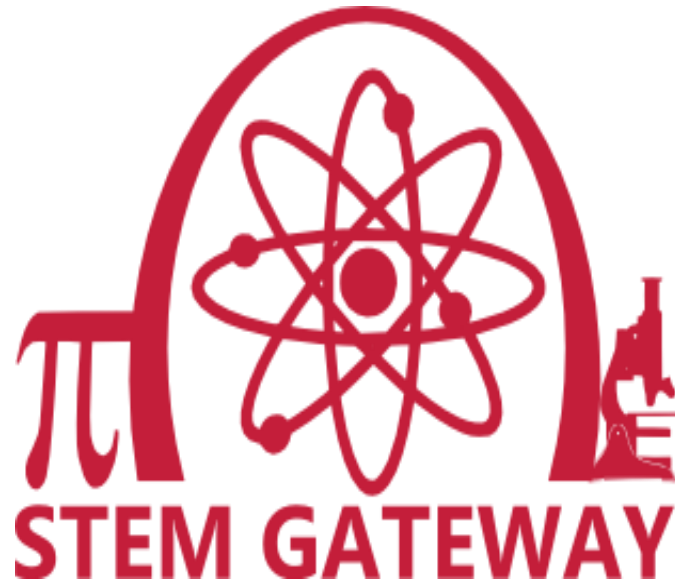


# STEM Student Persistence and Graduation at UNM

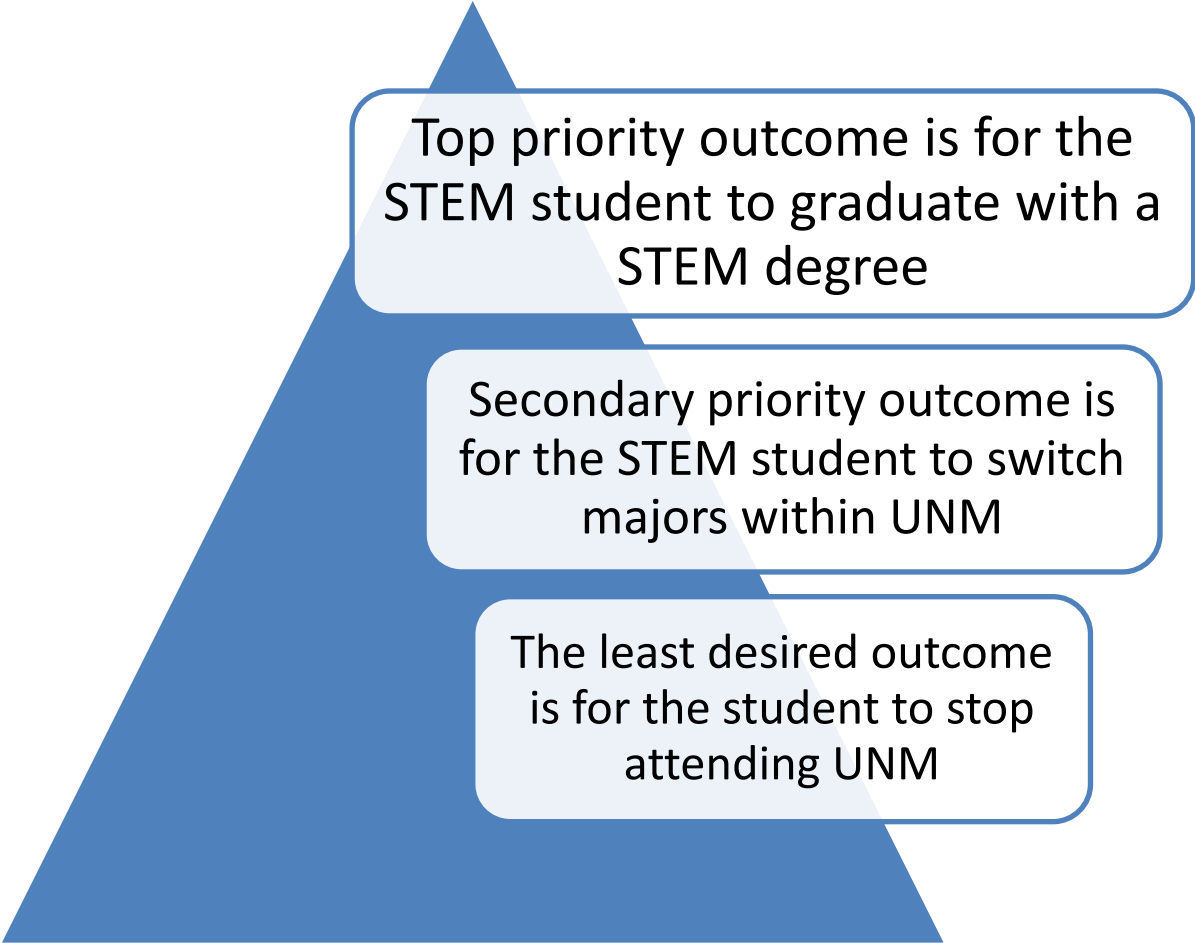
Presentation for the Alliance of Hispanic Serving Institution Educators annual conference, March 2013

