2014 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
   Ph #: 505-277-0963 Fax #:
   Email Address: timschroeder@unm.edu

Reporting Period Information

7. Reporting Period: From: 10/01/2013 To: 09/30/2014

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	$900,797.00	$0.00
b. Current Budget Period	$898,990.00	$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?

12. Authorized Representative Name: Julian Sandoval
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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 third year of operation.

ADMINISTRATIVE CHANGES

In November 2014, Tim Schroeder became Project Director for the new HSI Program "STEM Collaborative Center." Dr. Tim Gutierrez became the interim Project Director for STEM Gateway at that time. Natalie Robinson Bruner became the Project Director for STEM Gateway in January, 2015. Ms. Bruner brings a strong STEM and student programming background to STEM Gateway. She earned her bachelor's degree in Microbiology, with a minor in Chemistry, and her masters degree in Public Administration. She is currently completing her doctoral program in Educational Leadership. Natalie has served STEM higher education students for more than seven years.

PROJECT HIGHLIGHTS: COURSE REFORM

In the fall of 2013, UNM offered sections of the following redesigned gateway courses: CHEM 121 (4 sections), CHEM 122 (3 sections), MATH 121 (31 sections), PHYC 160 (1 section), PHYC 167 (5 sections) and BIOL 204L (10 sections). Together these sections served 2,373 enrollments (60.09% of these were Hispanic or low-income students).

In the spring of 2014, UNM offered sections of the following redesigned gateway courses: CHEM 121 (3 sections), CHEM 122 (4 sections), MATH 121 (18 sections), BIOL 204L (10 sections) PHYC 161 (1 section), PHYC 103 (1 section) and PHYC 168 (3 sections). Together these sections served 2029 enrollments (58.32% of these were Hispanic or low-income students).

In the summer of 2014, UNM offered sections of the following redesigned gateway courses: CHEM 122 (1 section), MATH 121 (27 sections), CHEM 121 (1 sections), BIO 202 (2 sections), Together these sections served 430 enrollments.

For the Course Reform project, three out of four Performance Objectives have been met or are on track in Year Three.

PROJECT HIGHLIGHTS: PEER LEARNING FACILITATORS

In the Spring 2014 semester, 50 Peer Learning Facilitators supported 30 sections of 9 STEM Gateway courses. In the Summer 2014 term, 3 Peer Learning Facilitators supported 2 sections of 2 STEM Gateway courses. In the Fall 2014, 47 PLFs supported 24 sections of 9 STEM Gateway courses. Fall 2014 also marked the inclusion of Biology courses to the program. Successful completion rates for students who participated in PLF programs were four percentage points higher than for students who participated in non-PLF-supported sections of the same courses (68.59% compared to 64.8%).

For the PLF project, eight out of nine Performance Objectives have been met in Year Three.

PROJECT HIGHLIGHTS: SSIGs

During Year Three, STEM Gateway developed and/or launched three workshop/event series designed to teach SSIG learning outcomes: (1) Students for STEM Success, (2) AEON workshops supporting STEM students in all disciplines, and (3) EASE workshops supporting STEM students in biology courses. Together, these events served 82 students, 73% of whom were Hispanic and/or low-income. The EASE workshops will be fully implemented in Year Four. We anticipate serving more than 3000 students per year through this program.

For the SSIG project, four out of five Performance Objectives have been met, and the fifth is on target to be met by its due date.

PROJECT HIGHLIGHTS: DATA DRIVEN DECISION MAKING

During Year Three, STEM Gateway completed two major data analysis projects: (1) Transfer STEM Student Analysis, and (2) Key Performance Indicators. Key findings are reported under performance objective C.1.

For the Data Driven Decision Making project, all Performance Objectives have been met in Year Three.

INSTITUTIONALIZATION EFFORTS: COURSE REFORM

During Year Two, and continuing through Year Three, STEM Gateway created a Course Reform Advisory Council composed of Deans, Associate Deans and Department Chairs (see Year Two APR for full description of this council). This council meets regularly and provides valuable insight into developing new projects and strengthening existing projects. This group will form the nexus of the movement to sustain the Course Reform initiative. In Years Four and Five, this Council will seek funding for future redesign projects, and leverage current and past projects to improve institutional culture within STEM departments. Recommendations from this group will be reported in the Year Four and Year Five performance reports and will be submitted to the Provost and other key leaders starting in October, 2015.

INSTITUTIONALIZATION EFFORTS: PEER LEARNING FACILITATORS

During Years Two and Three, STEM Gateway Staff met regularly with staff from the UNM Center for Academic Program Support (CAPS). The CAPS office at UNM oversees tutoring and supplemental instruction efforts for the University. In Year Three, CAPS worked closely with STEM Gateway to launch a pilot PLF program serving 12 sections of four courses. Gateway and CAPS shared resources, procedures and training sessions. STEM Gateway is currently on track to transition the PLF program to CAPS by the Fall 2016 semester.

