

St. Petersburg College
Educational Outcomes Assessment Record

2004-2005

(Report Year)

**Mathematics : Demonstrate effective mathematical skills emphasizing practical
problem-solving and data interpretation;**

(Goal)

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Assessment Records

1. Students will "demonstrate effective mathematical skills emphasizing practical problem-solving and data interpretation."

Approvals

Educational Outcomes Coordinator(s): Jan Ballantine, Cheryl Stratton

Director of IRE: Carol Weideman - June 13, 2006

VP Educational and Student Services: Carol Copenhaver - June 14, 2006

Educational Outcomes Assessment Record

2004-2005

I. Major Learning Outcome #1

Students will "demonstrate effective mathematical skills emphasizing practical problem-solving and data interpretation."

II. Methodology

Means of Assessment:

Method 1: On campus and eCampus assessments: Students in MGF 1106, Liberal Arts Mathematics I, and MAC 1105, College Algebra, completed their final exam with 5 additional multiple-choice questions developed especially for the General Education Assessment.

Method 2: Satisfaction data from Graduating Student Survey

Method 3: Enrolled Student Survey

Method 4: Employers' Survey

Method 5: ETS Academic Profile

First time in college (FTIC) students and students who have completed the majority of their general education courses will be asked to participate in the ETS/College Board Academic Profile Survey.

Date(s) of Administration: Method 1: Sessions II and III, Spring and Summer 05; Method 2: Oct. 2005; Method3:2005; Method4: 04-05; Method 5: Fall 04 - Sum

Use of Past Results:

This mathematical objective has been assessed several times in the past years. In 1999, students in STA 2023, MGF 1114, MAC 2233 and MAC2311 were tested with 10 application and interpretation questions.

Plans after that assessment included:

- 1.) increasing item correctness from 65% to 75%;
- 2.) considering curriculum changes where necessary;
- 3.) reconsidering the courses used to assess this General Education Objective;
- 4.) re-writing the assessment questions;
- 5.) giving students more time to take the assessment;
- 6.) tying the instrument to the selected courses' major learning objectives;
- 7.) aligning the major learning objectives of the courses chosen for assessment with the General Education Objective.

By May 2002, the assessment instrument contained the best 5 of the previous 10 questions (see #4 above). Courses where students were assessed were MGF 1107, MAC 2233, and MAC 2311. The combined mean of all 5 questions was 77% which surpassed the goal of 70%. The plans derived from this assessment included possible curriculum revisions and possible adjustments to pedagogical techniques to increase student success.

The 2003-2004 assessment was administered to graduating students via an online Survey/Test. The mean for the mathematics questions was 68%. The survey was taken by 183 of the students at the college.

The action plan following the 2004 assessment consisted of:

- aiming for higher student scores;
- assuring a stronger correlation of math scores on the assessment to the number of college level math courses completed;
- aligning course goals with the General Education Goal;
- considering alternate methodology for assessing General Education objectives.

Since 2000-2001, the Graduating Student Survey has reported students' satisfaction with the preparedness they received at St. Petersburg College in mathematics. These results are as follows:

2000-2001 - 5.82 (out of 7 with 7 being the highest)
 2001-2002 - 5.73 (out of 7)
 2002-2003 - 5.75 (out of 7)
 2003-2004 - 5.7 (out of 7)

The Enrolled Student Survey reports results to the request: Rate how well you perceive that you were prepared by St. Petersburg College in mathematics skills. The scale is 7 = excellent and 1 = poor. The scale is 7 = excellent and 1 = poor. The results are as follows:

2003 5.48
 2004 5.58

The Employers' Survey has been given to employers of St. Petersburg College graduates. Employers ranked students on a scale of 1 – 7 (with 7 being the highest) on the item, "Possesses necessary mathematics skills". Past results were as follows:

Item/ Students who finished at SPC in: Possesses necessary mathematics skills	1997-1998	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003
	5.8	5.5	5.2	5.9	6.0	6.0

As a result of these assessments, the following actions were taken to improve student success as well as enhance curriculum and faculty development college-wide.

