	86	77	71	48

The ***STEM Bridge*** program is more successful than anticipated; therefore funds were diverted from Honors Seminars (which showed little promise of increasing graduates) to the bridge program. This summer, the campus hotel will be converted to a dormitory with 72 beds. With the success of the STEM Bridge program, the campus has reserved one floor for a STEM House. This will allow the campus to triple the number of students served by the residential STEM Bridge and house them through their freshman year in the same location. Data indicates that the Summer Bridge program is particularly effective in retaining minority STEM majors.

Both schools (Science and Engr/Tech) have experienced increases in retention of minority students, which has lead to increases in minority graduation (note, new ethnicity definitions became effective in Fall 2010). The table below shows the IUPUI Student Demographic data.

	School of Science				School of Engr/Tech			
Ethnicity	2008	2009	2010	2011	2008	2009	2010	2011
African American	25	37	25	43	27	30	30	39
Native American	1	1	1	1	1	1	3	1
Asian American	15	21	30	35	13	18	14	18
Hispanic	6	13	13	14	6	14	10	13
Two or More	-	-	5	4	-	-	2	3
White	215	234	244	253	275	278	288	298
Unknown	4	6	5	8	8	9	9	10
Total Minority	47	72	74	97	47	63	59	74

CI-STEP has had success in sustainability of many of the initiatives (see table on page 4). After funds from CI-STEP were used to research best practices, develop and implement the initiative, the departments have agreed to institutionalize the initiative – 8 of the 18 initiatives to date. For example, the CDS center will be funded by a program fee charged each semester to science majors (this new charge was voted on by student government), and departments are willing to find funding to continue student mentoring initiatives once implemented into their courses.

The goals of CI-STEP fit nicely with the new Performance Based Funding Model adopted by the State of Indiana. This new model financially rewards campuses for increasing their degree count – and is no longer based on head count. Therefore, the campus will invest in sustaining initiatives, like those in CI-STEP, that have been proven to increase graduation rates.

Advisory Boards:

CI-STEP held advisory board meetings as scheduled, whose members are a diverse group of stakeholder, including: business, industry, entrepreneurs, and educators. The meeting dates were:

Internal Advisory Board: September 30, 2010; July 22, 2011; and July 25, 2012.
External Advisory Board: December 1, 2010; December 5, 2011; and December 7, 2012.

The Internal Advisory Board: brainstormed and generated ideas that facilitated data collection, analysis and reporting efforts; assisted the CI-STEP project team with strategic planning and generating ideas for implementation of project activities, and identified potential solutions for sustaining successful activities into the departments and schools; using a SWOT analysis, board members helped facilitate decision-making and establishment of action plans.

The External Advisory Board: helped the CI-STEP project team identify multiple audiences who could use the assessment results obtained from the project activities; helped in determining what specific messages, metrics or narratives speak to the concerns of multiple audiences.

Lessons Learned and Overall Impact:

There was impact beyond the intended goals of the individual initiatives. These included an increased socialization and networking opportunities among faculty in various STEM disciplines, and between faculty at IVYTech and IUPUI. There was also an increased awareness

of academic resources for faculty and students in STEM disciplines, which included an increased level of interest in studying trends on transfer students.

The CI-STEP activities (1A, 1B, and 1C) under the category of ***articulations with IVYTech*** has accomplished: increased dialogue among faculty; new course and program articulation agreements; launched new transfer student recruitment/support services; increased number of transfer students; and increased retention of transfer students in STEM-related majors. All of these are indicators that the achievement gap is closing and creating a seamless pipeline.

The evaluation of the ***Organic Chemistry Workshop Series*** found that faculty input in all aspects of the initiative is imperative; structured schedule and student roles are essential to promote student participation; maintaining low student-to-peer leader ratio is critical, 8-10 students per leader produced the greatest student performance on the ACS exam; maintain the same peer leader for each group; lack of answer key appears to be essential for conceptual focus; and workshop learning environment was effective for both students and peer leaders.

An unexpected benefits from the CI-STEP project was increased frequency of meetings among STEM faculty, which made a positive contribution in establishing the ***STEM Institute at IUPUI*** in the Fall of 2012. The investigators of CI-STEP and other investigators of STEM-related projects now have a common institute on campus to build cinergy.