INSTITUTIONALIZATION EFFORTS: SSIGs

Due to a change in strategy during Years Two and Three, we do not yet have data regarding the impact of the new SSIG model on student achievement. However, we have designed a strong measurement model, and the data will be collected throughout Year Four. If we find that this model improves student retention and/or academic performance, we will present this data to the Dean of Arts & Sciences in order to seek funding following the completion of the grant. The Dean is a member of the STEM Gateway Course Reform Council, 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

Efforts are currently under way to seek funding from the UNM Provost office to continue the STEM Gateway institutional researcher position following completion of the grant. This position would specialize in STEM data analysis for the Office of Institutional Analytics.

CONTRIBUTIONS MADE TO PRACTICE / LESSONS LEARNED

It is crucial to build powerful, reliable and comprehensive measurement models for Course Redesign projects. For instance, the STEM Gateway application was originally written to improve and measure student grades in redesigned courses. However, additional measures are also helpful in measuring impact and informing improvement efforts. For instance, how well do students in redesigned courses perform in subsequent courses that build upon that foundation knowledge (for instance, how well do Intermediate Algebra students perform in College Algebra the next semester)? Attention must also be paid to establishing valid baselines for comparing success rates. Fall success rates in gateway courses often vary widely from spring success rates for the same courses, and fall and spring courses often enroll different student populations. So which semester forms the appropriate baseline for assessing impact: fall or spring? Baselines should also be built on a range of semesters, rather than on single semesters. In addition to varying widely between fall and spring semesters, success rates also vary widely between academic years. Some Freshman cohorts appear to

be academically stronger than others. Consequently, building a baseline model that compensates for this variability is essential. We are now in the process of strengthening and refining our measure models for Years Four and Five (see course redesign narrative for more detail).

Requiring faculty members to complete a proposal to utilize Peer Learning Facilitators in the classroom strengthens the program three key areas: (1) When faculty members describe their teaching styles in a formal proposal, they are more likely to be strategic in utilizing active learning pedagogy. (2) Proposals allow PLF administrators to prioritize potential PLF classes based on the use of specific instructional practices, and on instructor receptiveness to improvement. This step is crucial when demand for PLF sections outpace the resources to provide them. (3) Formal proposals written by faculty members creates a mechanism for holding them accountable to active learning instruction. While this is not an issue for the vast majority of faculty members, it occasionally becomes an issue for faculty members who are overwhelmed with other duties, or who are uncomfortable with new instructional approaches.

Connecting student support programs to specific courses strengthens buy-in and effectiveness. The strongest and most promising option of the SSIG model is a workshop series that is connected to specific biology courses. Because we are able to cross-walk SSIG outcomes with course-level learning outcomes, we create an integrated academic support service that has strong buy in from faculty members.

There is a strong relationship between the number of credits that transfer students bring to UNM and their likelihood of success in STEM degrees at UNM. Transfer students who earn more credits before coming to UNM are more likely to graduate than those who earn fewer credits. This finding may have bearing on the relationships that four year colleges and universities establish with community colleges.

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 three years, develop 9 projects.	Project	9	/		9	/	
		Target			Actual Performance Data		
		Raw Number	Ratio	%	Raw Number	Ratio	%
(b) The three (3) course-reform projects implemented each year will directly affect at least 1800 studentlearners initially, and cumulatively more than 7200 by project end.	Project	3600	/		4679	/	
		Target			Actual Performance Data		
		Raw Number	Ratio	%	Raw Number	Ratio	%
(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	8	/		5	/	
		Target			Actual Performance Data		
		Raw Number	Ratio	%	Raw Number	Ratio	%
(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	8	/		2	/	

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

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, 2014 and January 15, 2015. The data were collected and analyzed by STEM Gateway staff.

(a)Target has been met. Three courses were chosen and are under development/pilots for the year.

(b) Numbers reported in enrollments rather than individual students, and include enrollments served in the first three years of this project combined. Target is based on Year Three as the initial year when a full slate of courses have been offered. Future targets include: Y4=5400, Y5=7200. Target has been exceeded, we have achieved 64% of the outcome projected for the end of five years.

(c) At the conclusion of Year Three, 6 course redesign courses had completed a second semester of instruction and 2 courses completed the third semester. 3 out of the 6 courses met the target of 75% course completions in the second semester. Both of the 2 courses offered in the third semester met the target of 80%.

