

Educational Excellence Project

Teaching, Technology & Learning • Mathematics Concentration

Laredo Community College

Texas A&M International University

Title V Cooperative Grant

Cultural Mathematics Academic Activity

Session ID Code: S 6

Room: Suffolk 7:50 – 8:40 AM

Dr. Selina Vasquez-Mireles

Texas State University – San Marcos

Mario E. Moreno

Texas A&M International University

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Introduction

Introductory video

<http://www.tamiu.edu/titlevmath/Mission.shtml>

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- **Grant was awarded on October 2007**
- **Staff was hired on July 2008**
- **Ever since, we have been engaged in more than 30 different projects, including , but not limited to:**
 - Developing the Faculty Development Needs Assessment in Mathematics;
 - Organizing more than 25 Best Practices-Faculty Development Sessions including the participation of more than 60 faculty members from TAMIU, LCC, and local and Regional ISD teachers;
 - Issuing 5 Title V-EEP Mathematics Newsletter;
 - Organizing 2 Summer Camps for more than 70 students.
 - Participating as presenter and expositor in 3 national, 1 regional and 2 local conferences;
 - Organizing 2 focus groups on How Students Learn Mathematics in College;
 - Participating in the TAMIU College Algebra Committee;
 - Participating in the P-16 State Initiative

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- Every single project we have been engaged in is directly related to 3 strands of the Title V-EEP Grant:
 - Improve Student Academics Achievement in Mathematics
 - Technology & Enrichment in Mathematics (TEMA) Computer Lab
 - Implementing the use of ALEKS (**A**ssessment and **L**earning in **K**nowledge **S**paces), a web-based, artificially intelligent, individualized educational software for College Algebra students
 - Offering Tutorial Services
 - Faculty Development in Curriculum Design, Assessment & Instructional Strategies
 - Participating in the standardization of College Algebra syllabus/testing
 - Teaching, Technology & Learning Center (TTLC)
 - Mathematics Instructional Digital Resource (MIDR) Center
 - Collaborative workshop series
 - **MATHEMATICS ACADEMY (**One of the most important programs**)**
 - Promote Mathematics Awareness in the Community
 - Hired Outreach Coordinator
 - Issuing a Quarterly Newsletter (“Math Solutions”)
 - Participating in PK-16 State initiatives.

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FOR STUDENTS: Properly Equipped and staffed the Title V-EEP Technology & Enrichment in Mathematics (TEMA) Lab
BCH 112



11/11/2010

AMATYC National Conference BOSTON, MA
November 2010

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FOR FACULTY MEMBERS: Identify space, designed, and equipped the Teaching Technology & Learning Center (TTLC)

BCH 118



11/11/2010

AMATYC National Conference BOSTON, MA
November 2010

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FOR FACULTY MEMBERS: Identify space, designed and equipped the Mathematics Instructional Digital Technology (MIDR) Center

KL 315F



11/11/2010

AMATYC National Conference BOSTON, MA
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Partnership

- 2 Hispanic Serving Institutions
 - Texas A&M International University
 - Laredo Community College
- P-16 partnership
- Research Leaders
 - Texas State University
 - Tarleton State University
 - Clute Intermediate School - Brazosport Independent School District
 - Texas A&M International University

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Influential Models

- Appreciative Inquiry:
 - **DISCOVER:** The identification of organizational processes that work well.
 - **DREAM:** The envisioning of processes that would work well in the future.
 - **DESIGN:** Planning and prioritizing processes that would work well.
 - **DESTINY (or DELIVER):** The implementation (execution) of the proposed design
- Lesson Study
- Mathematics Education

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Action Research

- Action research is a process in which participants examine their own educational practice systematically and carefully, using the techniques of research.
- Sagor, R. (2005) “The Action Research Guidebook: A Four-Step Process for Educators and School Teams”
- 4 Steps
 - Clarifying Vision and Targets
 - Articulating Theory
 - Implementing Action and Collecting Data
 - Reflecting on the Data and Planning Informed Action