Presented by; Vicky Dueer, Senior Institutional Researcher, Office of Institutional Analytics, University of New Mexico



**The STEM Gateway program is funded through a U.S. Department of Education TITLE V grant, 2011-2016 which focuses on improving persistence in STEM disciplines for Hispanic and/or Low-income students at the University of New Mexico.**

# Prioritizing Student Outcomes

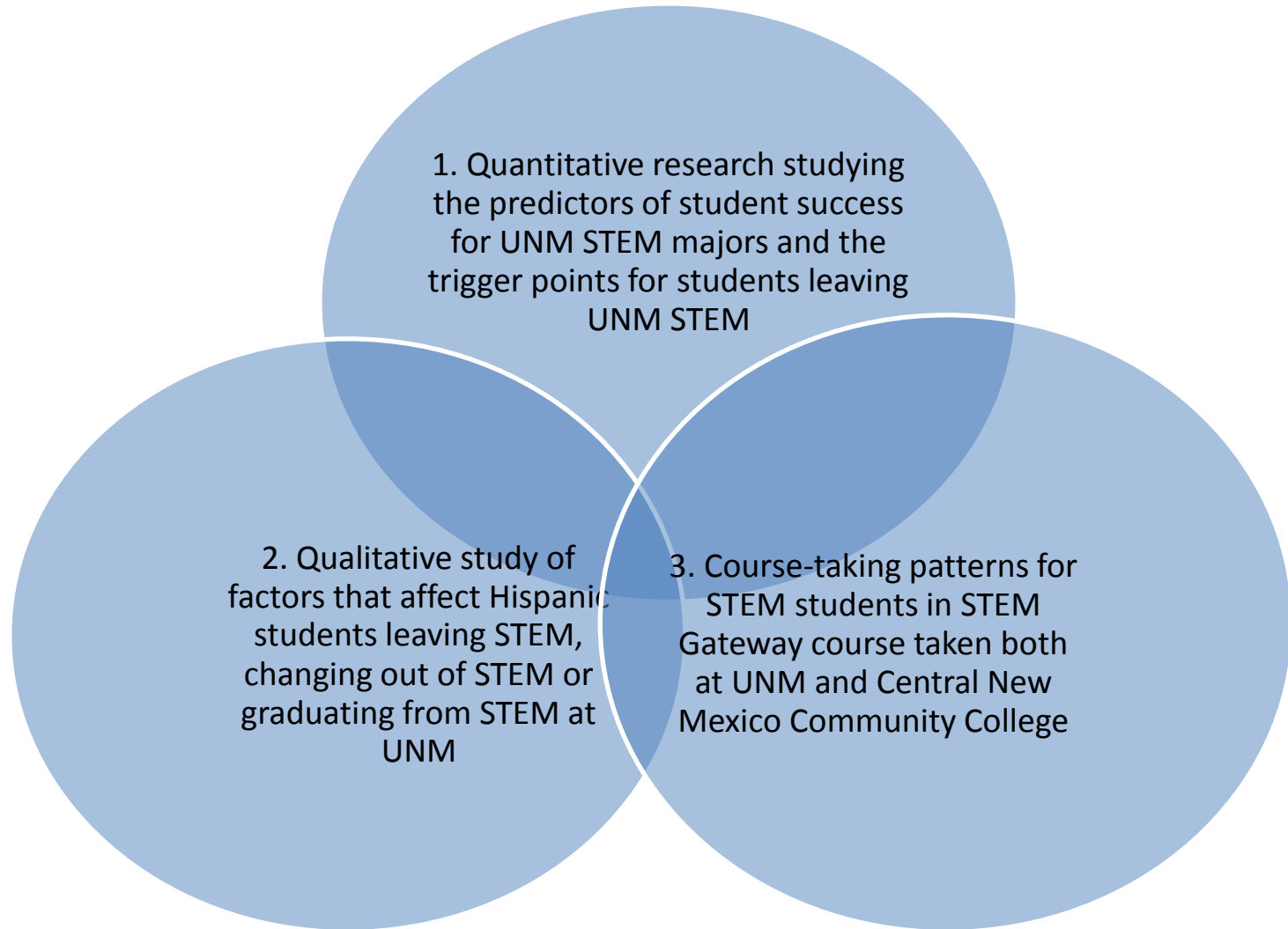


Top priority outcome is for the STEM student to graduate with a STEM degree

Secondary priority outcome is for the STEM student to switch majors within UNM

The least desired outcome is for the student to stop attending UNM

# Current Research Projects



FALL 2005, 2006,  
2007 COHORTS

STARTED AS FIRST TIME ,FULL-  
TIME FRESHMEN

STARTED UNM AS STEM MAJORS

STUDY  
SUBGROUPS

**1. Left**

Shifted out of STEM  
major or left UNM

SHIFTED

STOPPED

**1a**

**1b**

Subgroup  
Compare

Trigger Points

*What students are we  
not serving well?*

*When are students  
leaving our STEM  
programs?*

**2. Stayed**

Graduated STEM or still  
in STEM major at time  
of study

GRADUATED

ENROLLED

**2a**

**2b**

Subgroup  
Compare

*In which Gateway courses are students  
encountering the most barriers to  
completion?*

Succeed to Research  
Question #2; Course-  
Taking Patterns