DETAIL:
CHEM 121: Baseline Semester Completion Pct 86.4; Second Semester Offered 85.2
CHEM 122: Baseline Semester Completion Pct 81.4; Second Semester Offered 88.1; Third Semester Offered 84.8
PHYC 160: Baseline Semester Completion Pct 77; Second Semester Offered 66.1
PHYC 161: Baseline Semester Completion Pct 50; Second Semester Offered 70.4
BIOL 204: Baseline Semester Completion Pct 93.1; Second Semester Offered 94.3
MATH 121: Baseline Semester Completion Pct 78.7; Second Semester Offered 74.2; Third Semester Offered 84.4

(d) For these 8 courses, 2 courses met the target of improving success by 10% by the 2nd semester. There were not any courses that met the target of improving success by 20% the 3rd semester. See further analysis below

DETAIL:
CHEM 121: Baseline Semester Pct 70.33; Second Semester Offered 67.08; Success Change to Second Semester 4.62% decline
CHEM 122: Baseline Semester Pct 61.27; Second Semester Offered 73.01; Third Semester Offered 63.33; Success Change to Second Semester 19.15% improvement; Success Change to Third Semester 3.35% improvement
PHYC 160: Baseline Semester 47.3; Second Semester Offered 40.63; Success Change to Second Semester 14.1% decline
PHYC 161: Baseline Semester 37.9; Second Semester Offered 33.3; Success Change to Second Semester 12% decline
BIOL 204L: Baseline Semester 73.16; Second Semester Offered 91.43; Success Change to Second Semester 24.97% improvement
MATH 121: Baseline Semester 55.18; Second Semester Offered 58.33; Third Semester Offered 65.56; Success Change to Second Semester 5.71 improvement; Success Change to Third Semester 18.81% improvement

YEAR THREE ACCOMPLISHMENTS

In the fall of 2013, UNM offered sections of the following redesigned gateway courses: CHEM 121 (4 sections), CHEM 122 (3 sections), MATH 121 (31 sections), PHYC 160 (1 section), PHYC 167 (5 sections) and BIOL 204L (10 sections). Together these sections served 2,373 enrollments (60.09% of these were Hispanic or low-income students).

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were Hispanic or low-income students).

In the summer of 2014, UNM offered sections of the following redesigned gateway courses: CHEM 122 (1 section), MATH 121 (27 sections), CHEM 121 (1 sections), BIO 202 (2 sections), Together these sections served 430 enrollments.

Cohort 1 redesigns were implemented in Year One and continued in Year Two. Two redesign projects for Cohort 1 continued in Year Three. Cohort 1 included MATH 121, CHEM 122 and PHYC 160/161. PHYC 160/161 was 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. STEM Gateway is undertaking the necessary data collection and analysis to determine the longitudinal impact of this redesign project.

Cohort 2 redesigns were implemented in Year Two, continued in Year Three and are projected to continue into Year Four. These included BIOL 204L, CHEM 121 and PHYC 140 (now PHYC103).

Cohort 3 redesigns were implemented near the end of Year Three and will continue in Year Four. These included MATH 116, BIO 202/202L, and BIO 204. MATH 116 is being piloted in 2014-2015 as a new course that combines trigonometry (3 credits) and pre-calculus (3 credits) into one 4-credit course to remove redundancies from the courses and shorten time to degree completion for STEM students.

In support of the redesign projects, professional development opportunities were provided for STEM faculty. The members of the three Cohort 3 redesign teams (BIOL 202/202L, BIOL 204, MATH 116) began their work at the STEM Gateway course redesign institute on May 20-22, 2014. 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 learning 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. Cohort 3 team members joined the first and second cohort in monthly meetings beginning in July 2014 Workshops and work sessions were scheduled throughout the year. Cohort 1 redesign teams (CHEM 122, MATH 121, PHYC169/161), Cohort 2 redesign teams (BIOL 204L, CHEM 121, PHYC 140) and Cohort 3 teams (BIOL 202, BIOL 204L, MATH 116) met approximately monthly with co-PI Smith and graduate assistant Audriana Stark to discuss challenges, accomplishments, and participate in on-going professional development. Occasional meetings also took place between co-PI Smith and team leaders to address specific concerns with each project.

STEM Gateway also hosted an external expert who led workshops that focused on how to implement effective pedagogy in STEM courses for all faculty, including the course redesign teams with an emphasis on teaching in active learning classrooms (aka learning studios). The expert was Dr. Robin Wright (Associate Dean and Professor of Biology at the University of Minnesota. STEM faculty and graduate student teaching assistants attended these workshops. Wright participated as the plenary speaker at UNM's Success in the Classroom Conference and gave public lectures that were attended by both STEM and non-STEM faculty. Several instructors involved in redesign projects are contemplating moving their classes into learning studios as a result of the workshops.

To support the institutionalization of redesign projects and to assist in framing and guiding the critical course redesign initiatives, UNM created a STEM Gateway Course Redesign 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 from the Assistant Chair for Undergraduate Program from Physics & Astronomy. On September 10th, 2014 two additional department chairs joined the committee to represent Biology and Earth and Planetary Science. The council has been very engaged with recruiting course redesign proposals, and have provided support and guidance well beyond the endorsement of the redesign projects.

ASSESSMENT

Pursuant to evaluating Objective A.1, course enrollment and completion data were collected in redesigned course sections of the two Cohort 1 and three Cohort 2 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 achievements in redesigned sections versus non-redesigned sections of the same course in a single earlier semester. 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 CHEM 122 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. The MATH 121, BIO 204L, PHYC 103 teams collected student survey data in redesigned sections during Fall 2013 and Spring 2014. The data are being used to determine student perceptions of the redesign and, when appropriate, to make adjustments to the course redesign elements.

