STEM GATEWAY

DATA-DRIVEN PRIORITIZATION UPDATE

HTTP://UNMSTEMGATEWAY.BLOGSPOT.COM/

(RESEARCH TAB)

STEM GATEWAY

SPECIAL THANKS TO…

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- **Phil Handwerk,** University Business Intelligence Officer, UNM Office of Institutional Analytics

RESEARCH PROJECTS

PAST – CURRENT - FUTURE

MATH COURSE COMPLETION AND STEM DEGREES AT THE UNIVERSITY OF NEW MEXICO

Research question: "What UNM math courses did recent UNM STEM graduates complete en route to their degrees?"

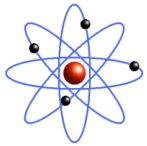
Population definition: Fall cohorts from 2000 through 2010 of first-time freshmen who were granted a bachelor of science or bachelor of arts in one of 18 STEM majors during the 2010-2011 academic year.

MATH COURSE COMPLETION AND STEM DEGREES AT THE UNIVERSITY OF NEW MEXICO

Report was distributed internally in July 2012, and is available online at: http://unmstemgateway.blogspot.com ("Research" tab)

Key Finding: More than 40% of the STEM graduates in this cohort began math at the level of college math or lower.

Analysis process: Focus groups of UNM faculty and staff reviewed the data and responded to three questions: (1) what are the limitations of this data? (2) what are the implications of this data? (3) what questions for future consideration does this study suggest?



STOP, SHIFT OR GRADUATE: STEM UNDERGRADUATE DEGREE COMPLETION PATTERNS AT THE UNIVERSITY OF NEW MEXICO

This study explores STEM degree completion patterns through two primary lenses:

- Degree outcomes. How do undergraduate students who graduate with STEM degrees differ from those who switch majors out of STEM, and from those who stop attending UNM prior to completing their degrees?
- Course outcomes. How do undergraduate STEM students perform in the core math & science gateway courses that lead into their STEM degrees?

STOP, SHIFT OR GRADUATE: STEM UNDERGRADUATE DEGREE COMPLETION PATTERNS AT THE UNIVERSITY OF NEW MEXICO

Population definition: First-time full-time freshmen students from the falls of 2005, 2006 and 2007 (inclusive of students who began in the summer preceding each fall term) who initially stated they were interested in STEM degrees, or who first switched to STEM degrees after originally entering as undecided students.

Analysis Process:

Focus groups will be held in April to answer the following questions: (1) what are the limitations of this data? (2) what are the implications of this data? (3) what questions for future consideration does this study suggest?

Focus groups will include representatives from faculty, staff, administration and students.

Report will be published in late Spring 2013.

STOP, SHIFT OR GRADUATE: STEM UNDERGRADUATE DEGREE COMPLETION PATTERNS AT THE UNIVERSITY OF NEW MEXICO

Selected preliminary findings:

- Hispanic STEM students are .65 times as likely to graduate with STEM degrees than non-Hispanic students (p=.001).
- Pell-Eligible STEM students are 1.43 times as likely to stop attending UNM (p=.007) and are .46 times as likely to graduate (p<.001) than non-Pell-eligible students.
- Female STEM students are .48 times as likely to pursue STEM degrees (from page 3), and are 1.36 times as likely to switch majors out of STEM (p=.005) than male students.
- First Generation STEM students are 1.62 times as likely to stop attending UNM (p<.001) and are .42 times as likely to graduate (p<.001) than non-First Generation students.
- American Indian STEM students are 2.55 times as likely to stop attending UNM (p<.001) and are 0.30 times as likely to graduate with STEM degrees (p<.001) as non-American Indian students.
- Sixty four percent of the STEM students who stop attending UNM do so before they matriculate into a degree program.

STOP, SHIFT OR GRADUATE: STEM UNDERGRADUATE DEGREE COMPLETION PATTERNS AT THE UNIVERSITY OF NEW MEXICO

Selected preliminary findings:

- Of all of the factors studied, cumulative college GPA seems to have the strongest relationship to student outcome category (graduation, shifting major or leaving UNM)
- In gateway killer courses, the largest difference in grade distributions among outcome groups is at the “A” range. Simply put, “A” students are far more likely to graduate than those who earn lower grades.

STOP, SHIFT OR GRADUATE: STEM UNDERGRADUATE DEGREE COMPLETION PATTERNS AT THE UNIVERSITY OF NEW MEXICO

Selected preliminary findings:

Of the gateway killer courses, those that result in the smallest percentage of graduators are:

Course category	Number of STEM students enrolled at end of the semester	Percent of STEM students who graduate with STEM degrees
Pre-calculus Math courses	2044	15.12%
STEM Gateway courses on the killer course list that are LEVEL 150 or lower	4359	23.31%
All math courses on the killer course list, combined	3440	24.83%
The average STEM Graduation rate for all STEM Gateway courses on the killer course list combined is 36.49%		

QUALITATIVE STUDY: EXPERIENCES OF UNM HISPANIC STUDENTS IN STEM PROGRAMS

Research Questions:

- As perceived by the subjects of this study, what factors that contribute to Hispanic students' completion of a STEM degrees at UNM?
- As perceived by the subjects, what obstacles do Hispanic students encounter in the STEM programs at UNM?

