

WESTERN WYOMING COMMUNITY COLLEGE

Mathematics Program Review

2009-2010

Program Review Committee

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I: Overview

Section IA: Purpose and Mission Statement

Purpose: The Mathematics program provides:

- (1) A two-year mathematics transfer program for students who wish to pursue training in mathematics and statistics.
- (2) Service courses for numerous disciplines such as business, engineering, and the sciences, that require mathematics and/or statistics training.
- (3) Courses that satisfy the general education requirements for graduation from WWCC.
- (4) A range of developmental mathematics courses that prepare students to succeed in the college-level curriculum.

Mission Statement: The mission of the Mathematics department is to provide high-quality education in mathematics and statistics, at all levels and venues appropriate for the WWCC setting.

To accomplish this, we will strive to provide, encourage, and enhance:

- (1) Professional development for all WWCC math/statistics faculty.
- (2) Monitoring and mentoring of adjunct math/statistics faculty.
- (3) Mentoring of new fulltime math/statistics faculty, during their Initial Contract period.
- (4) Communication and cooperation between math/statistics faculty members.
- (5) Communication with service disciplines at WWCC.
- (6) Communication with math/statistics faculty at the other Wyoming community colleges, and at the University of Wyoming.
- (7) Use of modern tools and technology for the teaching and learning of mathematics and statistics.
- (8) Service and outreach to the community.

Section IB: Program-Level Learning Goals

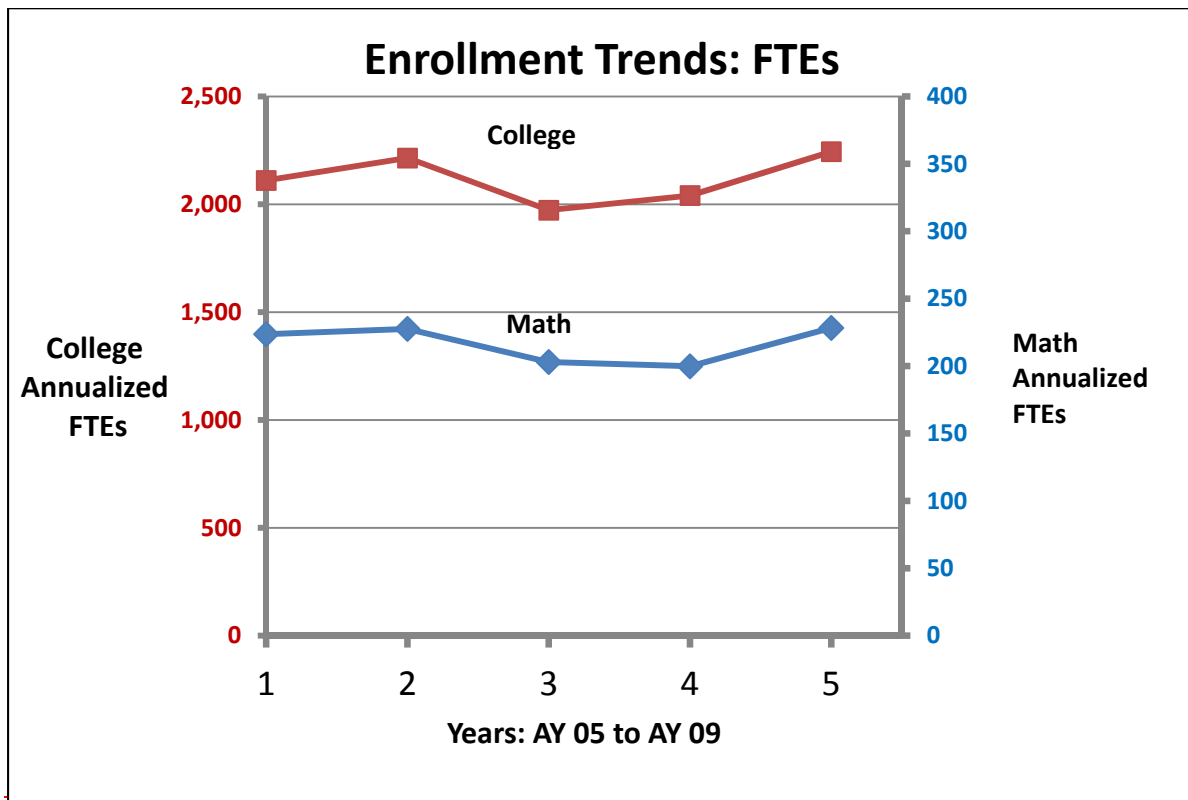
Program-Level Learning Goal	Relevant “WWCC Goals for Student Success”	Assessment Methods
Demonstrate proficiency in mathematical skills	Solve problems Retrieve information Communicate competently	<p>Course-level assessments: Tests and other instructor-specific assessments</p> <p>Program-level assessments:</p> <ul style="list-style-type: none"> • UW Transfer data • Graduate exit survey • Annual ETS Proficiency Profile test (MAPP) for graduates • Program-level student surveys • Program-level adjunct faculty surveys • Wyoming Community College Commission studies (whenever relevant to WWCC Math/Statistics)
Demonstrate an understanding of mathematical concepts and logic	Solve problems Retrieve information Communicate competently See issues from multiple perspectives	
Clearly communicate problem solutions or logical explanations, in written and/or spoken form	Communicate competently Develop life skills	
Use mathematical methods to solve applied problems, thereby developing an understanding of the practical usefulness of mathematics	Solve problems Retrieve information Communicate competently Develop life skills	
Use appropriate technology to solve math problems; and/or to improve conceptual understanding	Solve problems. Retrieve information. Develop life skills	

