2015 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: Natalie Robinson Bruner Title: Program Manager
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Reporting Period Information

7. Reporting Period: From: 10/01/2014 To: 09/30/2015

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	$898,990.00	$0.00
b. Current Budget Period	$701,635.00	$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?

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Executive Summary

The Project for Inclusive Undergraduate STEM Success (branded as STEM Gateway at the University of New Mexico) has completed a successful fourth year of operation.

ADMINISTRATIVE CHANGES

In Year Four, STEM Gateway focused on institutionalization efforts. For instance, STEM Gateway has rebranded the program to look more like a University of New Mexico department and help facilitate the institutionalization of the grant's components. This included creating a new website within the university's domain and using a new university-approved logo as of Fall 2015. STEM Gateway has also identified established university departments to partner with to institutionalize each component of the grant. In Year Five, STEM Gateway plans to host a colloquium on STEM Inclusive Excellence to help inform more stakeholders about the issues that surround diversity in STEM and providepractical applications for future implementation.

PROJECT HIGHLIGHTS: COURSE REFORM

In the fall of 2014, UNM offered sections of 8 redesigned gateway courses which covered 70 sections. Together these sections served 3,043 enrollments (65.82% of these were for Hispanic or low-income students). In the spring of 2015, UNM offered sections of 7 redesigned gateway courses which covered 58 sections. Together these sections served 2,370 enrollments (60.42% of these were for Hispanic or low-income students). In the summer of 2015, UNM offered sections of 5 redesigned gateway courses which covered 15 sections. Together these sections served 303 enrollments.

For the Course Reform project, two out of four performance objectives were met in Year Four.

PROJECT HIGHLIGHTS: PEER LEARNING FACILITATORS

In the Spring 2015 semester, 42 Peer Learning Facilitators (PLFs) supported 23 sections of 9 STEM Gateway courses. In the Summer 2015 term, 4 Peer Learning Facilitators supported 3 sections of 2 STEM Gateway courses. In the Fall 2015, 42 PLFs supported 28 sections of 12 STEM Gateway courses. Fall 2015 also marked the expansion of the PLF program in the Biology department, as their Year Four course redesign included PLFs.
Successful completion rates for students who participated in PLF programs were four percent higher than for students who participated in non-PLF-supported sections of the same courses (67.99% compared to 64.44%).
For the PLF project, seven out of nine performance objectives were met in Year Four.

PROJECT HIGHLIGHTS: SSIGs

Between October 2014 and May 2015, STEM Gateway continued work on two of the initiatives started in February 2014: Students for STEM Success (S3) with 193 participants; and the Achievement & Exploration Opportunities & Networking (AEON) STEM workshop series with 189 participants. These initiatives were transferred over to the STEM Collaborative Center for continued development and both initiatives were well-aligned with their goals. STEM Gateway did not continued with these initiatives after the conclusion of the Spring 2015 semester. STEM Gateway's efforts were focused on the Essential Academic Skills Enhancement (EASE) workshop series (2602 participants). Additional initiatives implemented were STEM focused presentations to select audiences and a re-launch of the STEM Gateway website.
For the SSIG project, all five Performance Objectives have been met.

PROJECT HIGHLIGHTS: DATA DRIVEN DECISION MAKING

During Year Four, STEM Gateway completed the (1) UNM Stem Transfer Students: Achievement and Issues, (2) Course Redesign Analysis, (3) Impact of Collaborative Learning: Peer Learning Facilitators in Gateway Courses, and (4) Mock Final Impact. Key findings are reported under performance objective C.1.

For the Data-Driven Decision Making project, all performance objectives have been met in Year Four.

INSTITUTIONALIZATION EFFORTS: COURSE REFORM

STEM Gateway has been planning to arrange for ongoing support of course redesign efforts within the Center for Teaching Excellence (CTE), which is the main campus faculty development office. However, CTE was involved in a reorganization during Year 4, which combined it with existing student academic support programs into a single Center for Teaching and Learning (CTL). During Year Five, CTL will hire a new Associate Director for faculty development with a STEM emphasis, in recognition of the importance of ongoing initiatives such as STEM Gateway. The STEM Gateway PIs have met with the CTL Executive Director to layout a generalized plan for institutionalizing aspects of the STEM Gateway redesign projects within CTL. Those plans will move forward in Year 5 after the new Associate Director is hired.

INSTITUTIONALIZATION EFFORTS: PEER LEARNING FACILITATORS

The institutionalization plan in partnership with the Center for Academic Program Support (CAPS) was expanded in Year Four. The CAPS office at UNM oversees tutoring and supplemental instruction efforts for the University. To assess the compatibility of the PLF program with the CAPS structure, they launched a pilot PLF program in collaboration with STEM Gateway to serve 12 sections of four courses during Year Four. In addition, Year Four resulted in both programs developing a detailed institutionalization plan that includes program modifications to implement, as well as funding requests to submit. STEM Gateway and CAPS composed a joint application for funding during Year Four to be submitted to the Student Fee Review Board in Year Five.

Year Five will also include additional funding requests and the fulfillment of the institutionalization plan. STEM Gateway is currently on track to transition the PLF program to CAPS by the Fall 2016 semester.

INSTITUTIONALIZATION EFFORTS: SSIGs

With the recent implementation of the new SSIG model in Spring 2015, we have preliminary data on the impact of the model on student achievement. The initial impact of this model is attractive to the biology department. The workshop series are currently required by all students who take any course in the biology core. The biology lab coordinator has committed to continuing the new model in the biology core upon completion of the grant. In Year Five, we will present this data to the chair of the department in order to seek funding. The chair of the biology department is a member of a STEM Gateway Course Redesign Team, has attended STEM Gateway Symposiums (held annually during Years Two and Three), and is consequently well-informed as to STEM Gateway initiatives.

INSTITUTIONALIZATION EFFORTS: DATA DRIVEN PRIORITIZATION

The initial plan to seek funding from the Provost to continue the STEM Gateway institutional researcher position has been offset due a change in leadership of the Office of Institutional Analytics (OIA). STEM Gateway has begun working with the Student Affairs Assessment & Research (SAAR) director to continue the university's efforts in data analysis related to STEM. This includes a self-populating dashboard that will be hosted on the SAAR website. In addition with the help of SAAR and OIA, Gateway plans to create another Datamart page to help continually assess the state of STEM courses. In Year Five, efforts will be focused on developing these initiatives that can be sustained beyond the grant.

CONTRIBUTIONS MADE TO PRACTICE / LESSONS LEARNED

Members of the course-redesign teams are strongly dedicated to the vision of improving student success in their courses. In particular, formal and informal discussions about teaching and learning have spread among 6 gateway course instructors in math, biology, and chemistry. Thus changes from the course redesign began to impact other courses and their departments' cultures. This is evident in that it has become increasingly difficult to separate redesigned sections from non-redesigned sections or partially-redesigned sections of a course, as was done in the past. Particular elements of the redesign are being used to varying extents across the course sections without a clear indication to what extent they are being used. Dissemination/expansion across sections has not been consistent, but arguably that all sections have been "touched" by the redesign process for several courses.