The high number of faculty participating in CI-STEP initiatives helped facilitate the establishment of a new track on "***Assessment in the STEM Disciplines***" at the 2013 National Assessment Institute – it is anticipated that this will attract new attendees to the institute.

The most important lessons learned are: (1) start early getting department chairs support to encourage faculty to buy-in to STEM education and transformative pedagogies, which include reward structure and targeting specific faculty; (2) evaluators need to work closely and early with each initiative because of the complexity of data collection; and (3) focus on specific goals and keep grant activities narrow to 3 best practices to be implemented. CI-STEP is exceeding the projected goals to date, and is on target to meet the final goals at the end of the project.

Dissemination:

The CI-STEP website is http://step.iupui.edu/. The purpose of the site is to serve as a centralized location for individuals to learn about the CI-STEP grant, and the impact it is making. The home page features a custom logo, a flash interrogated panel with scrolling pictures, a link to the CI-STEP Facebook page, a "Happenings" section which highlights upcoming events, and 4 hyperlinked information panels that represent the 4 different areas of grant activity. One will find detailed information on each initiative, the progress and impact being made, helpful resources, a list of grant publications and presentation, as well as a list of mini grant recipients, their grant goals, and a link to a dedicated site for data deposit and dissemination. In addition to being a site for the general public, it also serves as a place for colleagues to come and connect with others. In 2012, CI-STEP presented at the Moore Symposium. The site was used to post and distribute information to the symposium attendees, allowing the grant to reach across campus to a breath of faculty from the IU Medical School to the School of Science. CI-STEP is planning to partner with the National Assessment Conference, October 2013. This partnership will allow a strand of sessions through the conference focused on STEM education, allowing the work at IUPUI and IVYTech CC to be disseminated to a large national audience.

CI STEP Project

CI STEP Project

Data on Primary Goal

Number of STEM Graduates by Year at IUPUI

	Baseline Years			Year 1		Year 2		Year 3*		Year 4		Year 5			
	Base Year	2009-10		2010-2011		2011-2012		2012-13		2013-14		2014-15		Grand Total	
	2008-2009	Actual	Goal	Actual	Goal	Actual	Goal	Actual	Goal	Actual	Goal	Actual	Goal	Actual	Goal
Science	**112**	**131**	**112**	**148**	**123**	**165**	**136**	**0**	**149**	**0**	**164**	**0**	**180**	**556**	**976**
Biology	73	88		99		105								365	
Chemistry	30	37		39		50								156	
Geology	3	4		3		4								14	
Physics	6	2		7		6								21	
Technology	**181**	**185**	**181**	**189**	**199**	**185**	**219**	**0**	**241**	**0**	**265**	**0**	**292**	**740**	**1578**
Biomedical Engineering Tech	3	6		8		1								18	
Computer Information Tech	48	49		41		56								194	
Civil/Constr Engr Mgmt. Tech	45	38		45		34								162	
Computer Engineering Tech	2	6		8		6								22	
Computer Graphics Tech	27	26		31		24								108	
Electrical Engineering Tech	17	30		23		11								81	
Mechanical Engineering Tech	39	30		33		53								155	
Engineering	**87**	**96**	**87**	**99**	**96**	**132**	**105**	**0**	**116**	**0**	**127**	**0**	**140**	**414**	**758**
Biomedical Engineering	11	13		19		18								61	
Computer Engineering	10	12		10		21								53	
Electrical Engineering	24	27		24		30								105	
Mechanical Engineering	42	44		46		63								195	
Motorsports Engineering	0	0		0		0								0	
Mathematics	**37**	**28**	**37**	**37**	**41**	**42**	**45**	**0**	**49**	**0**	**54**	**0**	**60**	**144**	**322**
Computer Science	15	6		13		16								50	
Mathematics	22	22		24		26								94	
Total	**417**	**440**	**417**	**473**	**459**	**524**	**505**	**0**	**555**	**0**	**611**	**0**	**672**	**1854**	**3634**

Note 1: Data are reported by IUPUI Fiscal Year (i.e., Degree Year: July through June). For example, 2008-09 includes students who graduated in August 2008, December 2008, and May 2009.
Note 2: An individual student who double majors is only counted once in this data. (No double-counting – Each student should be reported under only one discipline.)
Note 3: A student who majored in more than one STEM department is counted in the department with the smallest number of majors.
Note 4: Include U.S. citizens or permanent residents only.

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