2013 Annual Performance Report

Submitted:
U.S. Department of Education
Title III - Part F - HSI STEM and Articulation Programs

ED 524B Cover Sheet

1. PR/Award #: P031C110184
2. Grantee NCES ID#: 187985
3. Project Title: Project for Inclusive Undergraduate STEM Success (STEM Gateway)
4. Grantee Name: University of New Mexico -- VP for Student Affairs Office Support Effective Teach
5. Grantee Address: MSC01 1247 1 University of New Mexico Albuquerque, NM 87131
6. Project Director Name: Tim Schroeder Title: Sr. Program Manager
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   Email Address: timschroeder@unm.edu

Reporting Period Information

7. Reporting Period: From: 10/01/2012 To: 09/30/2013

Budget Expenditures *(To be completed by your Business Office.)*

8. Budget Expenditures:

	Federal Grant Funds	Non-Federal Funds *(Match/Cost Share)*
a. Previous Budget Period	$469,012.48	$0.00
b. Current Budget Period	$900,797.35	$0.00
c. Entire Budget Period *(For Final Performance Reports only)*		

Indirect Cost Information *(To be completed by your Business Office.)*

9. Indirect Costs
   a. Are you claiming indirect costs under this grant? No
   b. If yes, do you have an Indirect Cost Rate Agreement approved by the Federal Government?
   c. If yes, provide the following information:
      Period Covered by the Indirect Cost Rate Agreement: From: To:
      Approving Federal agency: ED Other *(Please specify):*
      Type of Rate:
      (For Final Performance Reports only)
   d. For Restricted Rate Programs (check one) -- Are you using a restricted indirect cost rate that:
      Is included in your approved Indirect Cost Rate Agreement?
      Complies with 34 CFR 76.564(c)(2)?

Human Subjects (Annual Institutional Review Board (IRB) Certification)

10. Is the annual certification of Institutional Review Board (IRB) approval attached? N/A

Performance Measures Status and Certification

11. Performance Measures Status
    a. Are complete data on performance measures for the current budget period included in the Project Status Chart? Yes
    b. If no, when will the data be available and submitted to the Department?

12. Authorized Representative Name: Julian Sandoval
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Executive Summary

EXECUTIVE SUMMARY

The Project for Inclusive Undergraduate STEM Success (branded as STEM Gateway at the University of New Mexico) has completed a successful second year of operation. The STEM Gateway program includes four interconnected initiatives:

STEM GATEWAY COURSE REFORM PROJECT HIGHLIGHTS

In the spring of 2013, UNM offered sections of the following reformed gateway courses: CHEM 122 (3 sections), MATH 121 (6 sections), PHYC 161 (1 section) and PHYC 168 (3 sections). Together these sections served 917 enrollments (65.98% of these were for Hispanic or low-income students). In the fall of 2013, UNM offered sections of the following reformed gateway courses: CHEM 122 (4 sections), CHEM 122 (3 sections), MATH 121 (8 sections), PHYC 160 (1 section), PHYC 167 (5 sections) and BIOL 204 (2 sections). Together these sections served 1,604 enrollments (62.34% of these were for Hispanic or low-income students). STEM Gateway Course Reform Projects involved the participation of 12 UNM instructors (tenure track faculty members and lecturers) and 5 faculty representatives from Central New Mexico College.

To support the institutionalization of reform projects, UNM created a Gateway Course Reform Advisory Council on October 1, 2013. This committee consists of the Dean of Arts & Sciences, the Associate Dean of Engineering, and the Dean of University College, along with department chairs from Chemistry & Chemical Biology and Mathematics & Statistics, and representation from the faculty of Physics & Astronomy.

STEM GATEWAY PEER LEARNING FACILITATOR PROJECT HIGHLIGHTS

In the Spring 2013 semester, 42 Peer Learning Facilitators supported 18 sections of 6 STEM gateway courses. In the Summer 2013 term, 3 PLFs supported 2 sections of 2 courses. In the Fall 2013 semester, 45 PLFs supported 26 sections of 8 courses. The PLF program supported the efforts of 2,379 undergraduate STEM enrollments. Successful completion rates for students who participated in PLF programs were six percentage points higher than for students who participated in non-PLF-supported sections of the same courses (68.8% compared to 62.2%).

STEM GATEWAY STEM STUDENT INTEREST GROUP (SSIG) PROJECT HIGHLIGHTS

In the fall of 2012 STEM Gateway offered 8 sections of traditional SSIGs, with 62 student completions. Of these, 43 (69.3%) were Hispanic or low-income students. In the spring of 2013 we offered 8 sections of traditional SSIGs, with 28 student completions. Of these, 16 (57%) were Hispanic or low-income students. In the fall of 2013 we offered 2 sections of traditional SSIGs and 5 sections of STEM Academy SSIGs, with 52 student completions. Of these, 39 (75%) were Hispanic or low-income students.

Traditional SSIGs were offered for students co-enrolled in at least one of the following courses: CHEM 121 or 122, MATH 150 or 180 or PHYC 151. These sections were offered to students who had expressed interest in at least one of the following disciplines: biology, chemistry, engineering, environmental sciences, and earth & planetary sciences. STEM Academy SSIGs were offered in partnership with the following student support centers: El Centro (specializing in service to Hispanic students), College Enrichment and Outreach Programs (specializing in service to first-generation students) and the Women's Resource Center (specializing in service to female students).

Driven by low enrollment in these courses, STEM Gateway has developed alternative means to help student achieve the SSIG learning outcomes. The first of these is the workshop model. Starting in the late Fall of 2013, grant staff began developing the infrastructure for offering a series of orientations, mentorships, workshops and services designed to assist students in accelerating their acquisition of skills in key SSIG disciplines. These learning opportunities will be offered starting in February 2014, and will focus on the SSIG outcomes as well as content-mastery in specific academic disciplines.

The second of these new models is the skill acceleration SSIG model. STEM Gateway is partnering with the College Enrichment and Outreach Program and the UNM Math Department in a pilot program placing undergraduate tutors/mentors/facilitators in selected Intermediate Math (MATH 101, 102, 103; formerly MATH 120) sections to provide additional structure and support for students enrolled in the Emporium model. STEM Gateway facilitators will work individually with students to accelerate their content mastery and advance through course milestones quickly.

STEM GATEWAY DATA DRIVEN PRIORITIZATION PROJECT HIGHLIGHTS

The Data Driven Prioritization Project made substantial progress including the following areas:

STOP, SWITCH OR STAY: UNDERSTANDING UNDERGRADUATE DEGREE COMPLETION PATTERNS AT THE UNIVERSITY OF NEW MEXICO. This research project focused on the following two questions: (1) How do undergraduate students who graduate with STEM degrees differ from those who switch majors out of STEM, and from those who stop attending UNM prior to completing their degrees? and (2) How do undergraduate STEM students perform in the course math & science gateway courses that lead into their STEM degrees? Research for this project was completed, and findings were shared with UNM faculty, staff, students and administrators.

MYREPORT PROJECT. STEM Gateway organized and funded the development of a DataMart/"MyReport" tool that makes grade distribution patterns more readily available. The STEM Gateway staff worked closely with programmers and analysts from the Office of Institutional Analytics to develop the Grade Distribution Report (GDR). The GDR allows faculty and staff to select courses and subpopulations of students, and then to see the corresponding grade distribution patterns, pass rates, withdraw rates and success rates.

QUALITATIVE PROJECT. Begun in Year One, the qualitative study attempts to understand the Hispanic STEM student experience at UNM through interviews with students who have (1) graduated with STEM degrees, (2) or switched out of their STEM majors, (3) or who stopped attending UNM before completing their STEM degrees. Interviews were conducted with 21 former students, and their responses were coded and summarized in a written report.

COURSE-ON-COURSE IMPACT: Based on the recommendations of the Course Reform teams and the Course Reform Council, STEM Gateway conducted a pilot study course-on-course impact. This study measures the impact of individual sections of foundation courses on student achievement in later more advanced courses.