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Timeline

Month	Activities
February	Review cultural relevance and the Academy Review the statement of problem, purpose, and significance of study for each group Develop a research plan Construct a lesson plan
March	Review research question and lesson plan for each group Develop a methodology
April	Review methodology for each group Discuss relevant research statistics and data analysis
May	Review statistical results and preliminary conclusions for each group Discuss the discussion section
11/11/2010	AMSTYC National Conference BOSTON, MA November 2010

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Lesson Plans

- Geometry of the Cumbia
- Peer Instruction in the Mathematics Classroom (Clickers)
- Calculators & Culture
- Taking a Queue from Culture

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Geometry of the Cumbia

- Students will be able to:
 - Identify whether a transformation is a translation, reflection, or rotation
 - Apply various transformations to produce the correct location and orientation of the image
 - Determine the location and orientation of the pre-image given an image along with a description of the transformation that has already been applied
 - Construct combinations of geometric transformation (glide reflection)
 - Relate the transformation to an image and pre-image of culturally relevant movements

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Peer Instruction in the Mathematics Classroom

- Students will be able to:
 - Determine zeros
 - Determine degrees
 - Determine leading coefficients
 - Determine vertical asymptotes
 - Determine horizontal asymptotes
 - Determine oblique asymptotes
 - Demonstrate an ability to make connections between algebraic symbols and graphical representations of rational functions
- All through engagement in language-flexible discussion with peers and utilizing classroom response systems to respond to visually oriented questions

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Calculators & Culture

- Students will be able to:
 - Determine parent/common functions
 - Identify characteristics of quadratic functions
 - Describe effects of parameter changes on a quadratic function
 - Model quadratic problems with tables, graphs, verbal descriptions, and symbols
 - Interpret results and predict values
 - Investigate the historical development of calculators

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Taking a Queue from Culture

- Students will be able to:
 - Derive and solve rational equations
 - Identify rational functions from other parent functions
 - Graph rational functions and determine their domains and ranges
 - Solve cultural application queuing problems using rational equations

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Research Methods

- One-sample t-test
 - Gains on pre/post
- Independent t-tests with control variables (as applicable)
 - Gender
 - Ethnicity
 - Age
 - Section (Control/Treatment)
- Paired Sample t-test
 - Objectives
 - Pre/Post Questions

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Results

- Statistically significant results supported by qualitative evidence in favor of culturally relevant infusion

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Results

- Geometry in the Cumbia
 - Students showed stronger gains in scores regarding geometric transformations explained through culturally relevant examples
- Peer Instruction in the Mathematics Classroom
 - Students favored using peer-response systems in groups where code-switching is acceptable as opposed to peer-response systems without group interaction

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Results

- Calculators & Culture
 - Male students scored higher than female students in tests utilizing calculators when couched in a culturally relevant framework
- Taking a Queue from Culture
 - Although both Hispanic and non-Hispanic students had gains, non-Hispanics' gains exceeded that of Hispanics in regards to culturally relevant queuing theory instruction

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- After more than 2 year implementing strategies and programs for Math faculty and students, our results are encouraging...
- Our time series comparison analysis for Math 1314 student performance from spring 2005 to spring 2010, shows that...
 - Post-TITLE V intervention passing rates **ARE HIGHER** than pre-TITLE V intervention passing rates
 - Post-TITLE V intervention A rates **ARE SIGNIFICANTLY HIGHER** than pre-TITLE V intervention A rates
 - Post-TITLE V intervention AB rates **ARE SIGNIFICANTLY HIGHER** than pre-TITLE V intervention AB rates
 - Post-TITLE V intervention W rates **ARE SIGNIFICANTLY LOWER** than pre-TITLE V intervention W rates