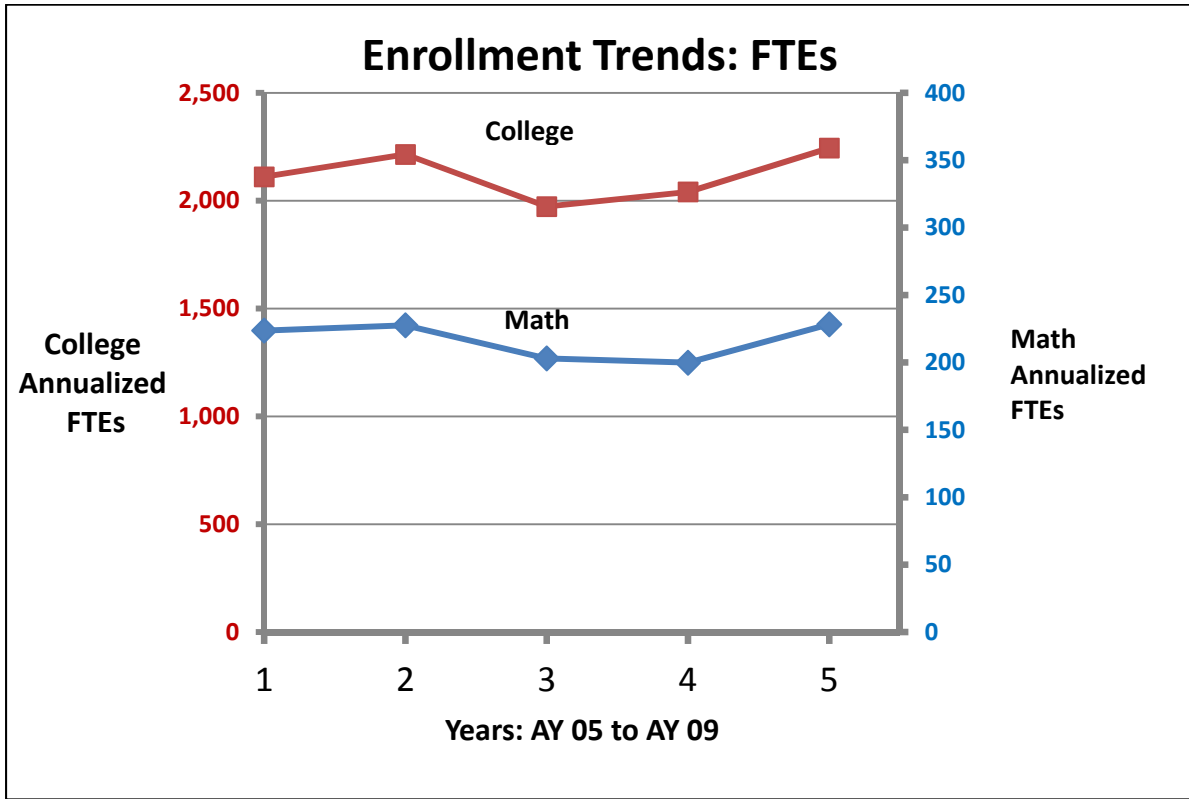
II: Fact Finding

Section IIA: Enrollment and Audience

Appendix A contains enrollment data provided by Kay Leum, Registrar, as summarized by Dianna Renz, Learning Assessment Associate. This data is for the five-year period AY 05 to AY09 (i.e., Summer 2004 through Spring 2009 semesters).