ADDITIONAL PROGRAM SUPPORT INITIATIVES

Several milestones were reached in improving the operating infrastructure for STEM Gateway, and in progressing towards institutionalization of grant strategies and impact.

In Year Two, the STEM Gateway Website was significantly expanded. This site offers students and other UNM community members access to information about each STEM Gateway program. It also includes a list of our research projects, and links to findings and reports. The website includes links to all formal grant documents, including the original grant application and annual performance reports. It also provides a comprehensive list of presentations by STEM Gateway faculty and staff members, a list of STEM education resources and publications, and a blog written by STEM Gateway staff.

STEM Gateway also increased its impact through professional presentations. In the past year, faculty and staff members associated with STEM Gateway projects have presented STEM Gateway findings and best practices at the New Mexico Association of Student Affairs Professionals, the UNM Mentoring Institute, the Conference on Excellence in Gateway Course Completion, the Alliance of Hispanic Serving Institution Educators, the New Mexico Higher Education Assessment & Retention Conference, and the UNM OSET Success in the Classroom Conference.

STEM Gateway is also collaborating with the UNM Vice President for Research, the Associate Vice President for Student Affairs and representatives from the Provost Office to design and build a UNM STEM Collaboration Center. This center would build upon the successes of the STEM Gateway program, and may provide institutionalization for course reform, institutional research and PLFs upon completion of the grant. The STEM Collaboration Center would provide support services to UNM departments and programs that serve STEM students, bringing into focus institutional resources to address campus-wide challenges in STEM student achievement. The Center would also add new support services available to students, such as a central online clearinghouse of undergraduate research and internship opportunities.

CONTRIBUTIONS MADE TO PRACTICE / LESSONS LEARNED

Successful curriculum and instructional change requires integration of departmental/college leadership with the faculty development plan. This arrangement is analogous to the critical partnership of frontline supervisors with training programs developed around adult learning theory to foster change in the business environment. Frequently changing leadership has made this critical partnership challenging to sustain at UNM and needs to be considered in any project of this scale.

Measurable results of the implementation of substantive curricular and pedagogical change may require more than two semesters. Initial assessment and revision along with challenges of faculty learning how to execute unfamiliar strategies and tools and expansion beyond core-team instructors may require more time. Providing continued faculty-development support over longer time periods is essential.

Invest in the early adopters. The PLF program asks much of faculty. By being effective, friendly, and open, program staff can encourage more faculty members to follow current PLF instructors into the realm of active learning. This change may be slow-going, but it will gain momentum as it progresses.

Section A: Performance Objectives

Project Objective: Objective A.1: Increase student success and retention by developing twelve (12) faculty-driven STEM Gateway course-reform projects to ultimately reach at least 7200 students annually (three (3) projects during the first year).

Check if this is a status update for the previous budget period.

Performance Measure	Measure Type	Quantitative Data					
		Target			Actual Performance Data		
		Raw Number	Ratio	%	Raw Number	Ratio	%
(a) Each year of the grant period, UNM STEM project will support three (3) gateway-STEM course reform projects. For the first two years, develop 6 projects.	Project	6	/		6	/	
(b) The three (3) course-reform projects implemented each year will directly affect at least 1800 student learners initially, and cumulatively more than 7200 by project end.	Project	1800	/		3302	/	
(c) Percentage of students completing each reformed course will improve with course completion by Hispanic and/or low income students to 75% by 2nd semester of reform implementation & 80% by 3rd semester.	Project	2	/		1	/	
(d) Percentage of students completing each reformed course with a grade of C or higher will improve by 2nd semester of reform implementation with an improvement of successful course completion by Hispanic and/or low income students by at least 10% by 2nd semester of implementation and 20% by 3rd semester, compared to the comparable pre-reform statistics for the course.	Project	2	/		1	/	

Explanation of Progress (Include qualitative data and data collection information)

NOTES ON DATA/FINDINGS:

All Data was collected from the UNM student information system (Banner) between the dates of November 1, 2013 and December 15, 2014. The data was collected and analyzed by STEM Gateway staff and by staff from the UNM Office of Institutional Analytics.

(a) Target has been met.

(b) Numbers reported in enrollments rather than individual students, and include enrollments served in the first two years of this project combined. Target is based on Year Two as the initial year when a full slate of courses have been offered. Future targets include: Y3=3600, Y4=5400, Y5=7200. Target has been exceeded, and after only two years we have achieved 46% of the outcome projected for the end of five years.

(c) At the conclusion of Year Two, two course reform courses had completed a second semester of instruction. Of these two, one course reported a completion percentage of 88.05% and the second reported a completion percentage of 74.17% (just 0.83 points below the target). Target was almost met.

(d) For these two courses, one reported an improvement in student success rates of 36% while the second reported no change. Target was not met. During the spring, the Course Reform faculty and staff will develop plans for improving this outcome.

YEAR TWO ACCOMPLISHMENTS

In the fall of 2012, UNM offered sections of the following reformed gateway courses: CHEM 122 (1 section), MATH 121 (8 sections), PHYC 160 (1 section) and PHYC 167 (4 sections). Together these sections served 781 enrollments (69.14% of these were for Hispanic or low-income students). In the spring of 2013, UNM offered sections of the following reformed gateway courses: CHEM 122 (3 sections), MATH 121 (6 sections), PHYC 161 (1 section) and PHYC 168 (3 sections). Together these sections served 917 enrollments (65.98% of these were for Hispanic or low-income students). In the fall of 2013, UNM offered sections of the following reformed gateway courses: CHEM 122 (4 sections), CHEM 122 (3 sections), MATH 121 (8 sections), PHYC 160 (1 section), PHYC 167 (5 sections) and BIOL 204 (2 sections). Together these sections served 1,604 enrollments (62.34% of these were for Hispanic or low-income students).

Cohort 1 redesigns were implemented in Year One and continued in Year Two. These included MATH 121, CHEM 122 and PHYC 169/161.

Cohort 2 redesigns were implemented in Year Two and will be continued in Year three. These included BIOL 204, CHEM 121 and PHYC 140.

In support of the reform projects, professional development opportunities were provided for STEM faculty. Workshops and work sessions were scheduled throughout the year. Cohort 1 redesign teams (CHEM 122, MATH 121, PHYC 160/161) met approximately monthly with co-PI Smith to discuss challenges and accomplishments. Occasional meetings also took place between co-PI Smith and team leaders to address specific concerns with each project. The members of the three Cohort 2 redesign teams (BIOL 204L, CHEM 121, PHYC 140) began their work at the OSET course design institute, Designing Courses for Effective Student Learning, along with 4 additional STEM faculty on May 16-17, 2013. Cohort 2 team members joined the first cohort in monthly meetings beginning in July 2013.

STEM Gateway also hosted two external experts who led workshops that focused on effective pedagogy in STEM courses for all faculty, including the course reform teams. These experts were Saundra McGuire (Chemistry and Assistant Vice Chancellor for Teaching, Learning, and Retention, Louisiana State University), and William Wood (Molecular, Cellular and Developmental Biology, University of Colorado). A total of 64 STEM faculty and graduate student teaching assistants attended these workshops. Both McGuire and Wood also gave public lectures with an estimated total attendance of 135 that were attended by both STEM and non-STEM faculty.

To support the institutionalization of reform projects and to assist in framing and guiding the critical course reform initiatives, UNM created a Gateway Course Reform Advisory Council on October 1, 2013. This committee consists of the Deans of Arts & Sciences, the Associate Dean of Engineering, and the Dean of University College, along with department chairs from Chemistry & Chemical Biology and Mathematics & Statistics, and representation from the faculty of Physics & Astronomy.

ASSESSMENT

Pursuant to evaluating Objective A.1, course enrollment and completion data were collected in redesigned course sections of the three Cohort 1 courses and grade-achievement data were collected in all sections of these same courses. Longitudinal tracking of course completion and grades by course was initiated. Comparisons were made between grade achievement in redesigned sections versus non-redesigned sections of the same course and, where possible, between redesigned and pre-redesigned sections taught by the same instructor. Grade achievement data were compared for all students and for a subset of Hispanic and low-income (Pell-grant eligible) students.