# STEM Study Subgroups

- *Total Across Groups* (n=1,503); First-time, full-time freshmen in 2005, 2006 and 2007 cohorts declaring a STEM major @1<sup>st</sup> semester
- ***Graduated*** (n= 334); Students who received their degree in a STEM major
- *Enrolled* (n= 86); Students still enrolled in a STEM major at the beginning of the 7<sup>th</sup> year
- ***Shifted*** (n= 639); Students who switched to a non-STEM major at some point
- ***Stopped*** (n= 444); Students who left UNM

# Percentage of Ethnicity Within Each Group

	Stopped	Graduated	Enrolled	Shifted
American Indian	11%	2%	5%	6%
Asian/Pacific Islander	4%	8%	7%	5%
Black/African American	2%	2%	0%	3%
Hispanic	<b>38%</b>	<b>28%</b>	<b>48%</b>	<b>36%</b>
International	0%	0.3%	1%	0%
Native Hawaiian	1%	0%	0%	0%
Race/Ethnicity Unknown	3%	5%	8%	3%
White, non-Hispanic	42%	55%	31%	47%
	100.0%	100.0%	100.0%	100.0%

# Percentage of Each Gender Within Groups

	Stopped	Graduated	Enrolled	Shifted
Female	36%	36%	26%	42%
Male	64%	64%	74%	58%
	100%	100%	100%	100%



# Key Factors Affecting Program Priorities

**High School GPA** aligns with advancement through these priorities. Students who leave UNM have the lowest high school GPA (average 3.27), followed by students who shift majors out of STEM (3.45), followed by students who graduate with STEM degrees (3.75).