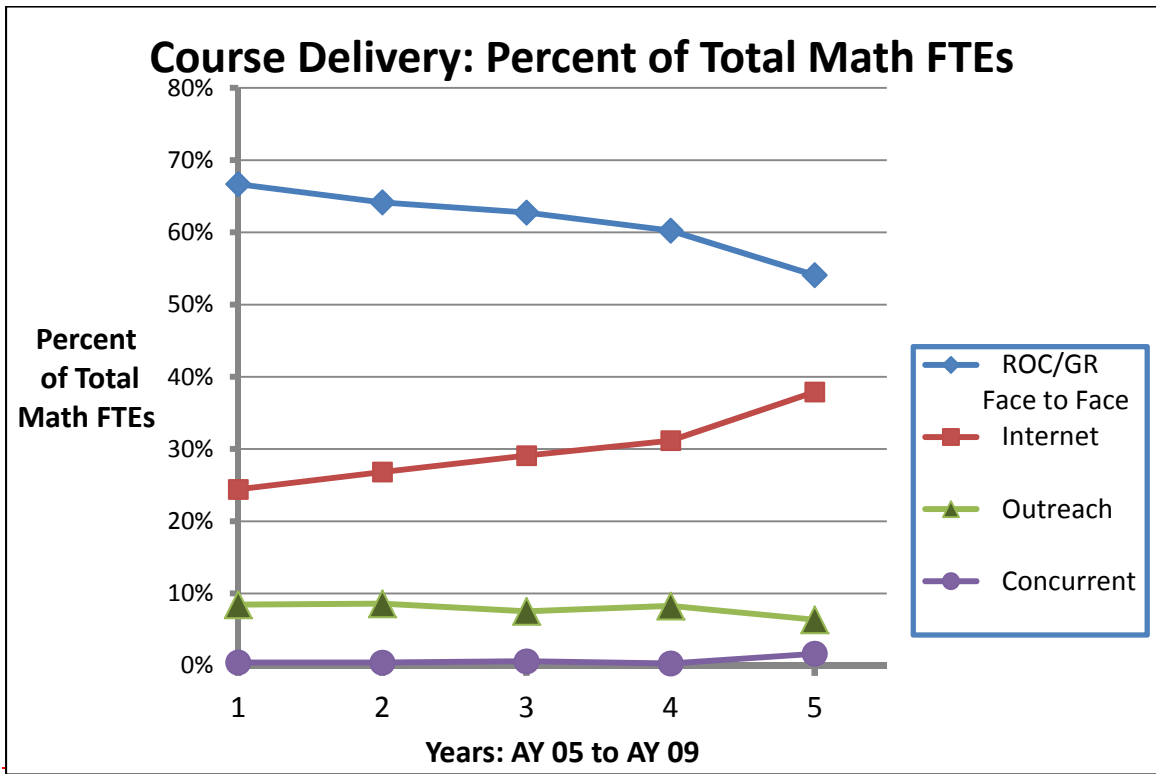
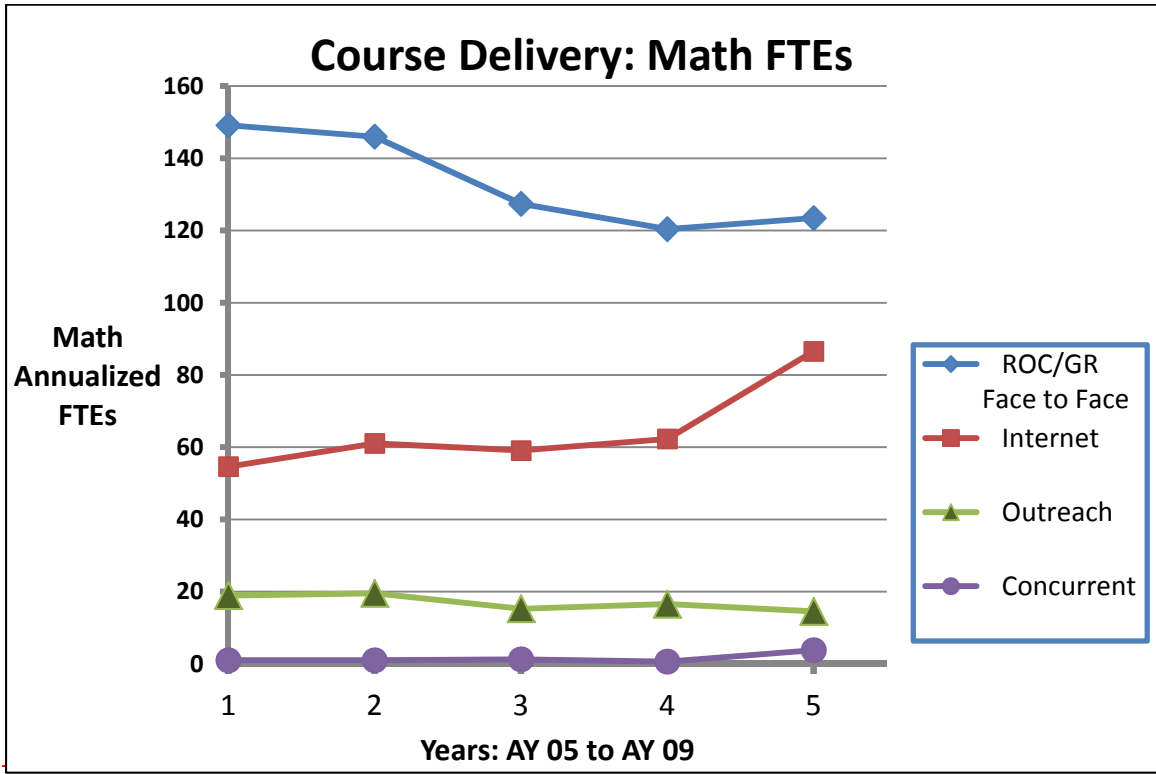
During that five-year period, the Math Program accounted for 9% to 11% of the College's total annualized FTE. As expected, Math FTEs have tended to increase or decrease with the College's total FTEs, as shown in this graph:

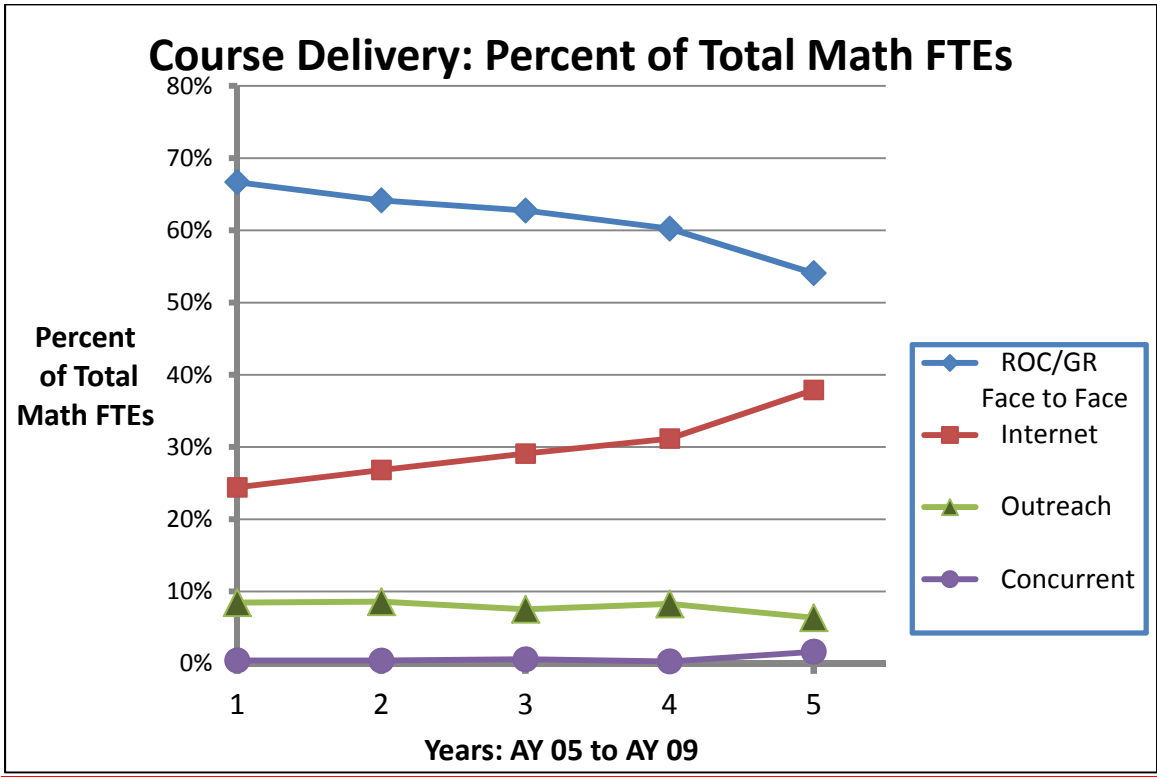
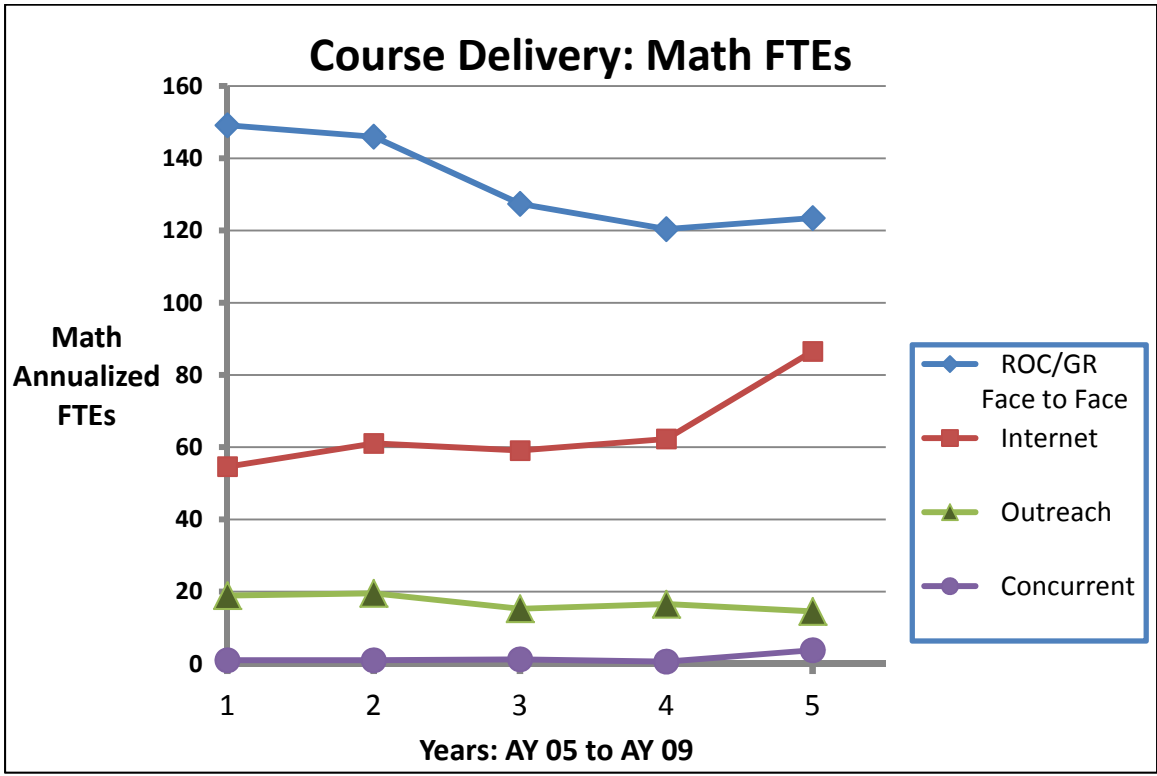




In the past five years, the Math department has made an effort to offer more online classes. The following two graphs show how online course delivery has increased from 24% of total Math FTEs in 04-05, to 38% in 08-09.

In the same time period, face-to-face course delivery has decreased, both in number of FTEs and in their percentage of total Math FTEs. Rock Springs/Green River face-to-face courses decreased from 67% to 54% of total Math FTEs, while Outreach face-to-face courses decreased from 8.5% to 6.4% of total Math FTEs.





Comments: Course delivery

The summary above includes both MATH and STAT (Statistics) courses at Western. The steady growth of our department's internet offerings, comprising 38% of total Math FTEs in AY09, can be attributed partly to attraction of new students who need alternatives to face-to-face classes. But a significant number of our internet students are also enrolled in face-to-face classes at Western; and they choose to take internet courses for a variety of reasons.

Section IIB: Facilities, Equipment, and Staffing

Classrooms

The classrooms commonly used for mathematics courses (Rooms 1220, 1221, 1332, and rooms in the A200 area) are adequate for the purpose of teaching and learning mathematics, but there is room for improvement. Below are some of the highlights and needs concerning equipment and facilities in classrooms commonly used for math courses:

1. As of this writing, document cameras have been placed in many of the classrooms where math is commonly taught. These cameras allow instructors to show graphics, calculator examples, and to write notes. However, there are a few classrooms that could be improved with the addition of a document camera (for example, room A208).
2. As of this writing, some of the classrooms have computers and projectors. The addition of computers in each classroom will allow for more interaction with the students to show demonstrations and to go over homework as many instructors are using online homework in their courses.
3. Some of the classrooms have filing cabinets that are useful for storing books, manipulatives and other classroom-aids. It would be useful to have cabinets placed in each classroom for the use of storage.
4. The use and need for SmartBoards in the classroom should be investigated and decided upon by the math faculty. The possibility of testing a SmartBoard in one classroom should be considered.