The Peer-Learning Facilitator program requires follow-up to maintain the consistency of the program. As the PLF program grows in both size and reputation, many interested new instructors do not always have the opportunity to work with PLFs, due to limited resources. This requires better utilization of a process that treats the proposal process as a screening tool. As a result, PLFs have been properly incorporated by instructors with the selected proposals. Support for these instructional teams are best implemented through a customized contract, continued through check-ins and end-of-semester semester data analysis.

The SSIGs model of connecting student support programs to specific courses strengthens buy-in and effectiveness. When implementing the workshops, students felt the greatest value was gained when the focus was on the acquisition of applicable skills for the associated class. Also, workshops must be a mandatory component of the course. Once workshops were made optional student attendance dropped drastically.

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 four years, develop 12 projects.	Project	12	/		14	/	
(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	5400	/		6926	/	
(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	15	/		12	/	
(d) Percentage of students completing each reformed course with a grade of C or higher will improve by 2ndsemester 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	9	/		5	/	

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) in December 2015. The data were collected and analyzed by STEM Gateway staff.

(a)Target has been met. Five courses were chosen and are under development/pilots for the year. (BIO 203/203L; CHEM 101; CHEM 131; CHEM132; ENVS 102L)

(b) Numbers reported in enrollments rather than individual students, and include enrollments served in the first four years of the project combined. Target is based on Year Four as the initial year when the full slate of courses were selected. Future targets: Y5=7200. Target has been exceeded; we have achieved 89.88% of the outcome projected for the end of five years.

(c)At the conclusion of Year Four, 10 redesign courses had completed a second semester of instruction and 5 of them had completed a third semester. 8 out of 10 courses met the target of 75% course completions in the second semester. All five persisting redesign projects persisting to the third semester met the target of 80%. (See “Status of Projects” for explanation of PHYC 160 and 161). Target not met.

DETAIL:

Cohort 1
CHEM 122: Second Semester Offered 88.1; Third Semester Offered 84.8
MATH 121: Second Semester Offered 74.2; Third Semester Offered 84.4
PHYC 160: Second Semester Offered 66.1; Third Semester Offered N/A
PHYC 161: Second Semester Offered 70.4; Third Semester Offered N/A

Cohort 2
BIOL 204L: Second Semester Offered 94.3*; Third Semester Offered 92*
CHEM 121: Second Semester Offered 85.2; Third Semester Offered 69.4*
PHYC 103: Second Semester Offered 100*; Third Semester Offered 100*

Cohort 3
BIO 202: Second Semester Offered 99*
BIO 204: Second Semester Offered 94.3*
MATH 153: Second Semester Offered 82*

*Indicates data that has been updated from the 2014-2015 annual report.

(d) For the nine previously taught, five met the target of improving success by 10% the 2nd semester (BIOL 204 (L)). There were not any courses that met the target of improving success by 20% for the 3rd semester although two courses met this metric in the second semester. See further analysis.

COHORT 1
CHEM 122: Baseline Semester (Success Pct) 61% Second Semester Offered (Success Pct) 73% Third Semester Offered (Success Pct) 63%
SUCCESS % CHANGE SECOND SEMESTER 19% SUCCESS % CHANGE THIRD SEMESTER 3%
MATH 121: Baseline Semester (Success Pct) 55% Second Semester Offered (Success Pct) 58% Third Semester Offered (Success Pct) 65%
SUCCESS % CHANGE SECOND SEMESTER 5% SUCCESS % CHANGE THIRD SEMESTER 18%
PHYC 160: Baseline Semester (Success Pct) 47% Second Semester Offered (Success Pct) 40% Third Semester Offered (Success Pct) N/A
SUCCESS % CHANGE SECOND SEMESTER -14% SUCCESS % CHANGE THIRD SEMESTER N/A
PHYC161: Baseline Semester (Success Pct) 37% Second Semester Offered (Success Pct) 33% Third Semester Offered (Success Pct) N/A
SUCCESS % CHANGE SECOND SEMESTER -12% SUCCESS % CHANGE THIRD SEMESTER N/A

COHORT 2
BIOL 204L: Baseline Semester (Success Pct) 73% Second Semester Offered (Success Pct) 91% Third Semester Offered (Success Pct) 83%*
SUCCESS % CHANGE SECOND SEMESTER 24% SUCCESS % CHANGE THIRD SEMESTER 14%*
CHEM 121: Baseline Semester (Success Pct) 70% Second Semester Offered (Success Pct) 67% Third Semester Offered (Success Pct) 69%*
SUCCESS % CHANGE SECOND SEMESTER -4% SUCCESS % CHANGE THIRD SEMESTER 0%*
PHYC 103: Baseline Semester (Success Pct) N/A Second Semester Offered (Success Pct) 100%* Third Semester Offered (Success Pct) 100%*
SUCCESS % CHANGE SECOND SEMESTER N/A SUCCESS % CHANGE THIRD SEMESTER N/A

COHORT 3
MATH 153: Baseline Semester (Success Pct) 52%** Second Semester Offered (Success Pct) 65%* Third Semester Offered (Success Pct) N/A
SUCCESS % CHANGE SECOND SEMESTER 24% SUCCESS % CHANGE THIRD SEMESTER N/A
BIO 204: : Baseline Semester (Success Pct) 69%* Second Semester Offered (Success Pct) 82%* Third Semester Offered (Success Pct) N/A
SUCCESS % CHANGE SECOND SEMESTER 18% SUCCESS % CHANGE THIRD SEMESTER N/A
BIO 202: : Baseline Semester (Success Pct) 79%* Second Semester Offered (Success Pct) 88%* Third Semester Offered (Success Pct) N/A
SUCCESS % CHANGE SECOND SEMESTER 11% SUCCESS % CHANGE THIRD SEMESTER N/A

*Indicates data that has been updated for the 2014-2015 annual report.
**Math 153 baseline is determined by taking the average of the baseline for Math 123 and Math 150 since Math 153 is a new course that combines Math 123 and Math 150.

STATUS OF PROJECTS

From the three Cohort 1 redesign teams that were implemented in Year One, two continued in Year Four and are projected to continue into year Five. Cohort 1 included MATH 121, CHEM 122 and PHYC 160/161. The PHYC 160/161 projects were not continued in Year Three by the Physics faculty who felt it is necessary to demonstrate longitudinal evidence of improved student persistence and achievement in order to support the change effort; hence, the absence of data for PHYC 160/161 in the third semester.

From the three Cohort 2 redesigns that were implemented in Year Two, two continued in Year Four and are projected to continue into Year Five. The teams included BIOL 204L, CHEM 121 and PHYC103. In the absence of clear placement criteria for encouraging or requiring students to enroll in the PHYC 103 course it has been difficult to attract enrollment necessary to sustain this potentially beneficial curriculum addition. PHYC 103 is no longer being offered; hence, the absence of data for PHYC 103 in the third semester. However, exercises and assessments that were developed by the redesign team are being utilized in other courses.

Three Cohort 3 redesign teams were implemented in Year Three and continue in Year Four. These redesign projects are projected to continue into Year Five. The projects included MATH 153, BIO 202/202L, and BIO 204. MATH 153 combines trigonometry (3 credits) and pre-calculus (3 credits) into one 5 credit course to remove redundancies from the courses and shorten time to degree completion for STEM students. Notably, the CNM participants on the redesign teams showed little engagement with the redesign process after the Course Redesign Institute provided at the beginning of the annual projects. This issue also appeared in some earlier cohorts. CNM faculty have very little incentive, working as individuals from their institution, to contribute to redesign projects that are likely to have immediate impact at UNM. Isolation of CNM faculty from the multiple UNM participants on each team also limits their impact.