During the STEM Gateway Symposium in April 2014, a topical-discussion group reviewed the objectives, organization, and preliminary outcomes of the course-redesign component by co-PI Smith. Smith provided insight about what teams have been doing during the time the projects are funded, assessment results from the teams, and how in the future STEM Gateway will be emphasizing sustaining and expanding course redesign projects by promoting the formation of communities of practice with instructors teaching the same course. During the discussion breakout sessions, we solicited ideas for future redesign projects as well as ways STEM Gateway can help teams to expand and sustain their efforts. Comments and suggestions arising from this group were recorded and taken under consideration by the Director and co-PIs.

Some redesign teams have disseminated the results of their efforts across UNM and to other institutions. Physics and Chemistry course-redesign teams presented sessions that described their Fall 2013 redesign efforts and preliminary results at UNM's annual Success in the Classroom Conference. The Chemistry team also presented at the New Mexico Higher Education Assessment and Retention Conference and the Biennial Conference in Chemical Education in Michigan. Although there was no formal recording of feedback to the session 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-redesign efforts provides a continuous source of ideas and constructive criticism on the redesign component along with reporting of barriers and pathways toward course-redesign success that inform planning and programming choices by the STEM Gateway staff.

Surveys of the team leaders from the Cohorts 1 and 2 were administered and assessed to determine what elements that the teams are still using, modifying, and adding and whether the redesigned elements are being utilized by members not a part of the original redesign team. Two of the five team leaders responded to the survey.

Interviews of Chemistry instructors were conducted by STEM Gateway staff to determine key ingredients that have made the Chemistry team successful in their efforts to expand the redesign elements to new instructors and continue to improve curriculum elements beyond the life of the grant. The Chemistry team has developed an ongoing community of practice that enables the existence of the project and ongoing improvement. Interviews revealed a change in the culture of teaching Chemistry 121/122. Not only are all instructors aligned in utilizing research-supported teaching pedagogy, they are also collaborating in an unprecedented way, using lesson study to improve topical areas of instruction as indicated by exams. STEM Gateway staff is taking into consideration lessons learned from the interviews in order make adjustments to the ongoing professional development program for other course redesign teams.

FINDINGS

Members of the course-redesign 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 Conference and national conferences. In addition, overlap in membership between the first-, second-, and third year cohorts in chemistry, physics, math and biology demonstrates ongoing commitment to redesigning curricula. Given a wide variability among factors that influence the projects, we see varying outcomes from the teams. These findings are described for each team below.

Several factors are likely contributors to slower than anticipated improvements in course completion and success (grade of C or higher) rates for targeted students. First, performance dips are well known in metanalyses of course redesigns and may require more than the 3-semester evaluation window in order to set a new, positive trajectory. Second, dissemination of effective practice beyond the original redesign-team members has proven to be a challenge. Some team members are no longer at UNM (half of the Math 121 team, for example) and although other instructors are generally open to adopting the new pedagogical strategies developed by the original teams, some of this adoption is only partial, is occurring incrementally, and/or is moving forward with varying levels of instructor competency. As a result, success rates vary by as much as 20 percentage points between sections of the same course and sections with lower success rates are diluting the effects of significantly improved success rates in other sections so that the overall results, reported above, are below our anticipated progress at this point. In some cases, instructors without prior teaching experience have been added to teach the redesigned courses and although they are generally anxious to adopt the redesigned elements they are still developing overall teaching skill sets that may be affecting overall success rates. Third, it is difficult to establish a valid baseline for comparing the success rates in the redesigned courses. Currently, we are using a single, pre-redesign semester for these baseline data but will, beginning in Year 4, make a more rigorous analysis of baseline criteria that takes into account considerable variability between semesters for each pre-redesign course. In addition, changes in assessment and grading policies that have accompanied the redesign work make it difficult to compare current student learning achievement with pre-redesign grade distributions. For example, all CHEM 121 and 122 instructors now administer common examinations, which was not true in the past and there is a perception that the current examinations are more rigorous than the exams that most instructors administered in the past. At the same time, there is ongoing critical analysis of these new examinations by the Chemistry faculty to address potential adverse-grade impacts of poorly worded test items.

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 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. 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 instructors meet weekly to continue to refine their redesigned sections and have reported a change in culture among teachers of CHEM 121 and CHEM122.

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. Given, there was no increase in students' ability to solve problems despite their improved conceptual understanding and without longitudinal data to support the project, Physics 160/161 has discontinued the redesign elements until data can show that the efforts are making the intended impact for students going on to other STEM major courses. They feel that is unwarranted to dedicate further energy to this initiative without evidence of longitudinal impact of course redesign on subsequent completed courses. STEM Gateway is working with Physics and Astronomy and the Office of Institutional Analytics to obtain these data.