Action Plans: 2011.2, 2012.8 (see Section IIIC)

Mathematics Advancement Center

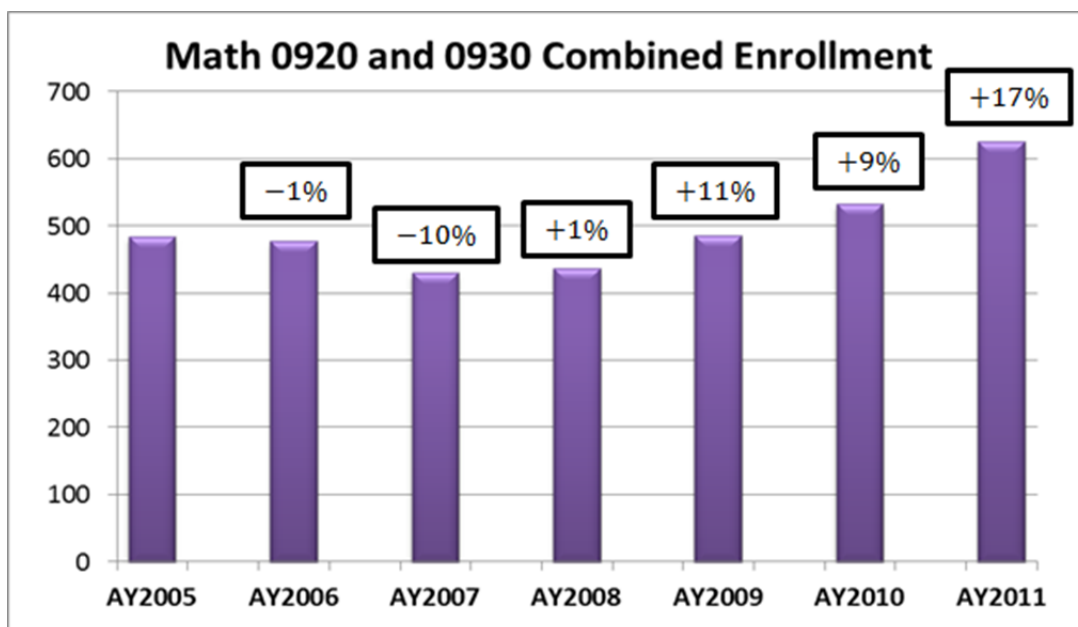
In Fall 2010 the former Engineering Lab (Room 1407) was repurposed as the Mathematics Advancement Center (MAC), in conjunction with the redesign of Beginning and Intermediate Algebra (MATH 0920/0930).

The MAC is a specially designed classroom and computer lab, dedicated exclusively for students to study, learn and engage in mathematics. Based on the Math Emporium Model that has been adopted at colleges around the country, MATH 0920 and 0930 are designed for mastery of learning, self-discovery of math, and include a strong focus on personalized support. The MAC is available to students during the semester from Monday through Friday and is staffed with quality instructors who help guide students through the material.

Action Plans: 2011.1, 2011.7, 2012.1 (see Section IIIC)

Staffing

The current staffing of the math department (full-time and adjuncts) has generally been adequate. However, the math department has identified the need for the addition of a developmental math specialist position. The graph below shows yearly enrollment numbers in Math 0920 and 0930, with the year-to-year percentage changes. (This data includes all sections, and was recently updated to include AY 2011 numbers). See Appendix A2.



The Math department has increasingly been relying on adjunct faculty to teach Math 0920/0930, given the enrollment increases, and the more stringent educational requirements required to teach higher level courses (Math 1400 and above). A full-time developmental math specialist would teach some of the developmental sections, but would also be responsible for coordinating and managing all Math 0920/0930 sections, currently 600+ students per year. The developmental math specialist would also be responsible for managing the MAC (see the previous page) and the computer-based learning system currently being used for all non-internet Math 0920/0930 classes.

Action Plans: 2012.7 (see Section IIIC)

Section IIC: Printed Materials and Website

Printed Materials

WWCC's 2009-2010 catalog, course catalog, prospective students letter and brochures all are consistent with the goals and ideals of the WWCC mathematics department.

A review of the course outlines (syllabi) from the full-time and adjunct math faculty shows that most syllabi contain substantially the requirements set by the Curriculum Committee. However, as expected, many syllabi have not been updated to the newest recommendations for "Course Primary Learning Goals and integration of the Goals for Student Success".

Website

The website for the math department is very simple and understated. The primary goals for the math department need to be added to the website, along with some more information for potential math majors. This could include a link to our courses, an introduction to the faculty members, a link to the suggested program of study for a major in mathematics, and some links to other 4-year schools. Also, the math department could incorporate information into the "Why Western" links on the college website.

Action Plan: 2012.5 (see Section IIIC)

Section IID: Learning Pathways

	WWCC Goals for Student Success					Math Program Learning Goals				
	Communicate Competently	Retrieve Information	See Issues from Multiple Perspectives	Solve Problems	Develop Life Skills	Demonstrate Proficiency in Math Skills	Demonstrate Math Concepts and Logic	Clearly Communicate solutions	Use Math to Solve Applications	Use technology to Solve Math Problems
Math 920	X		X	X	X	X	X	X	X	X
Math 930	X		X	X	X	X	X	X	X	X
Math 1000	X	X	X	X	X	X	X	X	X	X
Math 1100/1	X	X	X	X	X	X	X	X	X	X
Math 1400	X		X	X	X	X	X	X	X	X
Math 1405	X		X	X	X	X	X	X	X	X
Math 1450	X		X	X	X	X	X	X	X	X
Math 2200	X		X	X	X	X	X	X	X	X
Math 2205	X		X	X	X	X	X	X	X	X
Math 2210	X		X	X	X	X	X	X	X	X
Math 2250	X		X	X	X	X	X	X	X	X
Math 2300	X		X	X	X	X	X	X	X	X
Math 2310	X	X	X	X	X	X	X	X	X	X
Math 2350	X		X	X	X	X	X	X	X	X
Math 2355	X		X	X	X	X	X	X	X	X
Stat 2010	X	X	X	X	X	X	X	X	X	X
Stat 2050	X	X	X	X	X	X	X	X	X	X
Stat 2070	X	X	X	X	X	X	X	X	X	X

Section IIE: Professional Development

See Appendix B for a summary of Mathematics professional development activities in the last five years.