- As a part of the three year review, courses were reviewed/ revised to include more problem solving and data interpretation. Faculty web sites provided improved access to faculty syllabi, assignments and office hours, online tutoring and practice exams. At faculty request, some math classrooms now contain three walls of boards for group work. Additional classroom sets of calculators were acquired and many rooms are now equipped with presenter software/hardware. During the first week of classes, the Learning Support Center promoted their services including ongoing afternoon study sessions. Final exam reviews were also conducted by college faculty.
- Traditionally, in-service has been held on one day per semester. Now, in-service

discussions with all faculty are spread throughout the school year rather than all on one day. In all courses, at regular intervals, faculty members reviewed textbooks. An instructor had a project based text for MGF 1107 published. It is being used for online and some face-to-face classes. The following General Education honors courses: MGF 1108H, STA 2023H and MAC 2311H, were coordinated college-wide. STA 2023H incorporates Service Learning.

- The mathematics departments work closely with Student Support Services, Brother To Brother, Title III and the Collegiate High School in an effort to monitor student progress. They also furnish tutors for the Learning Support Center.

As a result of the 2004 – 2005 General Education Assessment Committee's recommendations and results of past assessments, faculty re-wrote the Specification Plan for assessing students. The faculty team suggested assessment in MAC 1105 and MGF 1106, General Education mathematics courses that typically enrolled many students. The faculty team was able to validate a new instrument by aligning some course learning objectives directly to the General Education Objective. To make the General Education Assessment transparent, they decided to assess with questions added to the final exam. These changes include implementation of all the previous action plans.

Current Assessment

This is a summative interpretation for General Education improvement and an assessment of the General Education outcome listed of students enrolled in MGF 1106 and MAC 1105. The overall objective of this report is to use the findings to create action plans.

The General Education goal has been tied to these **Major Learning Outcomes** of MGF 1106 and MAC 1105.

MGF 1106:

The student will:

1. Demonstrate an understanding of mathematical logic by
 - identifying and illustrating a problem-solving strategy.
2. Demonstrate an understanding of sets and systematic counting by
 - using Venn diagrams to show set operations and solving problems.
3. Demonstrate knowledge of basic concepts in probability by
 - determining expected values.
4. Demonstrate knowledge of statistics by
 - evaluating measures of central tendency (mean, median, mode).

MAC 1105:

The student will:

1. Demonstrate knowledge of fundamental concepts of algebra when determining characteristics and properties of relations and functions and performing processes by:
 - performing operations of given functions.
 - graphing given functions.
2. Demonstrate the ability to solve and graph a variety of equations, inequalities, relations and functions by:
 - solving real world problems that require the use of quadratic equations and inequalities.
 - solving and graphing exponential and logarithmic equations using properties.
3. Demonstrate understanding of the concepts of this course, particularly those which will be pertinent in calculus, by applying knowledge of given functions to real world problems

such as curve fitting, modeling, optimization, and exponential and logarithmic growth and decay.

Means of Assessment:

Method 1: On campus and eCampus assessments:

Students in MGF 1106, Liberal Arts Mathematics I, and MAC 1105, College Algebra, completed their final exam with 5 additional multiple-choice questions developed especially for the General Education Assessment. The assessments took place during Spring 2005, Session II and Summer 2005, Session III. Students marked answers to questions on Scantrons. Campus Representatives extracted the scores of these questions and reported them to the Team Leader. (See Attachment: Mathematics Specification Plan)

It was up to the discretion of faculty whether to count the questions as part of the final exam grade. One campus wanted the process to be as transparent as possible and inserted the questions in the exam and counted them as part of the student grade. Some faculty used the questions as extra credit.