Physics 140, now PHYC 103, was a new course on fundamental mathematics and problem-solving skills that was intended to provide a stronger foundation for success in PHYC 160. The course was piloted in Spring 2014 and offered in Fall 2014. Enrollment numbers have been low (17 students in spring and 13 in the fall). Course instructors are working with the department chair, advisement and STEM Gateway to determine factors for placement and promote the class to students. In the absence of clear placement criteria for encouraging or requiring students to enroll in this new course it has been difficult to attract enrollment necessary to sustain this potentially beneficial curriculum addition.

BIOL 204L instructors successfully developed and implemented redesigned curriculum for the plant half of the course. The animal half of the course is still being 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 in 2013 and Robyn Wright, in 2014, to broaden interest in course redesign.

PLANS FOR IMPROVEMENT

Efforts for improvement during Year 4 are focused on (a) ensuring expansion to more instructors /sections and sustainability of the projects past the life of the grant, and (b) modifications to the faculty-development support from STEM Gateway. STEM Gateway built in extra professional development support and requirements for teams to support effort on (a). Emphasis on sustaining and expanding the project was also built into the Course Redesign Institute for Cohort 3. STEM Gateway also plans to take into account lessons learned from interviews with the chemistry team in order to tailor faculty development sessions on sustaining and expanding redesign projects. For example, STEM Gateway will hold individual team sessions where we utilize the lesson-study model to demonstrate to teams how the approach works in order to have continual improvement.

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 and Astronomy), course redesign cohort 1 (MATH 121, CHEM 121, PHYC 160/161) and cohort 2 (CHEM 122, PHYC 140, BIO 204L), the Center for Effective Teaching, and STEM Gateway staff to help achieve our improvement goals.

STEM Gateway will investigate longitudinal data for the PHYC 160/161 course to determine the extent the redesign efforts prepare students for subsequent STEM courses and try to re-initiate the PHYC 160/161 redesign elements. STEM Gateway will also work closely with the PHYC 103 team on determining placement criteria for students and marketing the new course.

Finally, STEM Gateway will work with several stakeholders to determine whether the currently implemented placement system, particularly for mathematics courses, is flawed. If the system is found to be flawed, efforts will be made to improve the placement system for STEM courses.

Project Objective: 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	%
			1896 / 2370	80		2173 / 2370	92
		Target			Actual Performance Data		
(b) The STEM PLF program will employ 40 Undergraduates per semester	Project	Raw Number	Ratio	%	Raw Number	Ratio	%
		40	/		52	/	
		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	/		55	/	
		Target			Actual Performance Data		
(d) STEM PLFs potentially impact more than 3000 students per year	Project	Raw Number	Ratio	%	Raw Number	Ratio	%
		3000	/		3316	/	
		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		5 / 5	100
		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	%
			9 / 9	100		2 / 9	22
		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	%
		64	/		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	%
		18	/		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	/		3	/	

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, 2014 and January 15, 2015. The data was collected and analyzed by STEM Gateway staff and by staff from the UNM Office of Institutional Analytics.

(a) This measure has been met

(b) This measure has been met

(c) This measure has been met

(d) This measure has been met

(e) This measure has been met

(f) Target has not been met. During the first two years of this program, approximately 146 full semester sections have been supported by the PLF progam. Of these, only eleven 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 PLF-supported sections by October 1, 2014. Of those eleven, only two 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, marked (g) (h) and (i).

(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.

(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 = 2.949. This measure indicates that the STEM Gateway Program has been successful in recruiting high performing student employees as Peer Learning Facilitators. Retention of these students has also been strong. Over the course of the first three years, 85.6% of all PLF student employees have either graduated or returned to their PLF jobs the following semesters. Consequently, retention is extremely high among PLF employees.

PEER LEARNING FACILITATOR PROGRAM: YEAR THREE ACCOMPLISHMENTS

In the Spring 2014 semester, 50 Peer Learning Facilitators supported 30 sections of 9 STEM Gateway courses. In the Summer 2014 term, 3 Peer Learning Facilitators supported 2 sections of 2 STEM Gateway courses. In the Fall 2014, 47 PLFs supported 24 sections of 9 STEM Gateway courses. Fall 2014 also marked the inclusion of Biology courses to the program.

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-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 Three, student employees engaged in both Pre-Semester and weekly Professional Development Trainings. 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, and how to navigate tutoring in an active learning environment (Spring and Fall 2014 schedules attached as "Attachment One.")

PARTNERS

Other stakeholders beyond the faculty and students who PLFs serve and who have participated in the program include our sister grant, STEM Up. STEM Gateway has hired former student employees from the STEM Up grant as they make their transition to UNM. STEM Gateway staff also assisted in facilitating during the STEM Up Retreat in December 2013. The PLFs also work closely with Kelli Hulslander (STEM Advisement Coordinator) and her STEM advising team, and the student tutors at the Center for Academic Program Support (CAPS), as well as their staff members. During Spring 2014, 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 - 12pm and last semester, UNM was able to offer tutoring until roughly 8pm instead of 12 pm 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 8-12pm (8pm last year) if any student wants to de-brief afterward. With the assistance of Chemistry and Math department instructors, who donated old finals and keys, several PLFs worked with other CEOP staff to proctor and tutor. Through this project, STEM Gateway served 176 students. Finally, the PLF Program has worked to assist other departments'' facilitation of similar work. During Fall 2014, CAPS began a small pilot PLF Program aimed to serve students in other types of classes that were not eligible for support under the STEM Gateway grant. Three classes: Geography 101, Management 202, and Chemistry 111, all had CAPS PLFs during this semester. CAPS PLFs also attended several training sessions with the STEM Gateway PLFs.