We recommend that Enhanced Professional Development funds be increased to allow for each math faculty member to afford reasonable travel expenses to a professional conference once every two years. At present funding levels, faculty cannot do so without personally funding part of the expense.

Presently, there is no organized effort to involve adjunct faculty in professional development specifically targeted to mathematics, or mathematics education. The department should investigate the desirability and feasibility of such professional development for adjuncts.

Action Plans: 2011.5, 2012.6, 2012.10 (see Section IIIC)

Section IIF: Recommendations from Previous Portfolio

Status of Previous Action Plans, FY05 - FY07

2004-05			
Task or Action	Purpose & Measure of Success	Who is Responsible?	Completion
Rewrite the Math/Stats Brochure	The old brochure is out of date and needs major revisions. Completion upon submittal for printing.	Rose Marie Cheney/ Dave Metz	Done
Offer Business Statistics as an Internet Course	To accommodate the on-line business degree. Completion upon offering the course	Dragan Skropanic	Done –STAT 2010 NT offered every Fall for the past 6 years
Work with College recruiters to help recruit more math, computer science, and engineering majors.	These majors would help increase enrollments in upper level math and science classes. Completion upon visiting at least three high schools and following up on 100% of student interest inquiries in mathematics major from the Admissions Dept.	Chuck Newberg	Done – visited Cokeville, Star Valley, and Kemmerer
Explore options for a high school dual/concurrent enrollment program.	To meet the needs of the community. Completion upon a plan of implementation.	Chuck Newberg in conjunction with the Math Dept.	In progress
Tasks Dependent on Increased Funding (Provide estimated cost)	Data to Justify Need, and Consequence of Not Funding.	Who is responsible?	
Request Elmos for RSC 1220 and 1221. and additional rooms be upgraded for math classes- graphing boards, rewiring of lights, etc. \$5,000	This will make it easier for instructors to teach effectively. See FTE data for justification. If this is not funded the status quo will remain.	Chuck Newberg	Done

2005-06			
Task or Action	Purpose & Measure of Success	Who is responsible?	completion
Update/Complete Department WebPages	Department webpage is a primary source of information for potential students so having it up to date strengthens marketing efforts. Completion upon providing IT with new information for the webpage.	Math Dept. with Dragan Skropanic as coordinator	Partially completed/ongoing
Work on improving success rates in the Math 0920/0930 classes	Improve retention rates for the college. Success upon identifying specifics action that can be taken to improve success rates without compromising standards.	Math Department	In progress
Develop a process to measure the program wide goals identified in this program review (Polya's 4-step).	To document student learning student learning on a program wide level (direct assessment). Completion upon implementation.	Math Department	Dropped as a goal
Offer Business Calculus I as an Internet course.	To increase the number in the distance education course, replaces MATH 2350 CV	Susan Heyborne	Done -- Math 2350 offered every Fall since FA08
Develop a departmental plan to coordinate the various distance education courses (outreach, NT, CV, and VT) and work with the various adjuncts who teach them..	To ensure quality and consistency of the various classes and multiple delivery methods. Completion upon implementation.	Math Department	In progress; Math Dept. Coordinator (Sarah Pauley) communicated with various adjuncts

Ask IT for tracking program of students	Being able to track students through the math sequence will help measure success of the various classes. Completion upon request of program.	Dave Metz	Request was made. English and Math departments (Dave Metz and Barb Smith) asked IT to write a tracking program, but IT has not done so.
Tasks Dependent on Increased Funding (Provide estimated cost)	Data to Justify Need, and Consequence of Not Funding,	Who is responsible?	
Request additional rooms be upgraded for math classes- graphing boards, rewiring of lights, etc. \$5,000	This will make it easier for instructors to teach effectively. See FTE data for justification. If this is not funded the status quo will remain.	Dave Metz	Substantially completed.

2006-07			
Task or Action	Purpose & Measure of Success	Who is Responsible?	
Continue to strengthen the coordination of the distance ed classes and work with the various adjuncts who teach them.	To ensure quality and consistency of the various classes and multiple delivery methods. Completion upon submittal of written document to Dean of AA, Distant Ed Director and all adjunct math teachers.	Math Department	In progress; Math Dept. Coordinator (Sarah Pauley) communicated with various adjuncts. All adjunct approval now requires on-site or live distance interview. Math department minimum educational standards for teaching MATH courses were revised
Revise earlier action plans and add new actions as needed	Provides an opportunity to revisit earlier goals and allows for flexibility in long term planning	Math Dept. with Chuck Newberg as coordinator	Done: viz. current Program Review.

Comments: Previous Action Plans

Nearly all of our previous actions plans are either completed, or are continuing projects. Some highlights:

- Work to strengthen our developmental Math courses is continuing. The computer-based learning approach for Math 0920 and Math 0930 is fundamental to this effort, and the new MAC (Mathematics Advancement Center) is an essential facility.
- There are no current plans for Math faculty to participate in recruiting trips to high schools. Time and personnel limitations are the main issue here. But we also recognize that Engineering majors comprise the overwhelming majority of students in our higher-level mathematics courses (Calculus III, differential equations, linear algebra), and that situation is unlikely to change. Tana Gnose has recently been hired by the Engineering department, and one goal is to have Tana visit schools and help recruit more Engineering students to Western.