The CHEM 121 and PHYS 160/161 teams collected concept-inventory data in order to test their individual project goals of enhancing conceptual understanding of course content and objectives. These data were analyzed by either comparing pre- and post-instruction results or comparing post-instruction data to that reported from other institutions who have reformed their courses. The MATH 121 team also collected student survey data in redesigned sections during Fall 2012.

During the STEM Gateway Symposium in March 2013, a topical-discussion group reviewed the objectives, organization, and preliminary outcomes of the course-reform component, following a presentation by co-PI Smith. Comments and suggestions arising from this group were recorded and taken under consideration by the Director and co-PIs. Each of the course-reform teams presented posters that described their Fall 2012 redesign efforts and preliminary results at UNM's annual Success in the Classroom: Sharing Practices that Work conference. Although there was no formal recording of feedback to these particular posters from attendees, the presenters reported receiving a number of useful suggestions that they planned to incorporate into their redesign plans. Monthly meetings of the faculty involved in the course-reform efforts provides a continuous source of ideas and constructive criticism on the reform component along with reporting of barriers and pathways toward course-reform success that inform planning and programming choices by the STEM Gateway staff.

FINDINGS

Most members of the course-reform teams and all team leaders were strongly dedicated to the vision of improving student success in their courses. This conclusion is demonstrated by team participation in ongoing meetings and workshops, completion of both formal and informal assessments that guided their decisions on mid-stream adjustments to their original plans, and presentation of initial results at UNM's Success in the Classroom: Sharing Practices that Work conference. In addition, overlap in membership between the first- and second-year cohorts in chemistry and physics demonstrates ongoing commitment to reforming curricula and not only courses.

Some improvements in student success are related to changes that have effects beyond the course-reform teams. For example, although the pedagogical redesign of MATH 121 has so far been implemented by instructors teaching a minority of the MATH 121 students there was improvement in student success (course completion with a grade of C or higher) across all sections, even those not supported by the course redesign efforts. Although there are no experimental controls for identifying the cause(s) of this more general improvement, including factors unrelated to STEM Gateway-supported interventions, it is likely that at least part of the improvement is related to syllabus changes that were implemented across all sections. The course coordinator and course-reform team leader reduced the number of topics covered in the course and revised the exams administered across sections in order to better match the course outcomes developed during the STEM Gateway redesign process. These changes impacted all course sections without changing any expectations in how the content was taught by instructors who are not using all of the redesign components. Further modifications in the topical coverage in the course are being implemented during Fall 2013 and will make it easier for other instructors to gradually adopt the pedagogical changes made by the reform team.

Data collected by the chemistry and physics course reform teams have shown measureable impacts of redesign on student conceptual understanding of the course content. Pre- and post-testing with a chemistry concept inventory shows approximately twice as much gain in conceptual understanding of core concepts in the redesigned sections versus sections taught in Fall 2012 by instructors not using the redesigned pedagogy. Physics concept inventories were administered only in the redesigned courses so direct comparison to students in other course sections were not possible. However the learning gains demonstrated by the UNM students in the redesigned sections were similar to those reported in the literature from other universities who have substantially modified the instruction of calculus-based physics.

Implementation of redesigned course components did not produce anticipated measureable differences in grade achievement between sections utilizing all aspects of the redesign versus those sections taught by instructors who are not, at least at this time, using the redesign team's pedagogical interventions. Where applicable, there also were not significant variations in the grade achievement in courses taught by the same instructors prior to and after course redesign. This lack of change, despite improved conceptual understanding in Chemistry 122 and the physics courses and higher final-exam scores in these three courses indicates the challenges of grades to actual student learning. Each instructor assigns grades based on different criteria, which include variable weighting of homework assignments, curving grades, dropping lowest-exam score, or providing extra-credit opportunities. Although letter grades are the "currency of the realm" for defining student success and access to subsequent courses, there is always a concern that assessment for grades may not be well aligned with learning. Physics and chemistry faculty suggest that measured improvement in conceptual understanding did not equate to improved problem-solving skills, which figure prominently in graded homework and some high-stakes exams.

In addition to the problems of better aligning learning with summative assessment there is also the matter of instructors not successfully implementing new pedagogical approaches. Many faculty possess insufficient knowledge of how to activate the active learning and frequent formative assessment aspects of the redesigned course. Having the right curriculum elements may not matter as much as the implementation. This should not be an unexpected outcome although it was not taken into consideration when evaluation metrics were proposed in the original grant proposal. Research on STEM course reform shows numerous examples of modest gains or no gains in the early stages of some redesigns as instructors develop familiarity and assessment of early interventions inform appropriate modifications that lead to subsequent success. In addition, many of the UNM were teaching the course for the first time at UNM this year.

PLANS FOR IMPROVEMENT

Efforts for improvement during Year 3 are focused on (a) greater involvement by key leadership and (b) modifications to the faculty-development support from STEM Gateway. Successful curriculum and instructional change requires integration of departmental/college leadership with a faculty development plan. STEM Gateway provides the faculty-development component and key leadership has endorsed the objectives of the program. However, the integration of department and college priorities and planning with STEM Gateway initiatives has not engaged leadership to a sufficient degree. STEM Gateway has established a STEM Gateway Course Reform Advisory Council consisting of administrators and other faculty members from Arts and Sciences, Engineering, and University College, along with department chairs and faculty representatives from Chemistry & Chemical Biology, Mathematics & Statistics, and Physics and Astronomy. Beyond assisting with the selection and recruitment of course-reform teams, the council contains the critical leaders (especially the chairs of math, physics, chemistry, and Arts & Sciences Dean) who need to truly support and not simply endorse the work of the teams. The most critical courses to transform are taught in those three departments. We intend to guide the council members to allocate faculty resources and time in ways that show a true priority commitment from departments and deans to achieve and sustain the goals of the course-reform component of STEM Gateway. The faculty-development program to support the course-reform component is being modified to provide more opportunities, and greater expectations for teams to participate in opportunities, to develop confident execution of redesigned instructional approaches. Most faculty in the program are successfully shown why they should teach differently and what pedagogical approaches are best to pursue, but they commonly don't know how to implement those approaches. If a teacher's concrete teaching experience is with a transmissionist, lecture-dominated model, the "how" part of a more constructivist, learner-centered, social, active-learning approach seems abstract. Without experiencing the less familiar instructional style and getting feedback on her or his own teaching it is very difficult for a teacher to effectively make the transition. A corollary to this need to expand the faculty-development effort is inclusion of planning to expand the adoption of reformed course curriculum and pedagogy to instructors beyond the initial reform team. So, far there has only been modest success at expanding the impact of the work accomplished by the initial team. In part, this is because the instructors assigned to teach these courses change each semester, which is a barrier to consistency in the instruction. We hope that the advisory committee will be able to address this challenge. However, this difficulty also reflects inadequate attention to strategies for expansion as part of the STEM Gateway faculty development effort, which are now being built into Year 3 programming.

Although the course-reform design within STEM Gateway is robust, it is appropriate to be flexible to accommodate slightly different models proposed by departments and faculty teams. Overall success is likely to be stronger by climbing from toeholds of opportunity provided by departments. This has already been true in some of the projects; the Physics 160/161 reform focused on problem-solving courses that parallel the gateway course, the Physics 140 team is developing a new bridging course, and the Biology 204L team proposed to focus on the laboratory part of the course but their initiative is also impacting how some of the faculty are teaching the lecture part of the course. The biology example is especially illustrative of how accepting a redesign proposal that was more limited than preferred has led to more widespread pedagogical change than was originally proposed. In the future, partly through the representatives to the advisory council, we intend to start with what faculty are most willing to change in determining the likely effectiveness of the proposed redesign.

Project Objective: Objective A.2: Increase engaging, collaborative classroom learning through the training and deployment of undergraduate Peer Learning Facilitators (PLFs) in large-enrollment STEM gateway courses; to affect at least 3000 students annually (1500 students each semester).