To strengthen partnerships with the PLF instructors, a PLF Advisory Council was formed in Year Two. In Year Three, this group addressed two challenging tasks: (1) The Advisory Council developed 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 the Spring 2015 semester.

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. The PLFs also evaluate each training session that they attend via a short survey. These surveys are utilized by STEM Gateway staff and PLF instructors to 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.

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 compassionate experts. They enjoy the work they do, as reflected by their responses to surveys and by the fact that they continue to work as PLFs each semester (I lose almost no employees each semester beyond those who graduate). They value the opportunities for guidance from instructors and often experiment with new ways to better serve their students.

Overall, the PLF has been a highly successful program. In Year Three, the PLF program met 8 of 9 performance measures (measure A.2.f was not met, but is problematic in its structure. See Annual Performance Report for Year Two for full explanation). In Year Two, the PLF program served more than 3,000 students, and recruited and retained more than 50 highly successful student employees (PLFs). Students who enrolled in PLF-supported sections were four percentage points more likely to succeed than their peers in non-PLF-supported sections of the same courses.

PLANS FOR IMPROVEMENT

The primary improvement for the PLF program will be developing a plan for institutionalization. STEM Gateway staff has created a plan in partnership with the Center for Academic Program Support (CAPS) (see partnership narrative above). This plan will be expanded in Year Four, and STEM Gateway staff will collaborate with administrators and CAPS staff to solicit funding to continue the PLF program after the completion of this grant.

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	/	
(b) Throughout the five years of this grant, at least 150 Hispanic and/or low-income students will complete SSIG sections	Project	150	/		158	/	
(c) Throughout the five years of this grant, this SSIG program will impact 700 students	Project	700	/		225	/	
(d) Throughout the five years of this grant, SSIG sections will shadow at least four gateway courses	Project	4	/		5	/	
(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		89 / 111	80		101 / 111	91

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) and directly from student participants (by way of surveys and sign-in sheets) between the dates of October 1,2013 and January 15, 2015. 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 already been met.

(c) Target for the entire five year period of this grant have not been met, and we are 32% towards that goal. Plans have been implemented that will allow us to complete and exceed this goal by the end of Year Four (see narrative below).

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

(e) Target has been met.

YEAR THREE ACCOMPLISHMENTS

To achieve the SSIG learning outcomes, the STEM Gateway strategies are three-fold: Students for STEM Success, AEON and EASE. All three are focused on orientation, mentorship, workshop, and services designed to assist students in accelerating their acquisition of skills in key SSIG disciplines. To effectively implement these initiatives, we hired a program specialist in September 2013. Between September and February 2014, foundational work was completed to organize the first set of workshops given though the Students for STEM Success (S3) initiative (see below). During Summer 2014, STEM Gateway staff focused on logistics associated with Fall 2014 workshops and events for both S3 and the Achievement & Exploration Opportunities & Networking (AEON) STEM workshop series (see below). During Fall 2014, staff moved forward with building the workshops for the Essential Academic Skills Enhancement (EASE) workshop series (see below), to be implemented Spring 2015.

SSIG MODEL OPTIONS & SUMMARIES:

(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 2013-2014 academic year. Between February and September 30, 2014, there were 14 staff lead workshops that reached a total of 82 students, 60 of whom were Hispanic or low-income students (73%). Additionally, S3 hosted and participated in a STEM fair event, in which STEM student organizations set up booths representing their group in an effort to recruit new members. They also created a listserv with a weekly digest of STEM related events to better facilitate communication with students. They created Facebook and Twitter accounts, which are updated regularly and increased the number of followers on both sites.

In Year Four, the student S3 facilitators are interested in creating a community of scholars across the diverse areas of STEM. To achieve this goal, they are starting a new student-based initiative on campus dedicated to creating this community from the ground-up, with a focus on first and second year undergraduates. They held their first student networking event (STEM Break) 25 September 2014.

(2) Achievement & Exploration Opportunities & Networking (AEON) STEM workshop series. AEON is 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 Enrichment & Outreach Programs, College of Nursing, El Centro de la Raza, Engineering Student Services, Graduate Studies, Research Opportunity Program/McNair Scholars, Science, Technology, Engineering and Math Undergraduate Pathways (STEM UP), STEM Advising, and STEM Gateway. Invited collaborators are American Indian

Student Services, Anderson School of Management, Career Services, Center for Teaching Excellence, Maximizing Access to Research Careers, Veterans Resource Center, and Women's Resource Center. The focus of AEON is to strengthen skills, build connections, and provide resources for the success of STEM students, regardless of their specific field of study. STEM Gateway staff attain these goals by offering various workshops throughout the semester, open to all UNM students. These workshops began in Fall 2014, and participation numbers will be reported in the Year Four APR.