III: Focus on the Future

Section IIIA: Assessment Reporting of Program Goals

(A summary of results from program-level assessments)

1) Student survey conducted for this Program Review

The survey was conducted in Spring 2010, approximately one week before the last date to drop classes. All current-semester MATH and STAT students were asked to take the survey. Of the 705 students enrolled in those classes, 389 responded to the survey, a response rate of 55%.

Some results of the student survey:

- 90% responded positively regarding their experiences in Math courses at WWCC, responding “Strongly Agree” or “Agree” to the question “Overall, my experiences with MATH classes at WWCC have been positive”.
- 95% reported they were NOT considering dropping their MATH or STAT course.
- 26% reported taking their previous math course 2 or more years ago.
- 74% responded positively that their previous math courses had prepared them well.

Appendix C shows further results from the Spring 2010 student survey.

2) Math adjunct faculty survey conducted for this Program Review

The survey was conducted in Spring 2010, during the last week of April and first week of May. Of the 15 (?) Math adjuncts who were asked to go to the SurveyMonkey link to complete the survey, only 7 did so.

Some results from those seven completed surveys:

- 100% chose “Very satisfied” (4) or “Satisfied” (3) when asked to “indicate your overall level of satisfaction in your role as a Math instructor at WWCC”.
- When asked, “What additional training or resources would you like to see offered to WWCC Math adjunct faculty?” two requested more communication/interaction with the full-time math faculty.
 - “I hear from the faculty resources person and the registrar, but not very often from the department.”
 - “Meet with members of the math department.”
- In another free-response question, “Is there anything else you’d like to share about your experiences as an adjunct in the Math program?” there were three responses:
 - “Great on-campus support: technical, distance ed and departmental...”
 - “This is a great college.”
 - “I love teaching math at WWCC.”

3) MAPP and CAAP Assessments

CAAP is the *Collegiate Assessment of Academic Proficiency*, a standardized, nationally normed assessment produced by ACT. MAPP is the *Measure of Academic Proficiency and Progress* test, also produced by the Educational Testing Service (ETS).

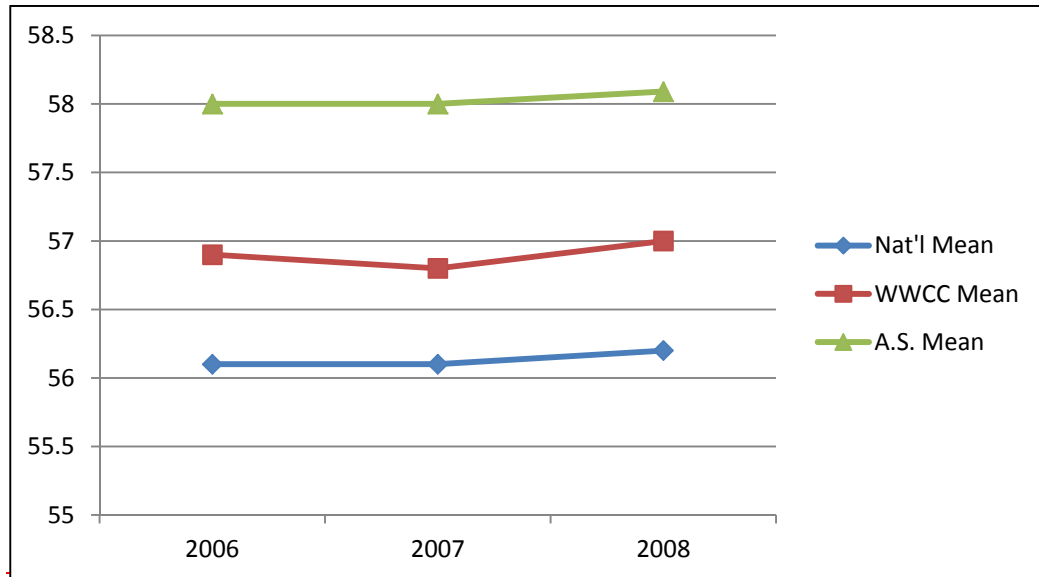
Both assessments (MAPP and CAAP) have four components:

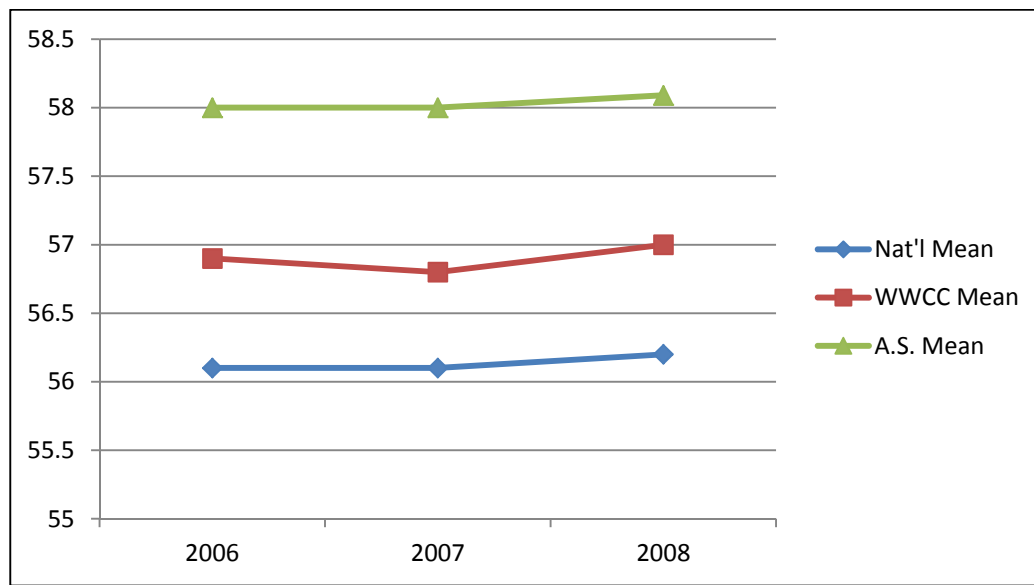
- Critical thinking
- Reading
- Writing
- Mathematics

CAAP:

We compared WWCC Associate of Science graduates with two-year graduates nationally, as a potentially useful way of evaluating how well our A.S. graduates perform mathematically.