Check if this is a status update for the previous budget period.

Performance Measure	Measure Type	Quantitative Data					
		Target			Actual Performance Data		
(a) Anonymous surveys of students in these classes will show PLF-supported collaborative learning meets needs of at least 80% of surveyed students.	Project	Raw Number	Ratio	%	Raw Number	Ratio	%
			1682 / 2102	80		1901 / 2102	90
		Target			Actual Performance Data		
(b) The STEM PLF program will employ 40 Undergraduates per semester	Project	Raw Number	Ratio	%	Raw Number	Ratio	%
		40	/		46	/	
		Target			Actual Performance Data		
(c) STEM PLFs will work in 15-20 STEM class sections per semester	Project	Raw Number	Ratio	%	Raw Number	Ratio	%
		15	/		22	/	
		Target			Actual Performance Data		
(d) STEM PLFs potentially impact more than 3000 students per year	Project	Raw Number	Ratio	%	Raw Number	Ratio	%
		3000	/		2312	/	
		Target			Actual Performance Data		
(e) Faculty in at least one Gateway course in each of the departments that teach a Gateway life/physical science or mathematics course (Biology, Chemistry, Earth & Planetary Sciences, Mathematics & Statistics, and Physics & Astronomy) will adopt a collaborative learning pedagogy supported by PLFs by the end of the second project year.	Project	Raw Number	Ratio	%	Raw Number	Ratio	%
			5 / 5	100		4 / 5	80
		Target			Actual Performance Data		
(f) Percentage of students completing each PLF supported course section with a grade of C or higher will improve by 2nd semester of implementation the completion by Hispanic and/or low-income students by 10% by 2nd semester and 20% by 3rd semester, compared to the prior success percentage in sections of the same course taught by the same instructor.	Project	Raw Number	Ratio	%	Raw Number	Ratio	%
			6 / 6	100		1 / 6	17
		Target			Actual Performance Data		
(g) The following performance measure has been added since the original application to measure impact at the student level: Students in PLF-supported sections will attain higher course success rates than students in non-PLF-supported sections.	Project	Raw Number	Ratio	%	Raw Number	Ratio	%
			2970 / 4769	62		2379 / 3457	69

Explanation of Progress (Include qualitative data and data collection information)

NOTES ON DATA AND FINDINGS:

All Data was collected from the UNM student information system (Banner) between the dates of November 1, 2013 and December 15, 2014. The data was collected and analyzed by STEM Gateway staff and by staff from the UNM Office of Institutional Analytics.

(a) Target has been exceeded by 10 percentage points

(b)In the Spring 2013 semester, 42 PLFs and 3 associated student workers were employed. In the Fall 2013 semester, 45 PLFs and 2 associated students workers were employed. This creates an average of 46 PLF student workers per semester for Year Two. Target has been exceeded by 15%.

(c) 18 sections were supported in the Spring 2013 semester, and 27 sections were supported in the Fall 2013 semester, creating an average of of 22.5 sections supported. Target has been exceeded by 46%.

(d) Numbers are reported in student enrollments rather than individual students. Actuals fell 23% short of Target. Target has not been met. During the Spring semester, the PLF Advisory Council will develop strategies for increasing the number of students served by PLF sections. The reason for the decline in enrollments/students served from Year One was the inclusion of General Physics problem sections as part of the STEM Gateway Course Reform program. These smaller sections were supported by PLFs, resulting in fewer students served overall. PLF staff will work with the newly created PLF Advisory Council to recruit larger STEM sections for Spring 2013 and Fall 2014.

(e) Attempts to involve the Biology Department in the PLF program are ongoing. Through the use of the Course Reform Initiative, we were able to secure Biology participation in a course reform project. Combined with our continued outreach to Biology faculty, we hope that we will be able to generate participation by this department by Year Four. Target has not been fully met.

(f) Target has not been met. During the first two years of this program, approximately 85 full semester sections have been supported by the PLF progam. Of these, only six sections meet the following criteria: (1) taught by instructors who also taught sections of the same course prior to their participation in the PLF program, AND (2) have completed teaching and grading at least two semesters of PLF-supported sections by October 1, 2013. Of those six, only one showed a 10% increase. In retrospect, this measure is not particularly effective. It excludes instructors who did not teach these courses prior to their involvement with the PLF program; it excludes instructors who left UNM before teaching their second PLF-supported semester; and it disadvantages instructors who came to the PLF program with already high

student success rates. Other measures will be proposed to measure the impact of the PLF program, including the one added in this report, marked (g).

(g) in order to measure program impact at the student level, we have added this performance measure during the past year. The ACTUAL PERFORMANCE DATA number represents the ratio of students in PLF-supported sections who earned "C" grades or higher. The TARGET number represents the success ratio of students in similar sections that were NOT supported by PLFs. In this case, students in PLF-supported sections demonstrated success rates 6.54 percentage points higher than their counterparts in non-PLF-supported sections. This measure illustrates how effectively PLF-supported sections serve students compared to non-PLF-supported sections of the same courses. Target has been exceeded by 6 percentage points.

YEAR TWO ACCOMPLISHMENTS

In the Spring 2013 semester, 42 Peer Learning Facilitators supported 18 sections of 6 STEM gateway courses. In the Summer 2013 term, 3 PLFs supported 2 sections of 2 courses. In the Fall 2013 semester, 45 PLFs supported 26 sections of 8 courses.

The services provided by PLFs include the academic support of introductory Math, Chemistry, Physics, and Earth & Planetary Sciences classes. The PLFs' primary duties are to assist faculty members who are interested in enacting more collaborative learning techniques in large STEM classrooms. Their tasks in this regard may include circulating among students during class to facilitate problem-solving, working with the instructor to assess recurring areas of confusion for students, and low-level grading of homework assignment or in-class tasks. The PLFs also hold outside tutoring hours for students to work with them one-one-one or in small groups. To stay on task with the classroom assignments, PLFs also complete preparatory work each week, as well as attend weekly Professional Development trainings.

STUDENT TRAINING

During Year Two, student employees participated in Pre-Semester Trainings (1-2 days of introductory material in the week before the semester begins) and weekly Professional Development Trainings. Pre-Semester training occurred in the week before UNM classes began, with all new and returning PLFs required to attend. Pre-Semester training agenda items included: navigating the administrative aspects of the PLF job, what to expect during the first weeks of work, explication of job duties and responsibilities, and a meet-and-greet with faculty members. The weekly Professional Development training expanded on the interpersonal aspects of working in the classroom community. PLFs learned about campus resources, learning styles, study skills, and how to navigate tutoring in an active learning environment. Students who miss the weekly Professional Development training have the option to complete a Reflection Sheet, which asks them to think about the interactions in and out of class that week.

PARTNERS

Other stakeholders beyond the faculty and students who PLFs serve and who have participated in the program include Christopher Ramirez (Project Assistant: VP for Equity and Inclusion) and his staff at UNM's Men of Color Initiative, Kelli Hulslander (STEM Advisement Coordinator) and her STEM advising team, and student tutors at the Center for Academic Program Support, as well as their staff members. The stakeholders with whom the PLFs work with the most are the MOCI team. PLFs for the past two semesters have held office hours during the "Boss Up Study Hours" on Wednesdays from 5-7 pm. These hours are set aside as a study hall-type open time for students of any sex or color to work on homework, inquire about graduate school, or simply socialize in an academic setting.

ASSESSMENT

The PLF Program staff team conducts surveys of all participants. Once a semester, the faculty teaching PLF-supported sections and the students enrolled in PLF-supported sections are surveyed. The PLFs themselves are surveyed twice—once at the beginning and once near the end of the semester. The PLFs also evaluate each training session that they attend via a short survey. In this way, staff are able to assess how well their needs are being met and what their concerns are for the future. Overall, the student participants rate the PLFs positively, though they often request more time meeting outside of class than is feasible for the PLF (for example, many request that PLFs hold extensive office hours and review sessions, despite those currently offered not being well-attended). Faculty also rate the PLFs highly.