(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. Foundational and logistical plans are in place to implement a total of 74 workshops over the course of the Spring 2015 semester. These are offered in partnership with the core Biology labs, with mandatory attendance for lab students. Topics covered will include: Basic Excel, scientific reading and writing, metrics, and critical thinking. Additional workshops will include advanced Excel with statistics, study tips, and advance Library research techniques.

During Year Three, staff focused on offering rudimentary workshops and building towards a more comprehensive program. Workshop scores in response to "To what extent does this workshop support your interest in STEM degrees or your ability to succeed in STEM courses?" range from 3.71 – 5.0 (5 point scale), with an average of 4.52 across all workshops. When asked, through our workshop evaluations over the past year, "What was one thing you will take from this workshop that will help you as a STEM student?," responses included: attitude matters, stick with it, you can make it, you are not alone, networking is important, it is ok to speak up, and it is never too early to start thinking about your future. When asked "Do you have any comments on this workshop or suggestions for future STEM workshop ideas?," responses included: increase marketing/advertising, great workshop, have a bit more student interaction, the smaller sizes are nice and personal, and have more workshops.

In Year Four, STEM Gateway staff will expand student participation in S3 and Aeon workshops. For the Spring 2015 semester, S3 will have four student centered meetings, four STEM Break activities, and host four workshops. The AEON collaborative has planned 14 workshops. For both of these initiatives, we anticipate 15 – 30 participants per event, totaling 390 – 780 students. Our largest impact will be through the EASE workshops. We will reach more than 1100 students, some repeatedly, through a total of 71 workshops. Expansion for each of these programs will continue through the Spring 2015 semester. By the end of Year Four, STEM Gateway anticipates serving more than 3,000 students using the modified SSIG model alone (far surpassing the goal measure A.3.c of 700 students in five years of the grant).

We have structured these initiatives in such a way that they establish the necessary foundation for institutionalization. The S3 is holding monthly meetings with STEM students, as if they were a charted student organization. This will build a following and ease the transition from paid facilitator format to a student officer structure. AEON is a collaborative across many programs at UNM, allowing for the continued programing and success once the STEM Gateway funding comes to an end. Lastly, the EASE workshop series is tightly connected to the Biology department, and this partnership will be leveraged to seek institutional funding.

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	333	/		369	/	

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, 2014 and January 15, 2015. 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 increased to 338, and during Year Three this number increased to 369.

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	9	/		9	/	

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, 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 has been met. The third of these tools (transfer student data analysis) will be expanded in Year Four to include more comprehensive student-level course analysis.

YEAR THREE ACCOMPLISHMENTS

The Data Driven Prioritization Project completed two large projects during Year Three:

TRANSFER STEM STUDENT ANALYSIS. This research project focused on better understanding STEM student achievement among transfer students at UNM in terms of UNM GPA and degree outcome status. In this transfer group, there were 912 transfer students who were admitted to UNM STEM programs between Fall 2006 and Spring 2009. Of these, 309 (34%) went on to graduate with STEM degrees, 136 (15%) changed majors out of STEM, 434 (48%) stopped attending UNM prior to completing a degree, and 33 (3%) were still enrolled in STEM programs at the time of the analysis. The following analysis has been shared with a small group of administrators, and will be presented to larger audiences in the spring of 2015. Key findings include:

Race and Ethnicity: Graduation rates differed widely by ethnicity. Only 17.5% of Native American STEM transfer students went on to graduate with STEM degrees, compared to 34% for Hispanic students, 30% for African American students and 35% for white students. Drop out rates also varied widely: 47% for Hispanic students, 47% for white students, 54% for Native American students and 70% for African American students. The descriptive statistics indicate that minorities tend to have more negative outcomes. As an example, American Indian, African American, non-White female, first generation students and Pell students were less likely to graduate with STEM degrees and more likely to drop out of UNM. An exception occurred with White male, who were less likely to graduate and more likely to drop out.

Minorities, Pell Eligibility and First Generation Status: An analysis of odds ratios compared different outcome groups to each other. First, when we compare STEM graduation, continued enrollment, and switching majors with dropping out of UNM, we find that first generation students are significantly more likely to drop out and less likely to graduate, remain enrolled or switch majors than not first generation students. Second, when we compared Native American students with non-Native American students with respect to graduation versus all other outcomes, Native American students are significantly less likely to graduate than non-Native American. Third, when we compare switching majors with dropping, African American students are significantly more likely to drop than non-African American students. Fourth, when we compare graduation versus all other outcomes, Pell eligible students were significantly less likely to graduate.

Transfer Credits: Students who transferred in more credits were more likely to persist and graduate with STEM degrees than students who transferred in fewer credits. Of students who transferred in fewer than 61 credits, only 8% graduated, and 77% dropped out. Of students who transferred in more than 61 credits, 30% graduated and 52% dropped out. Of students who transferred in a complete associate degree, 47% graduated and 32% dropped out.