Population definition:

Subjects will be previous UNM Hispanic STEM students who fit one of the following categories:

- graduated with a STEM degree
- graduated with a non-STEM degree after having been a part of a STEM program
- previous STEM students who withdrew from UNM before completing any degree.

Status: IRB approval has been obtained. Participant interviews are currently underway. Interviews, transcription and analysis will be completed by late Spring 2013, with the study published internally Summer 2013.

COMPLIANCE & PROGRAM REPORTING

Compliance reporting: Each year, STEM Gateway collects and reports data for the Annual Performance Report that is then submitted to the U.S. Department of Education. For Year One, this included the collection and reporting of baseline data for comparison purposes. STEM Gateway reports progress on over twenty objectives.

Program Reporting: Each semester, survey data is collected from:

- Students in PLF-supported sections
- Faculty who teach PLF-supported sections
- Peer Learning Facilitators
- Students in STEM Student Interest Group Courses

Each Course Reform Project also collects and reports student achievement data

COMPLIANCE REPORTING

Selected objectives from Year One APR:

Objective: PLF-supported sections will impact at least 3,000 students annually.

Y1 Actuals: PLF-supported sections impacted 2,993 students in the first year

Objective: Student success rates ("C" or higher) in PLF sections will improve by 10% in the second semester of implementation (over baseline semester of FA2011)

Y1 Actuals: Student success rates in PLF sections improved by 9.1% in the *first* semester of implementation (over baseline semester of FA2011)

Objective: Third-semester student persistence rates in STEM fields will improve by Year Three

Baseline data: Fall 2011 third-semester STEM retention rate = 76.6%

FUTURE RESEARCH PROJECTS

PROGRAM IMPACTS & IMPLICATIONS

- Design, collect and report student success data related to the following course reform proposals: Math 121 and Physics 160

CHANGE-OF-MAJOR PREDICTORS STUDY

- Work with the OIA office to develop models for predicting change-of-major out of STEM degree programs

UNM STEM EXPERIENCE FOR HISPANIC AND LOW-INCOME STUDENTS REFINEMENT

- Refine current data to better understand the STEM experience specific to Hispanic and low-income students
- Design and collect new data to understand this STEM experience

STEM EXPERIENCE FOR STUDENTS WHO TRANSFER INTO UNM

- Design and collect new data to understand this STEM experience from the transfer perspective

PERSONNEL CHANGES AND OTHER PROJECTS

INSTITUTIONAL RESEARCHER

Previous Model: STEM Gateway hired an institutional researcher to pull, analyze and report data related to the STEM experience at UNM

New Model: STEM Gateway will partner with the UNM Office of Institutional Analytics (OIA). STEM Gateway will fund the equivalent a full-time STEM researcher in OIA, and OIA will assign the appropriate staff members to work on STEM G projects.

Advantages of the New Model:

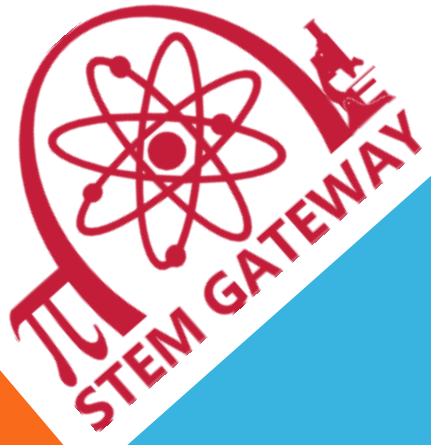
- STEM Gateway will have access to a wider variety of skill sets within OIA
- STEM Gateway requests will be better aligned with other similar projects within UNM

DATAMART PROJECT

Description: Utilizing carry-forward funds from Year One, STEM Gateway will partner with the Office of Institutional Analytics to create a Datamart for STEM data.

Example: To report student success rates in PLF courses, we can create an online form where we define our inputs, then click a button and presto! We receive our data.

Pick the courses	Organize by student populations	Pick the outcomes
By CRN	By Ethnicity	Course Completion (registered at the end of the semester)
By Subject	By Enrollment Status (i.e., Full-time)	Success Course Completion (“C” or higher)
By Course Number or Range	By Class Standing (i.e., Freshmen)	Grade Distribution Pattern
By Section Number	By Income Level (i.e., Pell Eligible)	
By Instructor		



Thank You