FINDINGS

The most successful element of the PLF Program is the work done by the PLFs in the classroom with students and faculty. The PLFs are skillful students who thrive in their roles as compassionate experts. They enjoy the work they do, as reflected by their responses to surveys and by the fact that they continue to want to work as PLFs each semester. They value the guidance they get from instructors and actively aim to evolve as students and tutors themselves. In addition, the PLFs build a peer support network amongst themselves where they share experiences and resources to further benefit their work and educational goals.

Less successful elements include the recruitment of new instructors and the expansion into new courses. While we have a committed pool of instructors who support and use the PLF program, new faculty growth is slower than we would like. Working with the PLF program requires instructors to commit to effective active learning classroom techniques. To institute active learning in the classroom, they must re-format and re-create much of the entire course syllabi, as well as consider deeply their learning outcomes. One faculty member commented that, while he likes working with the PLFs and using active learning in the classroom, it is substantially more work for him to teach in this type of setting. While the effectiveness of this methodology may augment the burden of extra work for faculty, the reality remains that this model requires much of an already overtaxed population of instructors.

Particularly absent from the PLF offerings are Biology courses. Despite attempts to recruit biology instructors to the PLF ranks, no classes have yet been added. However, STEM Gateway has recently added a biology project to the Course Reform initiative. It is hoped that this will lead to adding a PLF Biology course in Year Three.

PLANS FOR IMPROVEMENT

The PLF program has articulated two important areas for improvement: (1) Recruiting new and appropriate courses/instructors, and (2) Training, monitoring and evaluating instructors in the use of active learning classroom techniques.

To assist with the first priority, the PLF program will create a PLF Advisory Committee beginning in the spring of 2014. This committee will assist in designing a priority statement for determining which gateway courses/sections are most in need of PLF support. The committee will develop a plan for recruiting new instructors in accordance with the priority document, and a process for determining which courses/sections to support when demand for PLFs exceeds capacity/funding.

To assist with the second priority, the PLF program will sponsor two instructor training workshops per semester that promote active learning techniques, especially those that fit well with the PLF model. Instructors will be required to attend at least one of these trainings per year. In addition, the PLF Instructor Memorandum of Understanding has been revised to mandate an increased level of active learning in the classroom. While the PLF coordinator already conducts regular classroom observations of all PLF sections, the revised MOU will give her the ability to hold instructors accountable to higher standards.

Project Objective: Objective A.3: Increase student retention and success in STEM gateway courses by developing and piloting STEM Student Interest Groups (SSIGs) to shadow sections of at least four gateway courses (two courses during the first year); impacting at least 700 students (100 students in the first year)

Check if this is a status update for the previous budget period.

Performance Measure	Measure Type	Quantitative Data					
		Target			Actual Performance Data		
		Raw Number	Ratio	%	Raw Number	Ratio	%
(a) Throughout the five years of this grant, 15 SSIG sections will be offered	Project	15	/		21	/	
		Target			Actual Performance Data		
		Raw Number	Ratio	%	Raw Number	Ratio	%
(b) Throughout the five years of this grant, at least 150 Hispanic and/or low-income students will complete SSIG sections	Project	150	/		98	/	
		Target			Actual Performance Data		
		Raw Number	Ratio	%	Raw Number	Ratio	%
(c) Throughout the five years of this grant, this SSIG program will impact 700 students	Project	700	/		142	/	
		Target			Actual Performance Data		
		Raw Number	Ratio	%	Raw Number	Ratio	%
(d) Throughout the five years of this grant, SSIG sections will shadow at least four gateway courses	Project	4	/		5	/	
		Target			Actual Performance Data		
		Raw Number	Ratio	%	Raw Number	Ratio	%
(e) Anonymous surveys of students in SSIG sections show at least 80% of students identify SSIG experience as supportive in pursuit of STEM degrees and success in STEM-Gateway courses	Project		62 / 77	81		59 / 77	77

Explanation of Progress (Include qualitative data and data collection information)

NOTES ON DATA/FINDINGS:

All Data was collected from the UNM student information system (Banner) between the dates of November 1, 2013 and December 15, 2014. The data was collected and analyzed by STEM Gateway staff and by staff from the UNM Office of Institutional Analytics.

(a) Targets for the entire five year period of this grant have already been met.

(b) Targets for the entire five year period of this grant have not yet been met, though we are only 35% away from achieving that goal.

(c) Findings are reported by student enrollments rather than individual students. Target for the entire five year period of this grant have not been met, and we are only 23% towards that goal. See below for the plan to improve this outcome.

(d) Targets for the entire five year period of this grant have already been met.

(e) Target has not been met. See below for plan to improve this outcome.

YEAR ONE ACCOMPLISHMENTS

In the fall of 2012 STEM Gateway offered 8 sections of traditional SSIGs, with 62 student completions. Of these, 43 (69.3%) were Hispanic or low-income students. In the spring of 2013 we offered 8 sections of traditional SSIGs, with 28 student completions. Of these, 16 (57%) were Hispanic or low-income students. In the fall of 2013 we offered 2 sections of traditional SSIGs and 5 sections of STEM Academy SSIGs, with 52 student completions. Of these, 39 (75%) were Hispanic or low-income students.

Traditional SSIGs were offered for students co-enrolled in at least one of the following courses: CHEM 121, CHEM 122, MATH 150, MATH 180 or PHYC 151. These sections were offered to students who had expressed interest in at least one of the following disciplines: biology, chemistry, engineering, environmental sciences, and earth & planetary sciences.

STEM Academy SSIGs were offered in partnership with the following student support centers: El Centro (specializing in service to Hispanic students), College Enrichment and Outreach Programs (specializing in service to first-generation students) and the Women's Resource Center (specializing in service to female students). These Academy courses were designed and co-taught by STEM content experts and student-support experts (for instance, academic advisors, professional mentors or other professional staff). Each Academy was offered to meet the strengths and needs of one specific population. Through collaboration with the partner departments, each Academy focused on the needs of their populations, addressing all of the SSIG student outcomes and adding course content and outcomes as needed to improve STEM achievement rates. The Academies did not require students to be co-enrolled in any specific core gateway course, nor did they require any specific STEM degree interest.

Training and support for Academy and Traditional SSIG instructors was extensive. In June 2013, Dr. Gary Smith and Audriana Stark conducted a training workshop for all STEM Academy instructors. Outcomes for the training consisted of instructors having the ability to: explain the purpose of the STEM Academies and why they are important for aspiring STEM majors; explain how the curriculum-design framework of interactive and reflective exercises that promote the STEM Academy outcomes and how the framework is based in research-based learning principles; be ready to begin collaborative development of curriculum components; understand the basic structure of how to assess student mastery of the STEM Academy outcomes; be able to download and upload resources at the SharePoint SSIG-STEM Academy curriculum site; and be able to complete a draft syllabus

Follow-up sessions with instructors were held throughout summer to check progress on curriculum development and syllabus construction. Instructors then participated in professional development opportunities including monthly meetings of the instructional team. These meetings were held throughout the fall and spring semesters for additional follow-up with instructors, sharing of practices, and focused activities (ie. how to engage students with reading). Monthly meetings continue to be held for the STEM Academies.

A separate training was conducted by Dr. Gary Smith and Audriana Stark for the Traditional SSIG instructors. This training was composed of similar components as the STEM Academy workshop with differences attributed to the difference in the course models. It also had an emphasis on the online component given the courses are hybrid.

Recruitment for student participation was also extensive. The following methods were used to recruit student participation during the first two years of this program: Brochures printed and distributed, Inclusion in Freshman Academic Choices book, Individual meetings with advising directors (Engineering, Biology, University), Presentation at UNM Advising Institute, Brochure and announcement sent out over UNM advising listserve, Meeting with staff from American Indian Student Services, Meeting with staff from College Enrichment and Outreach Program, Meeting with staff from El Centro, Meeting with staff from Engineering Student Services, Booth at New Student Orientation sessions, Attendance at CEOP new student orientation luncheons, Posters with tear-offs in STEM buildings, Facebook page for SSIGs, Email sent to all students in companion courses from STEM Gateway, Email sent to all students in companion chemistry courses from instructor, Brochures distributed to students in the dorms, Advertising on student union building plasma screens, and First week visits to companion courses.