Five Cohort 4 redesign teams were implemented in Year Four and will continue onto Year Five. The projects include ENVS 102, CHEM 101, CHEM 131, CHEM132, and BIO 203/203L. Two of the projects involved a two-person partnership rather than a team of 4-5 members. Teams were not required to include a faculty member from CNM given concerns that arose with CNM faculty participation in Cohort 3. Thus, none of the teams have CNM representation. Plans to include CNM in other ways are explained in the 'Plans for Improvement' section.

It has become increasingly difficult to separate redesigned sections from non-redesigned sections or partially-redesigned sections of the course, as was done in the past APRs. Particular elements of the redesign are being used to varying extents across the course sections without clear indication of what extent they are being used. Dissemination/expansion across sections has not been consistent, but it is arguable that all sections have been "touched" by the redesign process for several courses. Therefore, we have included all sections of several courses in our analysis, although it does create some ambiguity in grade achievement related to the redesign since implementation varies by instructor.

YEAR FOUR ACCOMPLISHMENTS

In the fall of 2014, UNM offered sections of the following redesigned gateway courses: CHEM 121 (7 sections), CHEM 122 (3 sections), MATH 121 (35 sections), PHYC 103 (2 sections) and BIOL 204L (10 sections), BIOL 204 (2 sections), BIOL 202 (10 sections and MATH 153 (1). Together these sections served 3,043 enrollments (65.82% of these were for Hispanic or low-income students).

In the spring of 2015, UNM offered sections of the following redesigned gateway courses: CHEM 121 (5 sections), CHEM 122 (6 sections), MATH 121 (25 sections), BIOL 204L (10 sections), BIOL 204 (2 sections), BIOL 202 (6 sections) and Math 153 (4 sections). Together these sections served 2,370 enrollments (60.42% of these were for Hispanic or low-income students).

In the summer of 2015, UNM offered sections of the following redesigned gateway courses: CHEM 122 (2 section), MATH 121 (8 sections), CHEM 121 (1 sections), BIO 202 (2 sections), MATH 153 (2 sections). Together these sections served 303 enrollments.

As in the past, professional development opportunities were hosted for STEM course redesign faculty. The members of the four Cohort 4 redesign teams (ENVS 102, CHEM 101, CHEM 131/132, and BIO 203/203L) began their work at the STEM Gateway course redesign institute on May 16-17, 20, 2015. During the 2.5 day institute, Course redesign teams were briefed on the instructional change model and then provided with opportunities to interact with their team, other teams in the cohort, and STEM Gateway representatives on a series of activities that guided the members in writing and revising outcomes, instructional activities and assessments. The teams built teachable units that could be transferred and evaluated in accordance with standards set by the teams. They also laid out plans for the remainder of the project.

Monthly workshops and work sessions were scheduled throughout the 2014-2015 year. Cohort 4 team members joined the first three cohorts in monthly meetings beginning in July 2015. Cohort 1 redesign teams (CHEM 122, MATH 121, PHYC160/161), Cohort 2 redesign teams (BIOL 204L, CHEM 121, PHYC 103), Cohort 3 teams (BIOL 202, BIOL 204L, MATH 116), and Cohort 4 teams (ENVS 102, CHEM 101, CHEM 131/132, and BIO 203/203L) meet monthly with co-PI Gary Smith and graduate assistant Audriana Stark to discuss challenges, accomplishments, and participate in on-going professional development that address a range of relevant topics. Occasional meetings also took place between co-PI Smith and team leaders to address specific concerns with each project. In June 2015, individual consultations took place with Cohort 3 to discuss plan for the annual assessment reporting and sustainability of the projects. Special professional development sessions (i.e. Using Blackboard Learn for Group assignments, Teaching with iClicker, and Using Learning Catalytics) were added to the list of professional development activities for the 2015-2016 year in response to needs and expertise available. These latter sessions have been a joint effort between STEM Gateway and the Learning Studio Community of Practice.

The STEM Gateway Course Redesign Council, formed October 1, 2013, currently 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, Mathematics & Statistics, Biology and Earth and Planetary Science and the Assistant Chair for Undergraduate Program from Physics & Astronomy. The council has been very engaged with recruiting and selecting course redesign proposals, and have provided support and guidance well beyond endorsement of the redesign projects.

Advancing Course Redesign Projects, is a STEM Gateway-hosted event planned for early in Year 4 to bring together key leadership (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 & Astronomy), course redesign cohort 1 (MATH 121, CHEM 121, PHYC 169/161) and cohort 2 (CHEM 122, PHYC 140, BIO 204L), the Center for Effective Teaching, and STEM Gateway staff to help achieve our improvement goals. Teams provided updates of their projects that included objectives, assessments, improvements, and sustaining the projects. Some results of these reports are provided below.

ASSESSMENT

Pursuant to evaluating Objective A.1, course enrollment and completion data were collected in redesigned course sections of the Cohort 1, Cohort 2, and Cohort 3 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 and continues into Year 4. Comparisons were made between grade achievement in redesigned sections versus non-redesigned sections of the same course.

Success rates in most of the redesign courses historically vary from one semester to another. By using only single semesters (second and third semesters of redesign) as comparison metrics to a single baseline semester it is not possible to account for this variability. Therefore, we are not sure that there is any significance to the decrease in the success rate for BIOL 204L from the second to the third semester. In the final report for the grant, we will undertake a more rigorous assessment of grade achievement in the redesign courses across multiple pre-design and post-design semesters.

Teams in the redesign projects also collected various other assessment data to provide further information about their projects. The BIO 204, BIO 202, and MATH 153 teams collected student survey data in redesigned sections during Fall 2014 and Spring 2015. The data are being used to determine student perceptions of the redesign, and when appropriate, to make adjustments to course redesign elements.

FINDINGS

Members of the course-redesign teams are 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, an increasingly collaborative culture of teaching and learning, and continued improvement even after the year of financial support provided by STEM Gateway. Formal and informal discussions about teaching and learning have spread among gateway course instructors in math, biology, and chemistry, in particular. However, given there are many factors that influence the projects, we see varying outcomes from the teams. These findings are described for each team below.

The average grade for Hispanic students enrolled in Math 121 in the 5 semesters preceding course redesign was 2.11 (C) and in the 5 semesters following the beginning of redesign is 2.40 (C+) and has been as high as 2.55 (B-), which is the highest in the 20 years of accessible institutional data. The substantial improvements in the students who successfully complete Math 121 (College Algebra) highlights how redesign efforts can have unanticipated impacts on student success. More than 30 sections of Math 121 are taught each semester and usually only 4-6 sections are taught by members of the original redesign team. Nonetheless, improved student success is occurring across sections led by nearly all instructors. 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 as part of the redesign. The course coordinator and course-redesign 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 and will make it easier for other instructors to gradually adopt the pedagogical changes made by the redesign team. Nearly all sections of MATH 121 are using at least partially redesigned curriculum, mainly worksheets and online assessments developed by the redesign team.