Assessment Instrument:

The multiple-choice assessment items were developed college-wide and collected by the campus representatives, Sharon Morrison, CL; Sonja Hensler, SPG; Mark Billiris, SEM; Sandy Lofstock, TS. (See Attachment: Mathematics Instruments)

Assessment Instructions:

Instructors received written instructions and were asked to read the letter from Dr. Carol Copenhaver to students. (See Attachments: Faculty Instructions and Vice President's Letter)

Population:

The population sample included students who took the final exam in their MGF 1106 and MAC 1105 classes. The Spring assessment sample consisted of a total of 1082 students; 315 in MGF 1106 and 767 in MAC 1105. The Summer assessments sample consisted of a total of 441 students; 144 MGF students and 297 MAC students. Online mathematics courses were included as part of the results from Seminole Campus.

Number of respondents by campus

Number of respondents by campus

Spring 2005	MGF 1106	MAC 1105
Clearwater	142	241
St Pete/Gibbs	83	282
Seminole	N/A	47
Tarpon Springs	90	197
Summer 2005	MGF 1106	MAC 1105
Clearwater	45	128
St.Pete/Gibbs	60	101
Tarpon Springs	39	68

Method 2: Satisfaction data from Graduating Student Survey

In 2004-2005, data regarding the students' satisfaction with the preparedness they received at St. Petersburg College in mathematics was collected and reported.

Method 3: Enrolled Student Survey

In 2005, the Enrolled Student Survey reported results to the request: Rate how well you perceive that you were prepared by St. Petersburg College in mathematics skills. The scale is 7 = excellent and 1 = poor. The scale is 7 = excellent and 1 = poor.

Method 4: Employers' Survey

The survey of students who completed their course work at St. Petersburg College in 2003-2004 was given to their employers. Employers ranked students on a scale of 1 – 7 (with 7 being the highest) on the item, "Possesses necessary mathematics skills".

Method 5: ETS Academic Profile

First time in college (FTIC) students and students who have completed the majority of their general education courses are asked to participate in the ETS/College Board Academic Profile Survey as part of our assessment of our general education program. The Academic Profile is a paper and pencil timed test (40 minutes). The survey test includes 36 multiple choice questions.

III. Criteria for Success

Method 1: On campus and eCampus assessments:

Goal: For this study, analysis was done by item and by students. The goal of 70% competency, based on the college's passing rate in good standing, was considered. However, based on 5 questions, a 60% rate was used for this assessment.

Method 2: Satisfaction data from Graduating Student Survey

Goal: Above average (4 out of 7) means.

Method 3: Enrolled Student Survey

Goal: Above average (4 out of 7) mean on rating students' preparedness in mathematics.

Method 4: Employers' Survey

Goal: Above average (4 out of 7) mean on the item, "Possesses necessary mathematics skills".

Method 5: ETS Academic Profile

Goal: Attain mean scores equal to or exceeding reference groups.

IV. Summary of Assessment Findings

Method 1: On campus and eCampus Assessments:

Discussion Session II, Spring 2005:

Analysis was conducted by item and by students when Scantrons were available.

Student Assessment:

79.81% (597/748) of the students assessed accomplished the objectives at a 60% or above rate of acceptability.

Item Analysis:

The grand mean correct in Spring for all items in both classes was 66.25%.

The items with the least compliance over all were:

For MGF 1106 – # 2 with 32.68 % and # 5 with 52.51%

For MAC 1105 – # 2 with 53.10 %

Discussion Session III, Summer 2005:

Student Assessment:

78.74% (263/334) of the students assessed accomplished the objectives at a 60% or above rate of acceptability.

Item Analysis:

The grand mean correct in Summer for all items in both classes was 69.16%

These results indicate that the goal of 60% of students achieving at least 60% of the content has been met by the campuses reporting. Additionally, in MGF 1106 assessments, 3 of the 5 questions were answered above the 60% correct goal. In MAC 1105, 4 of the 5 questions were answered above the 60% correct goal. (See Attachment: Mathematics Statistical Analysis)

Method 2: The Graduating Student Survey

In 2004-2005, data regarding the students' satisfaction with the preparedness they received at St. Petersburg College in mathematics was collected. These results are as follows:

2004-2005: 5.78 (out of 7 with 7 being the highest)

Method 3: The Enrolled Student Survey

The 2005 report shows the student ratings to the question: "Rate how well you perceive that you were prepared by St. Petersburg College in mathematic skills." The scale is 7 = excellent and 1 = poor. The scale is 7 = excellent and 1 = poor. The results are as follows:
2005 5.65

Method 4: Employers' Survey

Employers ranked former students of St. Petersburg College on a scale of 1 - 7 (with 7 being the highest) for the item, "Possesses necessary mathematics skills". Survey results for students completing their coursework in 2003 -2004 showed a mean of 6.2. This mean is up from 6.0 the previous year.