ASSESSMENT

This SSIG Program is assessed primarily through three lenses: Student Satisfaction, Enrollment, and Completion. Based on surveys conducted of students enrolled in SSIGs, students are satisfied with their experiences. They feel that their interests in STEM are stimulated through involvement in the courses, and that they walk away with a stronger skillset with which to tackle the high rigor of STEM courses. Completion rates for SSIG sections are satisfactory, especially for STEM Academies.

However, enrollment remains a significant challenge. While the SSIG program is well on the way to achieving most of its objectives by the end of the grant, it has not produced a model that can be sustained or scaled up. Throughout the first two years, we have offered 23 SSIG sections with a total of 142 student completions. This has resulted in an average section size of 6 students. At the same time, our research has shown that an average of 500 first time students each fall semester indicate an interest in STEM degree programs, with only 22% eventually graduating with STEM degrees.

PLANS MOVING FORWARD

Clearly, the SSIG model has not reached the number of students necessary to significantly impact this outcome. Nor have we reached the number of students that would allow us to meet our objective of 700 students impacted by the end of the grant.

On April 5, 2013 we received permission from our program officer to modify the SSIG framework. Under the change request, we added the capacity to serve a greater variety of courses that meet our SSIG outcomes, and we added the capacity to reach students through workshops and out-of-class experiential learning opportunities.

The first new model we developed under this plan was the STEM Academy model described above. It was hoped that by connecting with programs that serve our primary target populations, we would tap into their advising and student support specializations and higher enrollments would follow. This did not materialize. While students and instructors enjoyed the Academy courses, enrollments did not rise significantly over the previous fall semester.

Working against the add-on course model at UNM are two significant factors, both driven by the same trend. Based on STEM Gateway research, we know that the most common time to completion for UNM STEM students is 5 years (approximately 42% of starting students who earn a STEM degree), followed by 4 years (22%) and then by 6 years (21%). Seeing this same trend, the state of New Mexico has developed higher education funding formula initiatives that reward universities for shrinking the time to degree completion for students. Following this, the UNM Provost has encouraged degree programs to reduce the number of credits required to 120 for all bachelor's degrees. In this climate, add-on courses that do not fit as core requirements or degree requirements are simply not seen as viable options by advisors, parents or students.

For Year Three of the STEM Gateway Program, we have developed two new strategies for immediate implementation. Each of these strategies focuses on the same SSIG outcomes and utilizes the same expanded models as approved by the Program Officer on 4/5/13.

The first of these is the workshop model. Starting in the late Fall of 2013, grant staff began developing the infrastructure for offering a series of orientations, mentorships, workshops and services designed to assist students in accelerating their acquisition of skills in key SSIG disciplines. These learning opportunities will be offered starting in February 2014, and will focus on the SSIG outcomes as well as content-mastery in specific academic disciplines. Priority will be given to accelerating knowledge and skills in the following areas: mathematics (especially pre-calculus mathematics), understanding the scientific method, utilizing STEM support resources, strengthening self-advocacy and self-identity (including civic engagement) within STEM, understanding fundamentals of research, and learning UNM STEM degree pathways.

The second of these new models is the skill acceleration SSIG model. Based on research conducted by STEM Gateway, we know that more than 40% of recent STEM graduates began math at the level of college math or lower. STEM students at UNM are not coming to the University with high math skills. And yet, for most STEM students at UNM, pre-calculus mathematics is a dream killer. Among STEM killer-course categories studied, STEM students who enroll in pre-calculus math courses have the lowest STEM degree graduation rate at 15.2. The average for all STEM killer-courses studied is 36.43%. In addressing this challenge, STEM Gateway is partnering with the College Enrichment and Outreach Program and the UNM Math Department in a pilot program placing undergraduate tutors/mentors/facilitators in selected Intermediate Math (MATH 101, 102, 103; formerly MATH 120) sections to provide additional structure and support for students enrolled in the Emporium model. In the Emporium model, students proceed through computerized content at their own pace. This model was newly adapted by UNM in the Fall of 2013, and is the only option available for Intermediate Algebra students. However, it has not yet realized its full potential in student achievement improvements. STEM Gateway facilitators will work individually with students to accelerate their content mastery and advance through course milestones quickly. Facilitators will also be trained on SSIG outcomes, and will work with students individually to help students connect with appropriate STEM support resources. This STEM Gateway sponsored pilot support program could create a model whereby the students most in need of Intermediate Algebra are also the ones most supported in succeeding. At the conclusion of the spring 2014 semester, student achievement rates from pilot sections will be compared to non-supported sections to determine whether this effort improves student course completion rates. If so, STEM Gateway will propose to the Dean of Arts & Sciences that the model be scaled up starting in the Fall of 2014. If we do not see the anticipated increase in student success rates, STEM Gateway will work with the Dean in developing other strategies that improve success in this important gateway course.

Project Objective: Objective A.4: As a consequence of the above objectives (A.1 – A.3), the number of Hispanic and other low-income students receiving Bachelors degrees in life/physical sciences, engineering, and mathematics will increase.

Check if this is a status update for the previous budget period.

Performance Measure	Measure Type	Quantitative Data					
		Target			Actual Performance Data		
		Raw Number	Ratio	%	Raw Number	Ratio	%
(a) As a consequence of the above objectives, the number of Hispanic and other low-income students receiving Bachelors degrees in life/physical sciences, engineering, and mathematics will increase.	Project	325	/		340	/	

Explanation of Progress (Include qualitative data and data collection information)

NOTES ON DATA AND FINDINGS:

All Data was collected from the UNM student information system (Banner) between the dates of November 1, 2013 and December 15, 2014. The data was collected and analyzed by STEM Gateway staff and by staff from the UNM Office of Institutional Analytics.

(a) In Year One, the baseline was established for this measure as the 2011-12 Academic Year. During Year Two, this number has already increased.

Project Objective: Objective B.1: CNM and UNM departments will concur on learning outcomes and assessment of learning achievement for essential STEM-Gateway courses in order to improve curriculum alignment for transferring students.

Check if this is a status update for the previous budget period.

Performance Measure	Measure Type	Quantitative Data					
		Target			Actual Performance Data		
		Raw Number	Ratio	%	Raw Number	Ratio	%
(a) CNM and UNM departments will concur on learning outcomes and assessment of learning achievement for essential STEM-Gateway courses in order to improve curriculum alignment for transferring students.	Program	6	/		6	/	

Explanation of Progress (Include qualitative data and data collection information)

NOTES ON DATA AND FINDINGS:

All Data was collected from the annual reports submitted by Course Reform Team Chairs, and from conversations with individual course reform team members.

(a)Target has been met. Each course reform team includes membership from Central New Mexico College that facilitates the alignment of learning outcomes and assessments for those courses. For more information on progress towards this objective, please reference the Course Reform narrative under the Objective A1. In addition, the STEM Gateway program is closely connected to the STEMP UP program (H.S.I. Collaborative Grant), helping to strengthen the student pathways between CNM and UNM.

Project Objective: Objective C.1: To develop sustainable capacity to track student achievement, by race/ethnicity and income level (measured by Pell Grant or similar parameter), through the STEM-majors curricula and based on courses taken at UNM or other institutions.

Check if this is a status update for the previous budget period.