Data collected by the chemistry course redesign teams CHEM 121 and CHEM 122 have shown measurable 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. Chemistry teams continue to assess and improve the redesign elements through analysis of exam results that lead to attention to changing how challenging concepts are taught. The Chemistry 121 and 122 (General Chemistry I and II) teams are particularly notable for establishing a community of practice among all instructors of these courses regardless of membership in the original redesign teams The Chemistry team meets weekly to continue to refine their redesigned sections and have reported a change in culture among teachers of CHEM 121 and CHEM122. Furthermore, an Active Learning Handbook has been developed by the team and is used as a guide for new instructors so that they can adopt the redesign curriculum.

BIOL 204L instructors successfully developed and implemented redesigned curriculum for the plant half of the course. The animal half of the course was developed and implemented in conjunction with redesign efforts to improve and align the lecture portion of the course (BIOL 204). There was an increased interest in course redesign from the biology departments and BIOL 204 and BIOL 202/202L were added to the list of redesign courses for Cohort 3. Instructors in biology stated the importance of having STEM Gateway host visits to UNM by leading biology educators, Bill Wood (2013) and Robyn Wright (2014), to broaden interest in course redesign. Building interest among biology faculty led to inclusion of a team to redesign BIOL 203/203L in Cohort 4.

BIO 204 implemented redesign activities partially in the fall 2014, fully in the plant half and partially in the animal half. Spring 2015 the team fully implemented redesigned curriculum for the entire term and both terms continued with lab reform efforts developed the prior year. There has been significant buy-in from the 204 instructors and adoption of online systems to share and manage resources that are created by the team. Resources are shared through Google Drive and UNM Learn as a way to increase the sustainability, including a syllabus with what activities were tried for each lecture and comments about their successes and failures. The BIO 204 team found generally positive student feedback to attitudinal surveys along with feedback about the value of key instructional strategies that were adopted.

Math 153 combines pre-calculus and trigonometry, two 3-credit courses, into a single 5-credit course. This is intended to remove redundancies in the curriculum and speed the time to degree. Results from spring 2015 showed an improved success rate for students who enrolled in the MATH 153 course as opposed to the MATH 150 and MATH 123 course. There were also fewer withdrawals in the MATH 153 course. Despite the rigor of a 5-credit course, the success rate for Hispanic and low-income students went from roughly half in the comparable replaced courses to nearly two thirds in the new course. Although teaching resources are shared online, observations of various instructors of the course shows varying adoption of commonly accepted best teaching practices and use of the resources. The MATH 153 team focused on collecting student data to inform their choice of instructional tools that were implemented during the redesign.

BIO 202 was partially implemented in the Fall of 2014 and Spring of 2015. It was fully implemented in the Summer of 2015. Partial implementation involved the use of instructional blocks that had been developed in either the Summer or Fall of 2014. By the Spring of 2015, all blocks were developed and used by the instructor teaching the redesigned course. The blocks were all further refined during the Spring 2015 semester. The 202-specific redesign includes the collection of material within a Google Docs folder that is easily accessed by both instructors within and outside of UNM. That file holds, for each unit, reading guides, reading quiz question, study guides and PowerPoint slides for all in-class activities. In the future, the team leader will conduct an experiment in several learning environments using various levels of the redesign material to isolate the effects of the redesign when controlling for instructor. The BIO 202 team found that, on common exam questions, students in the redesigned sections performed equally or moderately better than those in the non-redesigned sections and that students respond positively to the newly implemented material.

PLANS FOR IMPROVEMENT

Efforts for improvement during Year 5 are focused on a) assisting the faculty teams and their colleagues to sustain the redesign initiatives; b) collaborating with the Center for Teaching and Learning in order to institutionalize course redesign faculty-development components; and c) strengthening connections between UNM faculty teaching redesigned courses with their counterparts at Central New Mexico Community College (CNM).

Throughout the course of the project, the major concerns voiced by faculty were about time and work load involved in the redesign projects. Last spring, the Course

Redesign Council (CRC) recommended that STEM Gateway provide small supplemental grants to existing redesign teams in order to increase the likelihood of successful implementation and sustainability of their projects. STEM Gateway plans to provide MiniGrants to course redesign teams so that they may overcome barriers and challenges they have faced throughout the process of redesigning their courses. MiniGrants will be available in spring and summer 2016. STEM Gateway leadership has completed budgeting for FY16 and has budgeted $50,000 for this initiative.

Given the success of the first Advancing Course Redesign Projects meeting in 2014, STEM Gateway plans on holding another session that will include updates from cohorts 1 and 2 and emphasize the work that was done by cohort 3, barriers they face and potential solutions to those barriers. This is an important way to communicate the work of the redesign teams to the larger UNM community, particularly leadership that can be supportive on campus.

UNM's main campus faculty development program was involved in a reorganization during Year 4, which combined it with existing student academic support programs into a single Center for Teaching and Learning (CTL). During Year 5, CTL will hire a new Associate Director for faculty development with a STEM emphasis, in recognition of the importance of ongoing initiatives such as STEM Gateway. The STEM Gateway PIs have met with the CTL Executive Director to layout a generalized plan for institutionalizing aspects of the STEM Gateway redesign projects within CTL. Those plans will move forward in Year 5 after the new Associate Director is hired.

Because of the discontinuation of CNM faculty on redesign teams (discussed above) STEM Gateway, with advice from the Course Redesign Council, is working on alternative ways to help establish strong communication between UNM and CNM faculty who are teaching redesigned courses at UNM. An action plan will be implemented during Year 5.

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	%
		80	1620 / 2025	80	90	1827 / 2025	90
		Target			Actual Performance Data		
(b) The STEM PLF program will employ 40 Undergraduates per semester	Project	Raw Number	Ratio	%	Raw Number	Ratio	%
		40	/		44	/	
		Target			Actual Performance Data		
(c) STEM PLFs will work in 15-20 STEM class sections per semester	Project	Raw Number	Ratio	%	Raw Number	Ratio	%
		40	/		53	/	
		Target			Actual Performance Data		
(d) STEM PLFs potentially impact more than 3000 students per year	Project	Raw Number	Ratio	%	Raw Number	Ratio	%
		3000	/		5551	/	
		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	%
		14	14 / 14	100	5	5 / 14	36
		Target			Actual Performance Data		
(g) 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	%
		65	/		68	/	
		Target			Actual Performance Data		
(h) Withdraw rates for students in PLF-supported sections will be lower than for those students in non-PLF-supported sections of the same courses.	Project	Raw Number	Ratio	%	Raw Number	Ratio	%
		17	/		15	/	
		Target			Actual Performance Data		
(i) PLF grade point averages will be higher than their peers (Numbers in this table are automatically rounded to the nearest whole numbers. Actual GPAs are reported in the narrative below)	Project	Raw Number	Ratio	%	Raw Number	Ratio	%
			3 /		4	/	

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) in December 2015. The data were collected and analyzed by STEM Gateway staff.

(a) This measure has been met

(b) This measure has been met

(c) This measure has been met. PLFs served 23 sections during Spring 2015, 2 sections during Summer 2015, and 28 sections during Fall 2015.