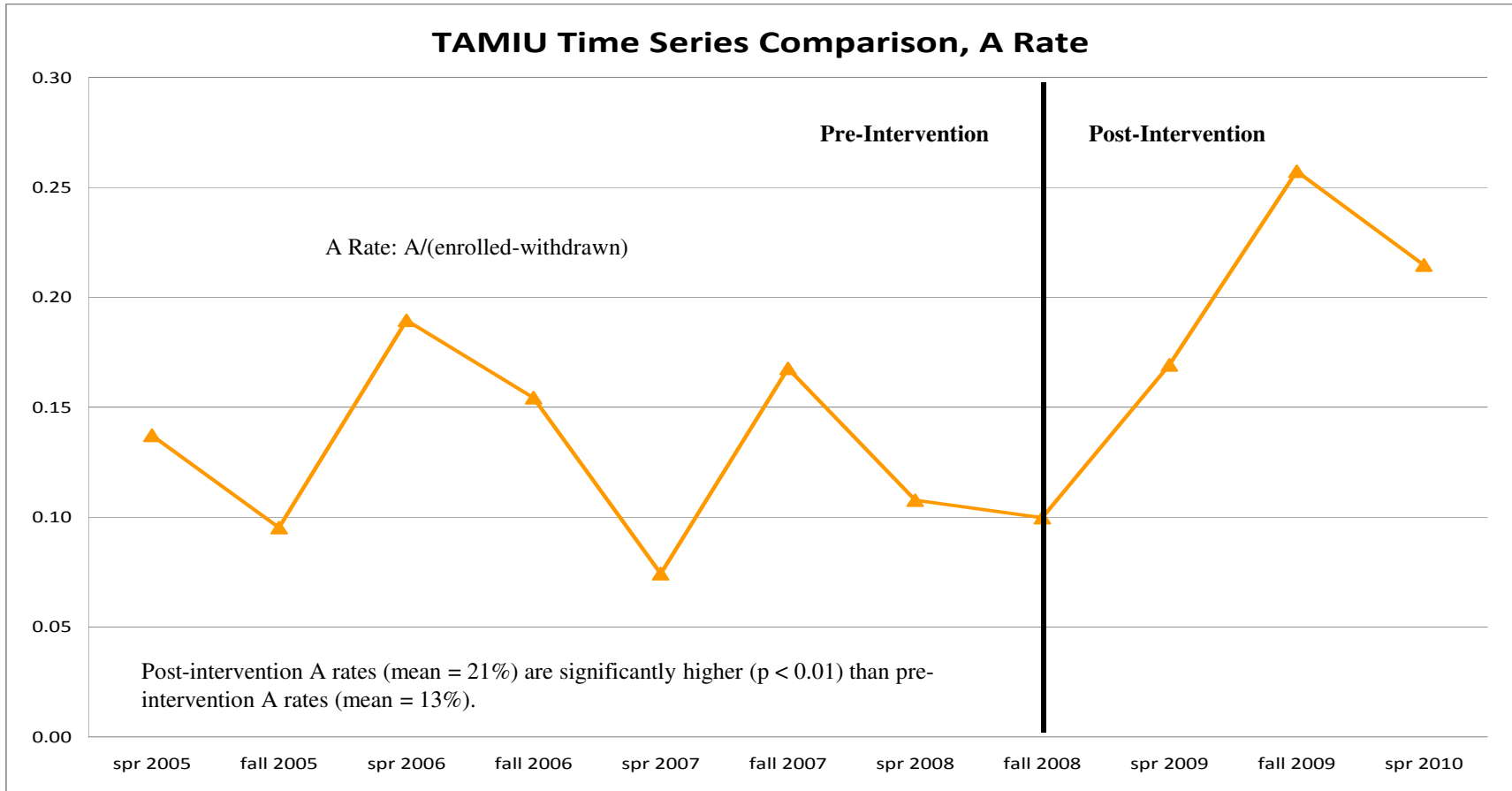
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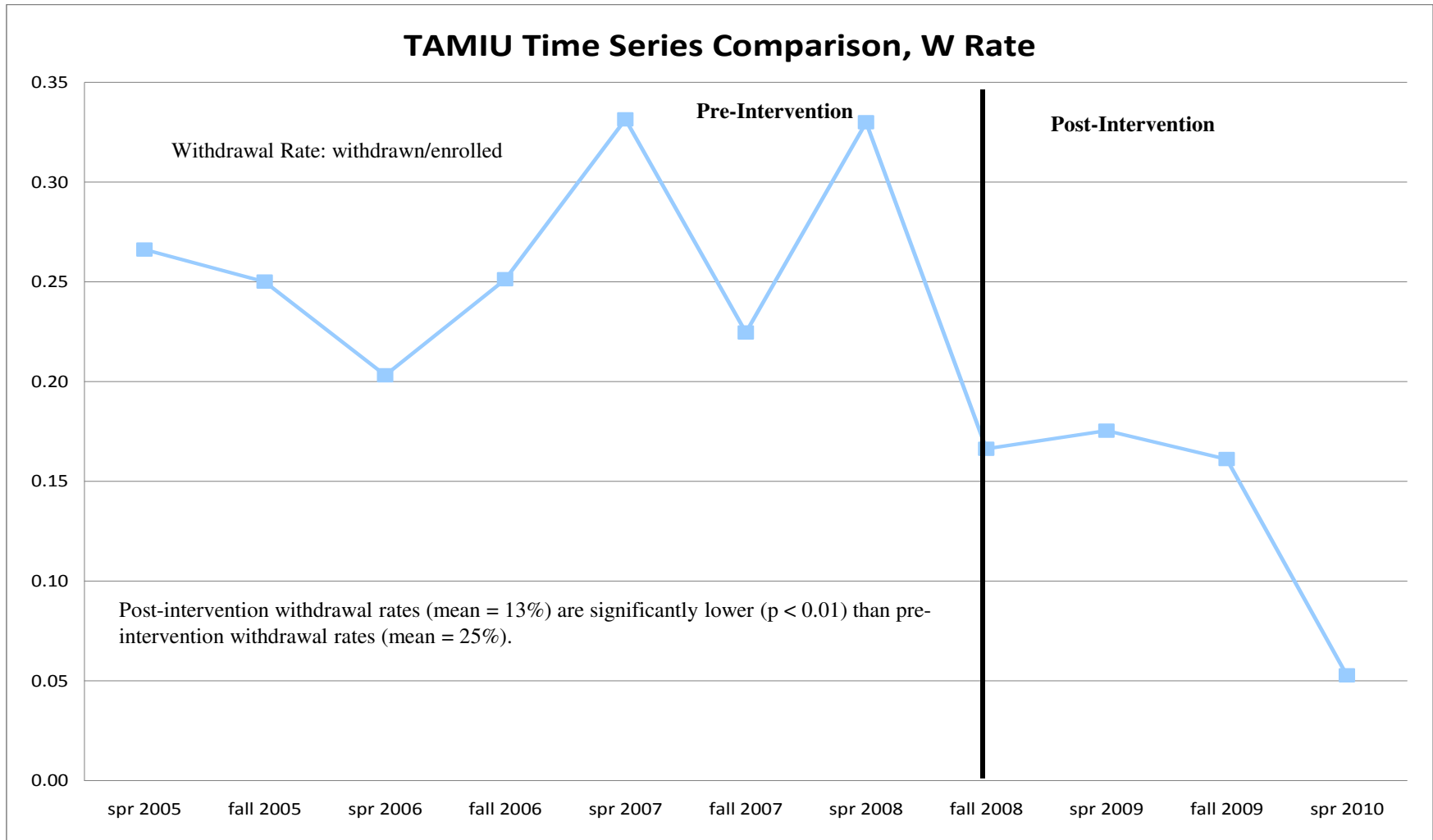
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- From Fall 2008 (when Title V-EEP finally took off) to Summer 2010, the passing rate for TAMIU-College Algebra students has been increasing consistently: From 44.78% on fall 2008 to 70.57% on Spring 2010

Math 1314 College Algebra	Semester						Total
	Fall 2008	Spring 2009	Summer I & II 2009	Fall 2009	Spring 2010	Summer I & II 2010	
Total Enrolled	469	308	90	565	418	130	1980
DFWI Count	259	151	42	226	123	40*	841
% DFWI	55.22	49.03	46.67	40.00	29.43	30.77	42.47

*Some students never showed up to classes

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CONCLUSION

- Although these results alone do not show a causal relationship between the TITLE V intervention and the improved outcomes, they do show persuasive evidence that the timing of these students' improvements correspond with the timing of the TITLE V intervention, particularly during the second and third semesters after the TITLE V intervention was implemented. This suggests that the intervention simply needed more time to take effect (as we suspected/hoped).

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Implications & Suggestions

- Vita
- Lesson Plan
- Critiques
 - Mathematics Instructional Best Practices
 - Cultural Relevance
- Content Pre/Post Tests

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QUESTIONS/COMMENTS/SUGGESTIONS?

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