Performance Measure	Measure Type	Quantitative Data					
		Target			Actual Performance Data		
		Raw Number	Ratio	%	Raw Number	Ratio	%
Establish by Grant Year One end, query structures in enrollment data needed to build/analyze data sets for: 1. Final-grade-achievement distribution of students in STEM Gateway Courses *Where in course-by-course progress toward a STEM degree, students change to non-STEM major or depart UNM 2. Course-retaking patterns of students withdrawing or failing Gateway courses with prior course grades and entrance-exam scores 3. Success of declared or aspirant STEM majors among transfer students (with focus on Hispanic, low-income and students transferring from CNM) in subsequent STEM courses at UNM to identify needs for inter-institutional curricular and assessment adjustments and to guide articulation and transfer agreements.	Project	3	/		2	/	

Explanation of Progress (Include qualitative data and data collection information)

NOTES ON DATA/FINDINGS:

This information was collected from reports submitted by Grant Staff and by regular staff meeting updates.

(a) Target has been partially met. The first two of these tools and studies have been created and are in use. The third is under development for Year Three completion.

YEAR TWO ACCOMPLISHMENTS

The Data Driven Prioritization Project has made substantial progress in the following areas:

COURSE REFORM IMPACT ANALYSIS. The first cohort of Course Reform projects began their collaborations in Year One, and offered courses starting in Year One and continuing through Year Two. In the Summer of 2014, STEM Gateway staff collected and reported grade distribution patterns of reformed sections, aggregated by instructor, student ethnicity and student income level. Staff also collected and reported similar data for two types of baseline sections: (1) sections offered by the same instructors before their reform efforts began, and (2) sections offered by non-reform instructors during the same semesters that reformed sections were offered. Results of these analyses were shared with Gary Smith and with the lead instructor on each Course Reform project. Reports are also made available to all primary STEM Gateway staff.

STOP, SWITCH OR STAY: UNDERSTANDING UNDERGRADUATE DEGREE COMPLETION PATTERNS AT THE UNIVERSITY OF NEW MEXICO. This research project focused on the following two questions: (1) How do undergraduate students who earn STEM degrees differ from those who switch majors out of STEM, and from those who stop attending UNM prior to completing their degrees? and (2) How do undergraduate STEM students perform in the course math & science gateway courses that lead into their STEM degrees? The structure for this study was designed in Year One, and further refined in Year Two. Data for this study was collected in both Year One and Year Two. Data was organized and analyzed by Grant Staff in Year Two. Data was reported to the PIs and other Grant Staff in Year Two. De-identified data was collected into sub-reports and posted to a restricted website in Year Two in preparation for focus group discussions. A focus group meeting was held in April, 2013 in the Office for Support of Effective Teaching. More than 20 STEM Gateway stakeholders participated in the discussions, including STEM faculty members, administrators, students, graduate students and professional staff. At this event, the summarized data was presented to participants, and the stakeholders were then divided into smaller discussion groups. Each group discussed the implications and limitations of the data, and proposed future questions for further study. Responses from these groups were collected and made available to the PIs and other UNM administrators. STEM Gateway and OIA staff then presented a subset of preliminary findings to the UNM Student Data Group in the spring of 2013. This committee includes representation from across the UNM main campus. The Project Director presented preliminary findings from this study at the Annual Gateway Course Experience conference in Indianapolis in April, 2013. The PowerPoint slides from both of these presentations are posted on the STEM Gateway website. Findings have also been presented to staff from the STEM UP program, to the Course Reform Advisory Council and to other campus organizations. Findings will soon be presented to the Provost Committee on Academic Success and at the New Mexico Higher Education Assessment & Retention Conference. Each presentation's PowerPoint slides are made available on the UNM STEM Gateway website.

PHYSICS DATA ANALYSIS. The Physics Course Reform asked the STEM Gateway research staff to collect and analyze data that might help create pre-requisites for General Physics that are more closely correlated to student achievement. The STEM Gateway staff collected the following variables: ACT/SAT Scores and subscores; Grades in pre-requisite math courses; COMPASS scores; simultaneous or other enrollment in General Physics and Calculus; Length of time since last math course completion; and Degree Program. Findings have been shared with the Physics course reform team, and will also be shared with other faculty members within the Physics department.

MYREPORT PROJECT. On February 22, 2013, the STEM Gateway Program was granted permission by our Program Officer to fund the development of a DataMart infrastructure and a "MyReport" tool that makes grade distribution patterns more readily available. The STEM Gateway staff worked closely with programmer and analysts from the Office of Institutional Analytics to develop the Grade Distribution Report (GDR). The GDR allows faculty and staff to select courses and subpopulations of students, and then to see grade distribution patterns, pass rates, withdraw rates and success rates. This function allows staff to review the effectiveness of grant strategies on-demand, without needing to request the data from OIA staff members. The GDR was completed in September, 2013. Access to this report has been given to members of the Course Reform Council (including the Deans of Arts & Sciences and Undergraduate College) and their designees. Discussions are currently scheduled to develop permissions protocols for this report for other faculty and staff at UNM, in order to expand its institutional impact beyond STEM. The GDR was utilized in the completion of this Annual Performance Report. Under this DataMart project, two other reports were also developed: STEM Student GPA by Major (to compare student cumulative GPAs by major) and Students by Major in STEM Courses (to view which majors and in what frequencies are represented in STEM courses).

QUALITATIVE PROJECT. Begun in Year One, the qualitative study attempts to understand the Hispanic STEM student experience at UNM through interviews with students who have (1) graduated with STEM degrees, (2) or switched out of their STEM majors, (3) or who stopped attending UNM before completing their STEM degrees. Interviews were conducted with 21 former students, and their responses were coded and summarized in a written report. This project was completed in collaboration with Dr. Carlos Lopez Leiva, Associate Professor of Language, Literacy and Sociocultural Studies. This project was mostly concluded by September 2013, with the first draft report presented to Grant Staff in October 2013. Findings from this report will be shared at the New Mexico Higher Education Assessment & Retention Conference in February 2014. Findings will also be shared with key UNM faculty members and administrators in the spring of 2014. PowerPoint slides of these presentations will be available publicly on the STEM Gateway website. Dr. Lopez and STEM Gateway staff will also seek publication in peer-reviewed journals during the spring.

COURSE-ON-COURSE IMPACT: Based on the recommendations of the Course Reform teams and the Course Reform Council, STEM Gateway conducted a pilot study course-on-course impact. This study measures the impact of individual sections of foundation courses on student achievement in later more advanced courses. Driving this study was the assumption that using section grades as the primary measure of effective instruction is not sufficient. Simply put, some instructors grade tough, and others grade easy. A "C" grade in one section of General Physics may equate to a "B" grade in another section taught by another instructor. Since General Physics prepares students for future courses in engineering, chemistry, biology and geology, the real measure of effectiveness is how well General Physics students perform those subsequent courses. The course on course impact study creates a model where effectiveness in foundation courses can be measured based on student success in subsequent courses.

FUTURE PLANS

Year Three plans include the continuation of year two projects, including the continued distribution of findings to key UNM personnel and to educators at other similar institutions. Year Three also includes the development of three new major initiatives:

COURSE-ON-COURSE IMPACT DATA MART TOOL: Contingent upon approval of the Year Two Budget Carry-forward Plan, STEM Gateway intends to build upon the course-on-course impact model developed in Year Two. This model will be built as an online MyReport tool, where faculty and administrators can design their queries and collect the data on demand, rather than requesting it through the Office of Institutional Analytics. As with the GDR, permissions will automatically be granted to members of the STEM Gateway Course Reform Council, and a protocol for granting permissions to other faculty, administrators and staff members will be developed in cooperation with the Provost Office.

TRANSFER STUDENT STEM EXPERIENCE STUDY: The Stop, Switch or Stay study examined the UNM STEM experience from the perspective of a first-year student. However, many of UNM's STEM students transfer in from other institutions. The Transfer Student STEM Experience study will answer questions similar to those described above for Stop, Switch or Stay, but will ask them from the perspective of transfer students. This project will be developed in cooperation with other departments at UNM, including the Office of Institutional Analytics, the Center for Education Policy Research, University College, STEM UP, and Enrollment Management. We anticipate that it will be completed in the Fall of 2014.