(d) This measure has been met

(e) This measure has not been met. The physics and astronomy department is no longer interested in participating in the PLF program.

(f) Target has not been met. During the last four years of this program, only 14 sections meet the following criteria necessary for this performance objective: (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 the PLF-supported sections by October 1, 2015. Of those 14, only five 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 have been researched by the PLF Advisory Council and have been included in this report.

(g) This measure was added in the Year Two Annual Performance Report. This measure has been met.

(h) This measure was suggested by the Peer Learning Facilitator Program advisory council (composed of UNM faculty and instructors). This measure has been met when looking at individual sections. However, when comparing all PLF supported classes with non-PLF courses, there is a 3.24% lower withdraw rate for PLF sections compared to non-PLF sections.

(i) This measure was suggested by the Peer Learning Facilitator program advisory council (composed of UNM faculty and instructors). This measure has been met. The table above shows only whole numbers, but the exact GPAs are as follows: average PLF GPA = 3.715; average non-PLF GPA = 3.136. This measure indicates that the STEM Gateway Program has been successful in recruiting high performing student employees as Peer Learning Facilitators.

PEER LEARNING FACILITATOR PROGRAM: YEAR FOUR ACCOMPLISHMENTS
In the Spring 2015 semester, 42 Peer Learning Facilitators supported 23 sections of 9 STEM Gateway courses. In the Summer 2015 term, 4 Peer Learning Facilitators supported 3 sections of 2 STEM Gateway courses. In the Fall 2015, 42 PLFs supported 28 sections of 12 STEM Gateway courses. Fall 2015 also marked the expansion of the PLF program in the Biology department as their Year Four course redesign included PLFs.

The services of the PLF program include the academic support of introductory Math, Chemistry, Physics, Biology, 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-stakes grading of homework assignment or in-class tasks. To stay on task with the classroom assignments, PLFs also complete preparatory work each week, as well as attend weekly Professional Development trainings. As needed PLFs hold outside tutoring hours for students to work with them one-one-one or in small groups.

STUDENT TRAINING
During Year Four, student employees engaged in both Pre-Semester and weekly Professional Development Trainings during the fall and spring semesters. Pre-Semester training took place in the week before UNM classes began and included such topics as navigating the administrative aspects of the PLF job, what to expect during the first weeks of work, explanation 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, students in crisis, working on teams with different personality traits, and tutoring in an active learning environment

Summer PLFS were experienced from earlier semesters. Faculty instructors were also experienced returners. Due to this knowledge of course content and job duties, as well as the accelerated schedule of summer classes, STEM Gateway did not hold formal trainings during the months of June and July for these PLFs.

PARTNERS
Other stakeholders beyond the faculty and students who PLFs serve and who have participated in the program include our sister grant, STEM UP. Realizing that our student employees share common duties, beginning Fall 2015 STEM Gateway and STEM Up collaborate on weekly trainings and hold them together. The PLFs also work closely with the Center for Academic Program Support (CAPS), as well as their staff members. The PLFs are often invited to participate in discipline-specific and all CAPS trainings. During both the spring and fall semesters of 2015, the PLFs also assisted a fellow department, CEOP, with a large academic event: Mock Finals. The Mock Finals event is held on a Saturday from about 8am - 1pm during both semesters. Gateway was able to offer tutoring after students took mock exams because of the involvement of the PLFs. During that time, students can show up, get an actual previous final and a key and take the exam. Tutors are available from about 8am-1pm if any student wants to de-brief after the mock final. With the assistance of Biology, Chemistry, Math and Physics department instructors, who donated old finals and keys. Several PLFs worked with other CEOP and CAPS staff to tutor. Through this project, STEM Gateway served 330 students in Spring 2015 and 214 in Fall 2015. In Spring 2015, 77% of those surveyed reported that the event was "Extremely Helpful."

To strengthen partnerships with the PLF instructors, a PLF Advisory Council was formed in Year Two. Year Four consisted of this group addressing two challenging tasks: (1) developing additional performance measures to evaluate the effectiveness of the PLF program. Their recommended measures have been added to this report as measures A.2.h and A.2.i. (2) in preparation for institutionalization, and in order to cement full commitment from individual instructors, the Advisory Council created a proposal process. Using this process, individual instructors demonstrate their need for PLFs in the classroom, and describe how they will transform their instructional strategies to leverage PLFs to improve student achievement. This process was implemented for Spring 2015. The council was then able to institute criteria for Fall 2015, faculty proposals. In addition to these tasks, the council served as a resource in discussing CAPS alignment changes, advocated for the program in funding requests, determined a sustainable PLF to instructor ratio, suggested acceptable assignments for PLFS to grade, and oriented new faculty members on how to properly utilize PLFs in their classrooms.

Finally, the PLF Program implemented a joint project between STEM Gateway and the UNM Mathematics Department to create the Calculus Prep Workshop. The Calculus Prep Workshop serves as a refresher for students enrolled in calculus for the following semester. The workshop takes place the week before classes begin and covers essential topics in algebra, pre-calculus, and trigonometry. For the Fall 2015 workshop, we provided 2 PLFs to assist attendees with in-class review problems. Twenty-two students attended the workshop in Fall 2015. Attendees received an average course grade of 3.08 in calculus that semester compared to the average course grade of 2.46 for all students enrolled in calculus. Plans for Spring 2016 involve a Calculus Prep Workshop completely facilitated by PLFs with the sample problems and student learning objectives provided by the Mathematics Department.

ASSESSMENT
The PLF Program staff team conducts surveys of all student participants. Once a semester, the students enrolled in PLF-supported classes are surveyed. The PLFs themselves are surveyed twice—once at the beginning and once near the end of the semester. These surveys are utilized by STEM Gateway staff and PLF instructors to assess how well student needs are being met, how well PLF needs are being met, to understand student/PLF concerns for the future and to help instructors improve upon their instruction. In addition, PLFs are evaluated every semester through a classroom observation. Gateway visits each PLF section to determine how the PLF is performing, if they are a good fit for the subject, and how well the PLFs and instructors work as a team.

FINDINGS
As in previous semesters, one of the most successful elements 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 content leaders. They enjoy the work they do, as reflected by their responses to surveys and by their willingness ticontinue to work as PLFs each semester. PLFs value the opportunities for guidance from instructors and often explore new ways to better serve students. They care about the big picture of the grant and are interested in improving and evolving as students and as PLFs.

An area of improvement for the program involves maintaining consistency in the utilization of PLFs. Various stakeholders have determined this is best accomplished by helping faculty understand the many facets of utilizing PLFs in active and collaborative learning. As the program moves to CAPS, it will be housed under the umbrella organization of the Center for Teaching and Learning. The PLF program will have the opportunity to expand into faculty development by working with the Center for Teacher Excellence (CTE) over, which is also housed under this umbrella organization. Both departments have agreed to address this issue upon institutionalization and the hiring of a new CTE Associate Director.

Overall, the PLF program has been highly successful. In Year Four, the PLF program met 7 of 9 performance measures (measure A.2.f was not met, but is problematic in its structure. See Year Two Annual Performance Report for full explanation). In Year Four, the PLF program served more than 5,000 students, and recruited and retained more than 40 highly successful student employees (PLFs). Students who enrolled in PLF-supported sections were three percentage points more likely to succeed than their peers in non-PLF-supported sections of the same courses.