Method 5: ETS Academic Profile

First time in college (FTIC) students and students who have completed the majority of their general education courses will be asked to participate in the ETS/College Board Academic Profile Survey. Results will be reported Summer 2006.

V. Discussion and Analysis of Assessment Findings

Past results from previous studies are located in section II, Means of Assessment. The results of the current assessment are located in section III, Summary of Assessment. Future actions to improve student performance are outlined in section V, Action Plan and Timetable for Implementation.

VI. Action Plan and Timetable for Implementation

Based on the analysis of the results the following Action Plan Items have been selected for implementation:

A. Enable Greater Student Success

A1. Identify needs and address ways to improve overall student success

B. Enhance Curriculum & Faculty Development

B1. Align curriculum with General Education Objective and/or Accreditation/National Standards of the discipline

B2. Implement professional development for full time and adjunct instructors

B4. Revise course content

C. Improve Teaching and Learning Throughout the College

C2. Communicate & collaborate with other areas of the college (eg. Counseling, library, etc.)

C3. Other

D. Improve Assessment Methodology

D4. Improve method of data collection & analysis

D5. Revise assessment instruments

D6. Improve communications and instructions for faculty

D8. Make technology related improvements

D9. Other

Ref. #	Action Plan Detail	Date to Accomplish
A. Enable Greater Student Success		
A1.	Identify needs and address ways to improve overall student success;	12/2005
A1.	Help students focus on applied problem solving, higher level learning, and critical thinking	05/2006
A1.	Provide more open study sessions for students before exams	12/2005
B. Enhance Curriculum & Faculty Development		
B1.	Align curriculum with General Education Objective and/or Accreditation/National Standards of the discipline American Mathematical Association for Two Year Colleges (AMATYC) and the Mathematics Association of America (MAA);	05/2006
B2.	Implement professional development for full time and adjunct instructors e.g. critical thinking in the math classroom; promoting higher level learning; including more applied problem in the semester; Increase communication among faculty members to ensure consistency in curriculum	05/2006
B4.	Revise course content:Review for the inclusion of items in A	05/2006
C. Improve Teaching and Learning Throughout the College		
C2.	Communicate & collaborate with other areas of the college e.g. learning support centers and math tutoring, online math tutoring, counselors, Office of Services for Students with Disabilities and others	12/2005
C3.	Provide practice tests and answer books to learning support center and provide more practice for students online	05/2006
D. Improve Assessment Methodology		
D4.	Improve method of data collection & analysis: Include data collection of more students in more math classes as well as more online students	05/2006
D5.	Revise/write the 5 question assessment which aligns with the General Education objective and the course major learning objectives for all the classes that will be assessed	
D6.	Improve communications and instructions for faculty	05/2006
D8.	Give assessments online when possible	05/2006
D9.	Compare results from various teaching methods – eCampus, vs. in-class traditvs. academic systems	05/2006

VII. Budgetary and Planning Implications for Upcoming Unit Planning Cycle

The recommendations that follow will be suggested to the appropriate program directors to be included in the unit planning process:

Appropriate funds are requested for the following:

Budget:

1. Supplement for one faculty member from each campus as General Education Campus Representative;
2. Materials for faculty professional development opportunities and distribution (perhaps online or via CD/DVD);
3. Materials for preparation, distribution and scoring the General Education Assessment.

Planning:

1. Create a committee of 1 faculty member from each campus for General Education Campus Representation;
2. Plan and implement several professional development events, possibility online or via CD/DVDs;
3. Prepare, distribute and score the General Education Assessment.