**College GPA** aligns with advancement through these priorities. Students who leave UNM have the lowest college GPA at UNM (average 2.09), followed by students who shift majors out of STEM (2.95), followed by students who graduate with STEM degrees (3.51).

**ACT Scores** align with advancement through these priorities in all subjects: Students who leave UNM have, on average, lower ACT scores (21-23), followed by students who shift majors out of STEM (23-24), followed by those who graduated with STEM degrees (25-26).

# Shared Characteristics Among STOPPED STEM Students

CHARACTERISTIC	Actual Pct of STOPPED students	Expected Pct of STOPPED students	Odds Ratio (p-value)
Hispanic	38.1%	35.46%	1.07 (.498)
American Indian	10.8%	6.38%	1.69 (.006)
Pell-Eligible	27.3%	22.68%	1.20 (.127)
First Generation Student	40.6%	32.76%	1.24 (.079)
Required Remediation	39.5%	29.06%	1.36 (.004)
Required Remedial Math	26.4%	17.13%	1.54 (.001)
Received Lottery Scholarship	36.9%	68.59%	0.54 (< .001)
Lost Lottery Scholarship	42.1%	29.87%	1.41 (.031)

# Shared Characteristics Among STOPPED STEM Students

<b>CHARACTERISTIC</b>	<b>Actual Score for STOPPED students</b>	<b>Expected Score for STOPPED students</b>	<b>R<sup>2</sup> (Stopped vs. Not Stopped)</b>
<b>High School GPA</b>	3.27	3.46	.07
<b>Average College GPA</b>	2.09	2.83	.28
<b>Average Number of Semesters to Matriculation</b>	2.4	3.7	.04
<b>Average Number of Remedial Courses Taken</b>	1.7	1.6	.03

# Criteria for STEM Gateway Courses

Must meet at least one of the criteria on this list as defined by the STEM Gateway Program

Entry level (100 and 200 level) program-requirement courses that lead to degrees in the approved STEM disciplines

Companion courses (labs, problem solving courses, etc) that are connected to Core Requirement or Program Requirement courses

Pre-requisite courses that are required by students to take Core Requirement or Program Requirement courses

Large-enrollment (>500 students/year) courses required for degrees in the approved STEM disciplines

# The UNM STEM Gateway

## “Killer” Course List

- Fall 2011 list includes eighty two courses with high enrollments (121 and above across all sections) and low student pass rates.
- STEM Gateway studied the grade distribution patterns for sixteen STEM-based courses on this list, including Math (8), Environmental Science (1), Chemistry (4), Biology (2), and Physics courses (1).
- These courses represent a sizable portion of the gateway courses that STEM students complete en route to their degrees.

# Key Findings

- Focusing on the ABC passing range limits our understanding of the true nature of STEM course success.
- Averaging across the courses in our subset, Graduated students (86%), Shifted students (65%), and Stopped students (54%) completed in the Passing range.
- When comparing GRADUATED students to SHIFTED and STOPPED students, we find that largest grade difference is in the “A” range.
- Nearly 38% of GRADUATED students earned “A”s in these courses, only 15% of SHIFTED students and 11% of STOPPED students did so.

# “All the Way to A”

## Comparing GRADUATED to SHIFTED and STOPPED

	A	B	C	D	F	WD	CR	NCR	ABC
Graduated	38	33	16	4	1	7	2	0	86
Shifted	15	26	24	11	5	16	2	2	65
<i>Difference</i>	23	7	-8	-7	-4	-9	0	-2	21

	A	B	C	D	F	WD	CR	NCR	ABC
Graduated	38	33	16	4	1	7	2	0	86
Stopped	11	23	21	13	9	22	1	2	54
<i>Difference</i>	27	10	-5	-9	-8	-15	1	-2	32

# Concluding Remarks

- Share key findings with stakeholders in multiple formats, avenues, and forums.
- Shift key focus for STEM students at UNM on earning “A” grades instead of meeting the “Pass” standard.
- Design programs and services to help students appreciate the distinction between “A” grades and “passing” grades
- Consider the “A” grade achievement as a key performance indicator for UNM’s STEM improvement goals.