PLANS FOR IMPROVEMENT
The institutionalization plan in partnership with the Center for Academic Program Support (CAPS) was expanded in Year Four. The PLF program developed policies and

procedures that aligned to CAPS operations to facilitate the planned transition of the program. The program focused on familiarizing the PLFs with CAPS' workplace culture, weekly training format, and operating procedures. In addition, more professionalism topics were included in the PLF weekly training to ensure the quality of student employee met and exceeded the expectations of CAPS.

In Year Five, the PLF Program will continue to strengthening its partnership with CAPS and follow through with its obligations under the institutionalization plan.

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	/		18	/	
		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	/		158	/	
		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	/		1467	/	
		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	/		4	/	
		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	80	/		90	238 / 265	90

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) in December 2015. The data were collected and analyzed by STEM Gateway staff.

(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 already been met.
(c) Target for the entire five year period of this grant have been met. This includes the implementation of the new SSIG model (see narrative below).
(d) Targets for the entire five year period of this grant have already been met.
(e) Target has been met.

To achieve the SSIG learning outcomes, the outreach and activities initiatives over the October 1st, 2014 – September 30th, 2015 year were numerous. All initiavtive are focused on orientation, mentorship, workshop, and services designed to assist students in accelerating their acquisition of skills in key SSIG disciplines. All of these were added to our website, to increase student awareness and accessibility to the components and resources each had to offer.

Between October 2014 and May 2015, work continued on two of the initiatives started in February 2014: Students for STEM Success (S3) and the Achievement & Exploration Opportunities & Networking (AEON) STEM workshop series. Both of these initiatives were transferred over to the STEM Collaborative Center, which were well-aligned with their goals, thus STEM Gateway did not continued with these initiatives after the conclusion of the Spring 2015 semester. Efforts were focused on the Essential Academic Skills Enhancement (EASE) workshop series. Additional initiatives implemented over this past year included participation in the STEM Summer program organized by the STEM Collaborative, Mock finals (in cooperation with CEP), STEM focused presentations to select audiences, and a re-launch of the STEM Gateway website.

1) Students for STEM Success (S3). S3 is a student-centered initiative that is focused on strengthening skills and building connections that enhance the overall experience for STEM students at the University of New Mexico. There were two main goals of this component for the Fall 2014 – Spring 2015. Efforts initiated in the previous grant year were used as a foundation to continue building a clearer structure and purpose for this group. For the Spring 2015 semester, three main events were held each semester: STEM Breaks (for a relaxed setting to facilitate student networking), Presentations (each facilitator presented on a STEM related topic they found interesting, or beneficial to their fellow students), and Student Meetings (to facilitate in the ‘student organization’ aspect of the group). To incentivize participation in these events, STEM Gateway obtained a gift certificate to Rude Boys Cookies, a yearlong membership to Explora!, and a scholarship to a Kaplan course, which was then raffled off at the final meeting of the Spring semester (one entry per student per event attended).

Between October 2014 and May 2015, these events reach a total of 183 undergraduate students, some of whom attended multiple workshops, resulting in 193 participants.

The listserv established through this initiative had over 200 subscribers by the end of May 2015. At this point, the weekly digest of STEM related events was transferred to the STEM Collaborative Center, along with the Facebook and Twitter accounts associated with S3.

1. Presentations (total undergraduate participants – 32)
• Women in STEM Panel
• Undergraduate Research Opportunities
• Making Science Fiction in to Fact
• The Science of Gaming

• Minorities in STEM Panel
• Graduate School Panel
2. Student Meetings (4 meetings; total undergraduate participants – 11)
3. STEM Breaks (total undergraduate participants – more than 136)
• Scavenger Hunt – take 1
• Adult Night at Explora
• Movie Night
• Ice Cream Social
• Scavenger Hunt – take 2

2) Achievement & Exploration Opportunities & Networking (AEON) STEM workshop series. AEON was a collaborative effort across many interdisciplinary programs at the University of New Mexico. AEON active partners include: African American Student Services, Center for Academic Program Support (CAPS), College of Arts & Sciences, College Enrichment & Outreach Programs, College of Nursing, El Centro de la Raza, Engineering Student Services, Graduate Studies, Office of Career Services, Research Opportunity Program/McNair Scholars, Science, Technology, Engineering and Math Undergraduate Pathways (STEM UP), STEM Advising, STEM Collaboration Center (STCC), and STEM Gateway. Invited collaborators are American Indian Student Services, Anderson School of Management, Center for Teaching Excellence, Maximizing Access to Research Careers, Veterans Resource Center, and Women's Resource Center.

The focus of AEON was to strengthen skills, build connections, and provide resources for the success of STEM students, regardless of their specific field of study. STEM Gateway attained these goals by offering various workshops throughout the semester, open to all UNM students. Starting in Fall 2014, our lunch time workshops series started. To incentivize participation in these workshops, Gateway obtained lunch sponsors from eight UNM affiliates and six local eateries.

Between October 1, 2014 and May 31, 2015, STEM Gateway held 17 workshops with a total of 163 undergraduate students, some of whom attended multiple workshops, resulting in 189 participants.

1. Competitive Grad Programs
2. Designing for Space
3. Diversity in STEM
4. Alternative Health Careers
5. Summer opportunities in STEM - jobs and internships
6. Summer opportunities in STEM – research
7. STEM Abroad opportunities
8. 10 things that kill your chances of getting to the interview phase
9. Mock STEM Interviews
10. Emerging Pathogens and the Role of Natural History Collection Archives: The Hantavirus example
11. STEM Career Pathways
12. Critical Thinking and Pop-science – what to believe
13. Becoming a Compelling Communicator
14. Zombies, Superheroes and what we should really worry about
15. Maximizing your summer in STEM
16. Science of Cognition and Learning: How does the human mind process new information?
17. STEM Mixer and celebration

3) Essential Academic Skills Enhancement (EASE) workshop series. This series of workshops aims to provide undergraduate students with support in basic skills required for success in all STEM courses. STEM Gateway launched this workshop series Spring 2015.

In Spring 2015, STEM Gateway partnered with the core Biology laboratories to create four, mandatory-attendance workshops titled Metrics, Critical Thinking, Scientific Reading and Writing, and Basic Excel. Summer 2015 continued within the Biology department, and expanded to include two Chemistry courses on a mandatory basis. STEM Gateway expanded to include an Advanced Excel workshop. Additionally, the grant partnered with the Center for Academic Performance Services (CAPS) and the Centennial Science and Engineering Library (CSEL) to offer two additional workshop topics: Study Skills, and Library Research Strategies, respectively. Fall 2015 serviced the core Biology laboratories and two sections of College Algebra through the Mathematics and Statistics department, with mandatory attendance, and with General Chemistry with voluntary attendance, further incentivized with a quiz grade replacement.

Moving forward in the Spring 2016, STEM Gateway will continue with the core Biology laboratories, with an effort towards institutionalization. Changes to workshop content are made continuously in response to student feedback. Within the Biology courses, workshop scores in response to "As a result of attending this workshop, I learned about new concepts and feel prepared to utilize them" ranged from 4.36 – 3.67 (5 point scale).