Gender: There was no significant difference in outcome status based on gender. Men had slightly higher graduation rates than women (35% for men, 33% for women), slightly higher degree switching rates (16% for men, 14% for women), and slightly lower dropout rates (46% for men, 49% for women). However, these differences were not statistically significant.

Income Level: Students who were Pell-eligible were less likely to graduate (41% for non-Pell-eligible students, 34% for Pell-eligible students), more likely to switch majors out of STEM (15% for non-Pell-eligible, 21% for Pell-eligible) and surprisingly less likely to drop out (42% for non-Pell-eligible, 41% for Pell-eligible). However, the test of association between Pell eligibility status and outcome status were statistically insignificant.

Transfer GPA: Holding other variables constant, an increase in one unit of transfer GPA was associated a 0.336 increase in expected UNM GPA. In brief, students who do better before transferring to UNM tend to have higher UNM GPA once they are at UNM.

UNM GPA: Students who perform better in their UNM classes are more likely to graduate, less likely to drop-out and less likely to switch majors out of STEM. UNM GPA outperforms Transfer GPA in predicting student success in graduating with STEM degree.

Caution: Some tests are not significant due to multiple reasons. First, the counts in some ethnic groups are quite small. Second, some measures (such as first generation status) are internal. Internal measurement tends to have measurement errors.

Year Four: The next phase of this analysis will examine individual course taking patterns for transfer students. We will identify the courses that are most likely to negatively impact student achievement for transfer students, and we will examine the impact of gateway courses transferred in compared to gateway courses taken at UNM.

KEY PERFORMANCE INDICATORS ANALYSIS. This analysis attempted to identify short-term measures that correlate to graduation. The results of this analysis will allow UNM administrators to monitor the expected impact of specific interventions on STEM graduation, without having to wait four years for graduation rates. Key findings include:

Semester-to-Semester Retention: As expected, there was a significant and strong correlation between semester retention and graduation. Indeed, the longer students persist, the more likely they are to graduate.

Semester GPA: Semester GPA correlates to eventual graduation positively although the strength of correlation varies for different semesters.

Number of Repeated Courses: The number of repeated courses is negatively correlated to eventual graduation.

Upper Division Course and Degree Progression: The numbers of upper division course completed by the 4th and 5th semesters were positively correlated to eventual graduation significantly. The correlations ranged from medium to weak.

Math Grades and Degree Completion: As in previous STEM Gateway analyses, math performance is strongly associated with UNM graduation across the board. Earning at least one grade lower than "C" in a pre-calculus mathematics course would indicate that students were significantly less likely to graduate.

YEAR FOUR PROJECTS: Three major analysis projects have been planned for Year Four:

Transfer Analysis, Phase Two: Detailed analysis of course taking patterns for STEM transfer students.

Math Placement Analysis: Analysis of math placement tools and related advising practices to determine if STEM students are being placed properly into their initial math courses.

Course Reform Analysis: Comprehensive and detailed analysis of course reform projects and their impact on student achievement, specifically designed to improve student achievement in reformed sections.

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	/		78	/	
		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	/		605	/	

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, 2014 and January 15, 2015. 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 2012 freshman cohort. For year three, 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 2013-2014. For year three, 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

Year One Expenditures: $469,012
Year Two Expenditures: $900,797
Year Three Expenditures: $898,990
Year Three Overage: $8,834

EXPLANATION OF YEAR THREE OVERAGE AND PLAN TO COMPENSATE:

During the first two years of the STEM Gateway program, the Course Reform Team members from Central New Mexico Community College were hired as summer term employees through the UNM Human Resources (HR) Office. During Year Three, the HR office switched the hiring of these employees to another office: the UNM HR TEMP Office. Under the TEMP office, STEM Gateway was charged a percentage of the CNM employee salaries as a service & processing fee. This led to $5,135 of unanticipated costs related to the Course Reform project. This accounts for 58% of the overage. The remainder of the overage came from under-estimates of benefits costs for term employees (faculty on summer contracts and graduate assistants).

For Year Four, we will not hire CNM employees through the TEMP office, and will instead hire them on individual contracts. This will eliminate the HR TEMPS service fee. We will also estimate higher for benefits for term employees.

STEM Gateway will cover the Year Three overage in Year Four as a result of a change in directors. As mentioned in the Executive Summary, the previous STEM Gateway Director switched to another Title V program in early November, 2014, and his replacement began in late January, 2015. This nearly three month gap will result in Year Four STEM Gateway savings of more than $16,000. This savings will more than compensate for the Year Three overage of $8,834.

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
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

STEM GATEWAY PARTNER DEPARTMENTS AT CENTRAL NEW MEXICO COLLEGE
Dean's Office, School of Math, Science and Engineering
Biology Department
Mathematics Department
Chemistry Department

There were no major changes in partners between Year Two and Year Three.