

Quality Enhancement Plan

Mathematics Clinic & Technology in Teaching Mathematics

The Mathematics Clinic and *Technology in Teaching Mathematics* initiatives were successfully continued during the academic year 2011-12. Grambling State University developed these initiatives to specifically improve student performance in Pre-Calculus I and Pre-Calculus II (General Education mathematics courses) and to improve mathematical skills, comprehension and interdisciplinary application of math on a global level throughout the undergraduate population.

The *Mathematics Clinic* is available specifically to students registered in Pre-calculus I (MATH147) but is open to all students enrolled in mathematics courses. The clinic changed its' hours of operation to Mondays through Thursdays from 9: 00 a.m. until 4:00 p.m. in A.C. Lewis Library, Room 116. This service is facilitated by the QEP Office, along with the mathematics faculty. The time required for the clinic is taken from the regular office hours of faculty. *The Mathematics Clinic* offers services of several Mathematics faculty members for four days per week (an increase of 2 days from Spring 2011) , which is a distinct advantage to students, who choose to utilize enrichment resources.

Student participation increased significantly, in part due to a strategic marketing plan to encourage learning engagement during the Fall 2011 semester. It included Public Service Announcements (PSA's) on KGRM (Grambling's radio station), at sporting events on campus, advertisement on the electronic information boards across campus, and announcement in all the sections of pre-calculus classes. Additionally, global e-mails were sent to all students and faculty.

Data illustrates, on average, those who participated in *The Mathematics Clinic* performed better than those who did not participate. During the Fall 2011 semester, 48 Pre-calculus I students participated in *The Mathematics Clinic*. The average grade-point-average in MATH 147 for the students who participated was 3.10, while the average grade-point-average of all students registered in MATH147 was 2.40. The average grade-point-average of those MATH147 students who attended two or more Mathematics Clinic sessions was 2.70. See Table I below.

TABLE I

**MATH147 PRE-CALCULUS I MATHEMATICS CLINIC PARTICIPATION & GPA
(Fall 2011)**

Average GPA of all Students enrolled in MATH147	2.40
Average GPA of Mathematics Clinic participants	3.10
Average GPA of participants who attended 2 or more Mathematics Clinic sessions	2.70

The data supports the benefit of attending two or more sessions.

TABLE II
PERFORMANCE IN QEP MATH 147 PRE-CALCULUS I (Fall 2011)

	<i>Total Number of Students</i>	<i># of Students with Satisfactory Grade</i>	<i># of Students with Unsatisfactory Grade</i>	<i>Percent Satisfactory Grade</i>
Fall 2011	643	363	280	56%

Technology in Teaching Mathematics was implemented into twelve of the sixteen sections of MATH147 Pre-Calculus I, beginning the Fall 2010 semester. Specifically, the mathematical software and book bundle, *Hawkes Learning Systems* was adopted. The textbook includes a software package that supplements classroom instruction. Students are encouraged to solve additional problems at their own pace and at their convenience. This involvement helps students enhance their conceptual and procedural knowledge skills. The package also provides unlimited homework problems with immediate error-specific feedback. Faculty members can also generate homework assignments, quizzes and tests, and assess students' academic progress with the software.

The Academic Year 2011-2012 featured the incorporation of the QEP Peer Tutorial component. This component targets undergraduate students, who have a minimum grade point average of 3.0 and a grade of B or better in Pre-Calculus, to assist students with mastery of course content and problem-solving under the supervision of assigned faculty members and the QEP Office. National research supports peer-to-peer learning as a successful tool across the educational spectrum.

During the third semester of full implementation of *Technology in Teaching Mathematics* and *The Mathematics Clinic* (available to all MATH 147 students), 56% of students received a satisfactory grade (Table II). An analysis of the data for the previous 15 semesters (Fall 2003-Fall 2010) shows that an average of 46% of students earned a satisfactory grade (A,B,C) in Pre-Calculus I (shown in Table III).

TABLE III
PERFORMANCE IN MATH 147 PRE-CALCULUS I
Fall 2003 - Spring 2011

	<i>Total Number of Students</i>	<i># of Students with Satisfactory Grade</i>	<i># of Students with Unsatisfactory Grade</i>	<i>Percent Satisfactory Grade</i>
Fall 2003	128	13	115	10%
Spring 2004	98	10	88	10%
Fall 2004	161	25	136	16%
Spring 2005	113	41	72	36%
Fall 2005	182	77	105	42%
Spring 2006	89	55	34	62%
Fall 2006	142	53	89	37%
Spring 2007	82	52	30	63%
Fall 2007	126	80	46	63%
Spring 2008	76	59	17	78%
Fall 2008	481	317	164	66%
Spring 2009	320	155	165	48%
Fall 2009	580	291	289	50%
Spring 2010	289	163	126	56%
Fall 2010	646	374	272	58%
<i>15 Semester Average</i>	205	99	105	46%

Based on an increased grade performance in Fall 2011, the university anticipates continued growth as a result of the full implementation of Technology in Teaching, Mathematics Clinic and the peer Tutorial component. Overall, the increase in the Fall 2011 average pass rate, along with evidence of the mathematics clinic participants' higher grade point average support the institutional belief that student success is directly impacted by these initiatives.

In conclusion, the implementation of the Quality Enhancement Plan initiatives have strengthened student academic performance and fostered an environment which sustains continued awareness and accessibility of resources. Resources designed to produce long-term, consistent improvement in the mathematical skills and knowledge of students enrolled in Pre-Calculus I courses at Grambling State University.