Between January 18, 2015 and September 30, 2015, STEM Gateway offered a total of 201 workshops, with a total of 1531 undergraduate students, some of whom attended multiple workshops, resulting in 2602 participants. Of these, 1560 (60%) were Hispanic or low-income students.

4) STEM Gateway Presentations. STEM Gateway staff presented to various audiences (Sandia National Laboratory Post-Docs, Bridge students within American Indian and African American Student Services, as well as research oriented programs on campus) on STEM at UNM and the Impostor Syndrome. STEM Gateway held 6 workshops/presentations with a total of 69 undergraduate students.

Additionally, STEM Gateway provided a Calculus Prep workshop which aimed to prepare incoming Calculus students for the semester's challenges. Two of our Peer Learning Facilitators were present to assist students on the practice questions. Twenty two students attended this 3 hour workshop which covered math review, graphing, and problem solving.

Moving forward, STEM Gateway plans to offer the Calculus Prep workshop again, in partnership with the Mathematics and Statistics Department, before the Spring 2016 semester, and will continue to offer other workshops upon request.

5) STEM Gateway website. On August 17, 2015 we launched our new-and-improved website, re-locating it from a blogspot to the official UNM platform. STEM Gateway rearranged the content to make it more user friendly, and added resources for students including:
a. Course Redesign: Resources for Change
b. Peer Learning Facilitators: Active Learning Resource Center
c. For Students:
i. Student Resources
ii. STEM Listserv
iii. FAQ
d. Blog, with four reoccurring weekly topics:
i. STEM Career Profiles. Our goal is to get students to understand that the path to their careers and success is not always a straight line; to highlight the broad possibilities for them with STEM degrees, outside of the traditional or obvious pathways; to think about their STEM education in a way that they may not realize; and to encourage them to persist despite challenges they will encounter. STEM Gateway want students to realize the possibilities of their STEM education.
ii. Student Survivors. Our goal is to focus on how students reach their STEM undergraduate aspirations.
iii. Faculty Learning Strategies. Our goal is to cover faculty members' perspectives and thoughts on what students need to be successful in college.
iv. Two sides of the same coin: Mentor-mentee relationships. Our goal is to show the benefit to mentor-mentee relationships and how they interaction develops and the contribution it can have on student success.

As a result of the mandatory nature of the workshops, the highest traffic area of the website is the EASE workshop page. Barring this page, from the onset of the launch to September 30, 2015, unique page views are as follows, with count in parentheses:
Home Page (1007)
• Workshops (142; although some of these could be a result of EASE traffic)
• Blog – Student Survivors: Most Common Challenges (125)
• Blog – STEM Career Profiles: Senator Martin Heinrich (123)
• About Us (81)
• PLFs (73)
• Student Resources (73)
• STEM Listserv (68)
• Blog home page (68)
• PLF courses served (66)
• Blog – STEM Career Profiles: Dr. Chris Eppig
• For students (54)
• Blog – Faculty Learning Strategies – Physics (47)
• Blog topics (41)
• Blog – Mentor-Mentee: Dr. Diana Northup and Matthew (41)
• Workshop request (35)
• PLF Resource Center (34)
• Data & Impact (33)
• Course Redesign year 4 (30)
• And all other pages are below 30 visits

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 Bachelor's degrees in life/physical sciences, engineering, and mathematics will increase.	Project	333	/		424	/	

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) in December 2015. The data were collected and analyzed by STEM Gateway staff.

(a) Target has been met. In Year One, the baseline was established for this measure as the 2011-12 Academic Year. During Year Two, this number increased to 338. Year Three's numbers increased to 369. As of Year Four, the number of Hispanics and other low-income students receiving Bachelor's degrees in life/physical sciences, engineering, and mathematics has increased to 424.

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	/		79	/	
		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	531	/		913	/	

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) in December 2015. The data were collected and analyzed by STEM Gateway staff.

(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 2013 freshman cohort. For year four, 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 2014-2015. For year four, 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.

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 (3 projects per year for the first four years of the grant)	Project	3	/		2	/	

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 not been met. Two departments have begun collaborating across institutions in regards to learning outcomes as a result of STEM Gateway's initiatives.

UNM Course redesign teams were not required to include a faculty member from CNM given concerns that arose with CNM faculty participation in Cohort 3. Notably, the CNM participants on the redesign teams showed little engagement with the redesign process after the Course Redesign Institute provided at the beginning of the annual projects. They had very little incentive, working as individuals from their institution, to contribute to redesign projects that are likely to have immediate impact at UNM. This issue also appeared in some earlier cohorts. Thus, none of the teams have CNM representation. However, due to the culture change prompted by STEM Gateway initiatives, the Math and Chemistry departments have create inter-institutional relationships to facilitate curriculum alignment.

Based on the advice from the Course Redesign Council, STEM Gateway is exploring alternative ways to help establish strong communication between UNM and CNM faculty who are teaching redesigned courses at UNM. Therefore, Year Five will encompass initiatives aimed at including CNM at the departmental and institutional levels. STEM Gateway is developing initiatives to allow for a sustainable relationship between the two institutions.

For more on the changes that impacted 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), which helps 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, correlating student course-by-course progress with progress toward a STEM degree (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	/		3	/	

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 for the entire five year period of this grant have already been met.

YEAR FOUR ACCOMPLISHMENTS

The Data Driven Prioritization completed three data analysis and one exploratory data analysis projects during Year Four. The following projects were completed despite not having an institutional researcher the last three months of Year Four:

UNM STEM TRANSFER STUDENTS: ACHIEVEMENT AND ISSUES
In different questions throughout the study, student family SES were important in student academic performance as measured by GPA and learning outcomes. Despite the lack of significant statistical test results for family SES, we found convincing evidence that family SES contributed to student academic performance. SES are measured separately by first generation, Pell eligibility and expected family contribution. The results from this study cross validated many of the existing research findings such as the low performance of students from low SES families. It also raised some concerns over the performance of some ethic groups such as White males and non-White females. It also provides some positive messages. For instance, we found a significant association between first generation status and learning outcomes when both first generation students and not first generation student were both Pell eligible. Transferred students who were Pell-eligible and from better family educational background were significantly more likely to have positive outcomes in terms of having higher graduation rate, more STEM enrollment and shifting rate as well as lower stopping rate. This showed that the Pell grant was helping students who were not first generation. When all students were not first generation, we found a significant association between Pell status and learning outcomes. Pell eligible students tended to have more positive outcomes in STEM enrollment, shifting and stop rate. Not Pell eligible students had higher graduation rate. Statistically, this significant result means that Pell grant helped not first generation students to continue their pursuits for academic degrees. More comprehensive study is absolutely necessary for UNM to understand the impact of financial aid (including Pell) on student academic performances measured by GPA, continuous registration and degree outcomes. This type of study would be very meaningful for related policy makers.