# Next Steps: Focus Groups with Multiple Stakeholders

- **Goal is to answer three questions:**
  1. What are the implications of this study?
  2. What are the limitations of this study?
  3. What additional questions does this data prompt?

# Qualitative Study of UNM Hispanic Student Experiences in STEM

- Interviews with Hispanic STEM students around experiences with faculty, classes, campus life, and college preparedness.
- Sample first-time, full-time freshman (cohorts 2004-2007) who were Hispanic STEM students and meet one of the following criteria:
  1. Graduated with a STEM degree
  2. Graduated with a non-STEM degree after having been a part of a STEM program
  3. Previous STEM students who withdrew from UNM before completing any degree

*\*\*\*IRB approved study Protocol #: 12-360\*\*\**

# “Q Study” Research Questions

As perceived by the students of this study;

A). What factors contribute to Hispanic students' completion of a STEM degree at UNM?

B). What obstacles do Hispanic students encounter in STEM programs at UNM

Visit us at:

<http://unmstemgateway.blogspot.com>

The screenshot shows a Mozilla Firefox browser window displaying the UNM STEM Gateway blogspot page. The browser's address bar shows the URL [unmstemgateway.blogspot.com](http://unmstemgateway.blogspot.com). The page features a red header with the text "STEM Gateway" and "University of New Mexico". Below the header is a navigation menu with tabs for "WELCOME", "Overview", "Blog", "Course Reform", "PLF", "SSIG", "Research", and "IMPACT". The "Blog" tab is currently selected. The main content area displays a post dated "MONDAY, MARCH 4, 2013" with the title "STEM G Symposium... You're Invited!". The post includes a logo for the "STEM GATEWAY Symposium" dated "March 20, 2013". The text of the post describes the success of the STEM Gateway program in its first year, listing several key achievements and enrollment statistics. On the left side of the page, there is a sidebar with the UNM logo, the "STEM GATEWAY MISSION" statement, a "FOLLOW BY EMAIL" subscription form, and links to "IMPORTANT WEBPAGES" such as "Contact Info for STEM Gateway Team", "STEM G Facebook Page", and "STEM G Listserve".

STEM Gateway  
University of New Mexico

WELCOME Overview **Blog** Course Reform PLF SSIG Research IMPACT

MONDAY, MARCH 4, 2013

STEM G Symposium... You're Invited!

**STEM GATEWAY**  
Symposium  
March 20, 2013

During the first year of the STEM Gateway program, we have already seen promising successes:

- Course reform initiatives are currently underway in STEM gateway sections where 82% of enrollments come from Hispanic and/or low-income students (CHEM 122 = 86.78%; MATH 121 = 78.2%; PHYC 160 = 84.2%)
- Peer Learning Facilitators have been placed in 38 sections, serving 2,993 enrollments (Spring 2012 = 1164 students; Summer 2012 = 61 students; Fall 2012 = 1768 students)
  - More than sixty-five percent of students enrolled in PLF sections are either from Hispanic or low-income families
  - For Hispanic and low-income students, successful completion rates in sections that utilized PLFs were nearly five percentage points higher than for those sections that did not utilize PLFs

**STEM GATEWAY MISSION**  
UNM STEM Gateway  
Improve STEM instruction and student support at the University of New Mexico;  
Improve STEM graduation rates among Hispanic and/or low-income students.  
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# Questions and Feedback

## Contact Information:

Tim Schroeder, Project Director, STEM  
Gateway Program

277-1761

timschroeder@unm.edu

Vicky Dueer, Senior Institutional  
Researcher

277-7658

vjdueer@unm.edu

Join us in conversation:

<http://unmstemgateway.blogspot.com/>