MATH EXPERIENCE AT UNM: Our previous research has illustrated the importance of pre-calculus mathematics to STEM degree attainment. We have seen this illustrated in the Stop, Switch or Stay study, as well as in the Math Course Completion study completed in Year One. These studies have underscored our need to dive deeper into the math experience. Beginning in the spring of 2014, STEM Gateway staff will partner with faculty from the Math Department and administrators from the Dean of Arts & Sciences office to design and conduct institutional research into pre-calculus mathematics student success. Key to this study will be understanding which students are most successful in the current model, and how UNM can better serve the students who are failing. We anticipate project completion in the Fall of 2014.

Project Objective: Objective A.5. Improvement of student persistence and degree attainment in STEM fields will improve campus-wide retention and graduation rates as STEM aspirants represent a significant proportion of incoming students.

Check if this is a status update for the previous budget period.

Performance Measure	Measure Type	Quantitative Data					
		Target			Actual Performance Data		
		Raw Number	Ratio	%	Raw Number	Ratio	%
(a) Campus-wide 3rd semester retention rates will increase over baseline (2010-11 Academic Year)	Project	76	/		77	/	
		Target			Actual Performance Data		
		Raw Number	Ratio	%	Raw Number	Ratio	%
(b) Campus-wide STEM graduation numbers will increase over baseline (2011-12 Academic Year)	Project	521	/		536	/	

Explanation of Progress (Include qualitative data and data collection information)

NOTES ON DATA/FINDINGS:

All Data was collected from the UNM student information system (Banner) between the dates of November 1, 2013 and December 15, 2014. The data was collected and analyzed by STEM Gateway staff and by staff from the UNM Office of Institutional Analytics.

(a) Baseline data for this objective was established in Year One as the 2010-2011 academic year. The target number shows the third semester retention rate for the Fall 2010 freshman cohort. The actuals number shows the third semester retention rate for the Fall 2011 freshman cohort. For year two, this objective has been met.

(b) Baseline data for this objective was established in Year One as the 2011-2012 academic year. Since graduation rates for incoming students will not be available for four years, we are instead reporting the number of STEM bachelor's degrees awarded. The target number shows the STEM awards in 2011-12, and the actuals number shows the STEM awards in 2012-2013. For year two, this objective has been met.

NOTE ON BASELINE YEARS: 2011-2012 was selected as the baseline year for graduation because it represented the last set of students who would likely not be impacted by STEM gateway programming. 2010-2011 was selected as the baseline year for retention because it represented the first cohort of incoming students who would likely be impacted by STEM gateway programming. This discrepancy is due to our initial roll-out of services primarily aimed at first and second year STEM students.

Section B: Budget Information

BUDGET INFORMATION

TOTAL BUDGET EXPENDITURES YEAR ONE: $469,012
TOTAL BUDGET EXPENDITURES YEAR TWO: $900,797
PROPOSED CARRY_FORWARD TO YEAR THREE: $52,951

CARRY FORWARD JUSTIFICATION

DataMart Project. In the Year One Carry-Forward request, STEM Gateway originally estimated the cost of the DataMart/MyReport project at $58,187. However, we were able to achieve our outcomes (the development of the DataMart infrastructure and the Grade Distribution Report) for only $29,462. This left a carry-forward of $28,725 in salaries and benefits.

Changes in Institutional Research Approach. In the Year One Carry-Forward request, STEM Gateway developed a new method for partnering with the Office of Institutional Analytics in collecting and analyzing data. Prior to that point, UNM STEM Gateway hired an institutional researcher directly, and that individual resigned from her position on 11/11/2012. The new model called for OIA to provide this service to STEM Gateway, receiving compensation for one FTE position (40 hours per week), and started on February 23, 2013. The time gap between models and the start-up time required for OIA to hire and train new staff resulted in a carry-forward of $24,226 in salaries and benefits.

Together these sources accounted for $52,951 in carry-forward.

PROPOSED CARRY-FORWARD PLAN. We propose to utilize these funds accordingly:

Expand the number of Peer Learning Facilitator sections offered, especially in large lecture classes. This will assist STEM Gateway in meeting our goal of impacting 3000 students per year. This expansion will result in additional costs in student salaries of approximately $10,000, and will expand our PLF pool by 5 student positions per semester.

Expand upon the DataMart project funded with Year One Carryover to fund the creation of a Course on Course Impact Report tool. This model will be built as an online MyReport tool, where faculty and administrators can design their queries and collect the data on demand, rather than requesting it through the Office of Institutional Analytics. As with the GDR, permissions will automatically be granted to members of the STEM Gateway Course Reform Council, and a protocol for granting permissions to other faculty, administrators and staff members will be developed in cooperation with the Provost Office. This expansion will allow STEM Gateway to more fully evaluate the impact of Course Reform and PLF initiatives. It will require additional one-time funding in employee salaries or graduate assistant salaries (depending on where the programming expertise is found) of $18,000, including benefits.

Under the SSIG model, develop and/or expand one or both of the following initiatives (depending on success of the current skill acceleration pilot and on available funding):

Skill acceleration SSIG model. STEM Gateway is partnering with the College Enrichment and Outreach Program and the UNM Math Department in a pilot program placing undergraduate tutors/mentors/facilitators in selected Intermediate Math (MATH 101, 102, 103; formerly MATH 120) sections to provide additional structure and support for students enrolled in the Emporium model. In the Emporium model, students proceed through computerized content at their own pace. This model was newly adapted by UNM in the Fall of 2013, and is the only option available for Intermediate Algebra students. However, it has not yet realized its full potential in student achievement improvements. STEM Gateway facilitators will work individually with students to accelerate their content mastery and advance through course milestones quickly. Facilitators will also be trained on SSIG outcomes, and will work with students individually to help students connect with appropriate STEM support resources. This STEM Gateway sponsored pilot support program could create a model whereby the students most in need of Intermediate Algebra are also the ones most supported in succeeding. At the conclusion of the spring 2014 semester, student achievement rates from pilot sections will be compared to non-supported sections to determine whether this effort improves student course completion rates. If so, STEM Gateway will propose to the Dean of Arts & Sciences that the model be scaled up starting in the Fall of 2014. If we do not see the anticipated increase in student success rates, STEM Gateway will work with the Dean in developing other strategies that improve success in this important gateway course.

STEM Student Mentorship Program. Under this model, UNM would hire graduate students within the STEM degree programs to provide one-to-one mentorship for new STEM students. STEM Gateway research has demonstrated that students are most likely to leave their STEM degree programs during their first three semesters, well before they have enrolled in their upper level degree courses and began interacting with their discipline tenured faculty members. By creating a mentorship program linking graduate and undergraduate students, UNM will empower new STEM students to connect to their departments sooner, to fully utilize departmental support resources, and to sustain their enthusiasm for their chosen degrees. In developing this program, STEM Gateway would partner with the student support services that most directly assist traditionally underserved students (including El Centro, CEOP and the Women's Resource Center) and with student support programs within the academic disciplines (such as Engineering Student Services and the Arts & Sciences Advising Center). This mentorship program will also partner with the Math Department's pre-calculus support initiatives to promote student achievement in Intermediate College Algebra and College Algebra sections.

Depending on the extent to which the Skill Acceleration model is effective, one or both of these programs would be developed in Year Three. Carry-forward contribution toward this combination of programs would cost $24,951. This funding would be in the form of undergraduate or graduate student salaries and benefits.

Section C: Additional Information

STEM GATEWAY PARTNER DEPARTMENTS AT THE UNIVERSITY OF NEW MEXICO

College of Arts & Sciences (individual faculty members, departments and student programs)
School of Engineering (individual faculty members, departments and student programs)
Undergraduate College (individual faculty members, departments and student programs)
Department of Student Services, Division of Student Affairs
STEM UP program
Office of Institutional Analytics
Men of Color Initiative
El Centro de la Raza (Hispanic student serving organization)
Graduate Resource Center
Women's Resource Center
Office of Support for Effective Teaching
University Advisement
UNM Provost Office
Office of the Vice President for Research
Center for Academic Program Support
UNM Human Resources