COURSE REDESIGN EXPLORATORY ANALYSES
Broader measures of the impact of course redesign projects (some of which also include PLF implementation) was determined by (a) better defining the baseline prior to redesign, (b) using measures including the full grade distribution and not just success rates (% C or higher) or pass rates (%D and higher), or completion rates (anything other than W), and (c) is inclusive of demographic groups other than Hispanic and low income students. Comprehensive and detailed analysis of course reform projects and their impact on student achievement was conducted in Year Four. In addition, the course redesign analysis examined the achievement of students who took Math 123 (Trigonometry) and 150 (Pre-Calculus) separately or together for each semester during 2013-2014 as a baseline comparison for the newly design Math 153 (Pre-Calculus and Trigonometry). About 20% of the combined 123 and 150 enrollments during these semesters consisted of students who were taking both classes at the same time. The combined course allows students to reduce the number of courses and credits for students who are concurrently in the separate courses as well as reduce the number of semesters of this math sequence for students with subsequent enrollment of these courses. Combined grade achievement does not seem to differ based on whether students were taking one or both courses. Year Four also included an exploratory data analysis of metrics to predict success in CHEM 121 and EPS 101. Unfortunately, no metric satisfactorily met the desired criteria to move forward with this analysis.

IMPACT OF COLLABORATIVE LEARNING: PEER LEARNING FACILITATORS IN GATEWAY COURSES
The Peer Learning Facilitator program began as a means of enabling and empowering faculty to undertake new pedagogies that were expected to help students learn specifically in STEM gateway courses, which initially had high failure rates. Results from this assessment and previous ones conclude that PLFs demonstrated significant grade improvement in Math and Chemistry. In addition, previous college GPA, gender (being female) and having a PLF in class predicted better academic performance. It is important to connect students to academic and social interventions. Overall, the results are promising and positive for the Peer Learning Facilitator program. The program was designed and developed based on the needs of UNM students. The University of Colorado Boulder however was an inspiration for much of the PLF work at UNM. Their similar program is STEM focused and has received National attention for their Learning Assistant Alliance (Miller, Groccia, & Miller, 2001). Since the inception of the PLF model at UNM, the preliminary qualitative and quantitative data support its positive efficacy on student learning in the form of course grades for STEM gateway courses that prior to 2009 had significantly higher failure rates.
Data from this analysis was used in funding proposals and presentations for the PLF program.

MOCK FINAL IMPACT ANALYSIS
STEM Gateway partnered with CEP in an effort to support the grant's following objective:
Improvement of student persistence and degree attainment in the STEM fields will improve campus-wide retention-rate and graduation-rates as STEM aspirants represent a significant proportion of incoming students.
Mock Math Finals were developed to provide students a 'real life' experience to help them adjust to a final exam environment prior to their course exam, thus reducing test anxiety and increasing performance. Participating students are given a previous final exam, allowing them to take the exam, providing the answer key and tutors to help them with any questions that emerge. Math courses that have traditionally been included were: Math 100, 101, 102, 103, 121, 150, and 180. In 2014, STEM Gateway partnered with the College Enrichment Program (CEP) to offer more courses critical for STEM degree completion (e.g., Bio 201, Chem 121, etc.).
The goal of Mock Finals is not to simply distribute a key to the exams, but provide a space to practice the exam and get tutoring support from peers and staff. For Spring 2015, final course grades were higher for students who attended the Mock Finals in subjects that offered tutoring during the event. Overall, students were satisfied with the Mock Finals event. A majority of students who filled out an evaluation indicated the event was 'Extremely Helpful' and 89% indicated they were likely to attend another event. Student consistently mentioned they wanted more 'courses,' more 'subjects', more 'tutors' and so on.

YEAR FIVE PROJECTS
Three major analysis projects have been planned for Year Five:

Transfer Analysis, Phase Two: Analysis of STEM transfer student experience. (Partner: STEM UP)

Understanding university teachers' perceptions of course design processes: Researching how college teachers who have participated in a course-redesign program understand the course design process.

PLF Educational Aspirations: Exploring the impact of the PLF experience on students' attitudes towards STEM education careers.

Section B: Budget Information

Year One Expenditures: $469,012
Year Two Expenditures: $900,797
Year Three Expenditures: $898,990
Year Three Overage: $8,834
Year Four Expenditures: $701,635
Year Four Carry Forward: $113,247

EXPLANATION OF YEAR FOUR CARRY FORWARD AND PLAN FOR YEAR FIVE:

During Year Four STEM Gateway experienced a large amount of turnover, these changes in personnel stemmed from many staff members transitioning to the new grant with the previous STEM Gateway director. As a result, STEM Gateway needed to re-staff its administrative positions. Filling vacant positions took one to eight months. Once filled, some positions received less compensation or part-time fulfillment due to the difficult nature of filling the positions. This resulted in a carry forward of $21,368. Course Redesign had a few faculty members leave the university and no longer participate in the redesign process. The carry forward totaled $12,434. Year Four also resulted in utilizing 10 less graduate assistants than the previous year. Course redesign having smaller teams and the change in the SSIG model resulted in the hiring of less graduate assistants. These actions lead to in a carryforward of $61,317. The remaining $8,834 will cover the overage from Year Three. Programmatic changes were all done in an effort to institutionalize grant initiatives while maintaining the scope of the objectives.

This carry forward will be spent in Year Five as follows:

• Tech Crash Course Workshop Series ($10,500) STEM Gateway has not reached the desired level of involvement with the School of Engineering. This Tech Crash Course will serve as a non-threatening introduction for students to achieve their technology goals and build confidence in the field.

• STEM Inclusive Excellence Colloquium ($30,000) This is an opportunity for the University of New Mexico to discuss issues related to diversity in STEM and incite conversation that focuses on solutions.

• Travel (HACU, AACU and AHSIE; totaling $5,720) The project director has been able to gain valuable knowledge from conferences related to HSI student success and present the lessons learned by STEM Gateway initiatives to other HIS-serving institutions.

• Three Month Extension for staff salaries ($58,193) STEM Gateway will apply for a grant extension to facilitate the institutionalization of the grant's components. The course redesign teams need a full semester during the academic year to work closely with the new Center for Teacher Excellence (CTE) associate director. This will help shape the institution's future redesign efforts. Furthermore, the fall semester of 2016 also allows the PLF program to work with the CTE associate director. Faculty development regarding active and collaborative learning is the last component of the PLF program that remains unformed. As for the new SSIG model, an entire fall semester in 2016 is needed to finish the institutionalization of this component. The new SSIG model has had the least amount of time to reach a point of sustainability. Although it shows promise, completion of the fall semester in 2016 will allow the EASE workshops to gather additional data and fully develop the program. It will then have the basis to become a part of the biology department's culture and be institutionalized beyond the championing of the Biology lab coordinator.

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)
University College (individual faculty members, departments and student programs)
Department of Student Services, Division of Student Affairs
STEM UP program
STEM Collaborative 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
Center for Teaching and Learning*
Center for Teacher Excellence (formerly Office of Support for Effective Teaching)*
Center for Academic Program Support
University Advisement
UNM Provost Office
Office of the Vice President for Research
UNM Human Resources
Student Affairs Assessment & Research*

*New partnerships established due to restructuring of the university. These additional partners have helped Gateway attain its objectives, especially in regards to institutionalization.

STEM GATEWAY PARTNER DEPARTMENTS AT CENTRAL NEW MEXICO COLLEGE

Dean's Office, School of Math, Science and Engineering
Biology Department
Mathematics Department
Chemistry Department