CAAP MATHEMATICS, AY 2006-2008





Source: Dianna Renz/WWCC Assessment Office (also see Appendix D)

MAPP:

The MAPP was first administered at WWCC in AY 08-09. In that assessment, our A.S. graduates (n = 77) were not statistically different in Critical Thinking, Reading, or in Writing, when compared with the national group of all two-year college graduates. But those same WWCC A.S. graduates performed statistically better in Mathematics (115.1 vs. 112.4, $p < 0.0001$) when compared with the national group. (See Appendix E)

At the time of this writing, AY 09-10 MAPP results were not yet available.

Comments about MAPP and CAAP results:

- WWCC A.S. graduates' performance in the CAAP and MAAP Mathematics tests in those years was statistically greater than the national comparator groups.
- One should wonder if a difference of 2 or 3 points, between our WWCC group and the comparator groups, is of practical significance, regardless of its statistical significance.
- We should understand that the MAPP and CAAP Mathematics results are a broad-brush look at our graduates' general mathematical/quantitative abilities, at what is usually considered pre-college level. For example, the following is one of the criteria for students to be judged proficient at Level 3 (the highest level of the MAPP Mathematics test):

"...solve problems involving difficult arithmetic concepts, such as exponents and roots other than squares or square roots, and percent of increase or decrease...."

[<http://www.ets.org/proficiencyprofile/about/content/>]
- The assessment might be a better diagnostic tool for the Mathematics department if we could see the list of problems the students were asked to solve, and a summary of our students' performance for each problem.

- While we expect the quality of mathematics instruction to influence the performance of our sample of students who complete the assessment, there certainly there are other important variables at work. For example, in the ETS Proficiency Profile User's Guide, it states:

“Within any category of institutions, those that use the ETS Proficiency Profile test are not likely to be representative of all institutions in that category. In addition, the number of students tested and the sampling procedures vary from one institution to another, and it is impossible to verify that the students tested at each institution are representative of all the institution’s students at the relevant class level...”

[http://www.ets.org/s/proficiencyprofile/pdf/Users_Guide.pdf page 20]

4) **Core Indicator comparison with other Wyoming community colleges.**

The following table shows students' progression from remedial math courses to college-level classes, for a cohort of Wyoming community college students who enrolled in remedial math courses in Fall 2005. The seven rows represent the seven Wyoming community colleges, with WWCC highlighted. WWCC ranked 1, 2, or 3 in all four measures for success.

**Core Indicator #12:
Success in Subsequent, Related MATH Coursework
Ranking Data 2005 Cohort , Reported 2007-2008**

Rank	% of students successfully COMPLETED REMEDIAL MATH course in Fall 2005	% of students that successfully COMPLETE COLLEGE LEVEL COURSE within 1 Year	% of students that successfully COMPLETE COLLEGE-LEVEL course within 5 semesters	% of students that successfully COMPLETE COLLEGE-LEVEL course within 8 semesters
1	64.90%	44.27%	50.97%	55.64%
2	61.65%	43.58%	48.85%	53.85%
3	60.79%	40.77%	46.15%	52.29%
4	58.01%	37.57%	46.15%	49.41%
5	56.62%	32.93%	35.37%	37.80%
6	53.06%	18.52%	21.92%	25.94%
7	46.26%	17.66%	6.17%	5.76%
System %	59.12%	29.30%	32.77%	36.33%

Source: Wyoming Community College Commission

Section IIIB: Strengths, Limitations, and Opportunities

1. Strengths.

All available program-level assessments are consistent with the conclusion that the WWCC Math department provides high-quality instruction in mathematics and statistics.

Since the previous Program Review, we have decided that one Math faculty member should serve as ad hoc Math Coordinator, responsible for leading the planning for course scheduling, communication with adjuncts, and so on. As one of the larger faculty departments at WWCC, responsible for approximately 10% of WWCC FTEs, it is vital to have someone within the Math department who is responsible for these duties, which are distinct from those of the Math/Science Division Chair.

Dave Metz is the current Math Coordinator, and fulltime Math faculty serve two-year rotating terms. Previous terms were held by Susan Heyborne and Sarah Pauley.

2. Limitations.

a) Monitoring and mentoring of adjunct faculty and new full-time faculty is limited by staffing/time constraints. The Math Coordinator would be the logical person to fulfill those duties, especially if release time is allocated for that purpose.

Action Plans: 2011.6, 2012.9 (see Section IIIC)

b) The lack of a full-time developmental math faculty member may be a disadvantage, in our efforts to serve a large population of students who need developmental math.

Action Plan: 2012.7

3. Opportunities.

a) **MAC.** At the conclusion of the Fall 2010 semester, we will analyze the success rates in MATH 0920/0930 and make an evaluation of the Emporium Model in order to modify or make changes, if needed. Ongoing evaluation will be done in subsequent semesters.

Action Plans: 2011.1, 2011.7, 2012.1 (see Section IIIC)

b) **Review of Math 0930, 1400, 1405.** The student survey raised some questions about how well Math 0930 is preparing students for Math 1400, and how well the Math 1400/1405 sequence is preparing students for Math 2200 (Calculus).

Action Plans: 2011.3, 2012.2 (see Section IIIC)

c) **Classroom Issues.** The planned WWCC Science Labs will swallow one of the current Math classrooms. Therefore, starting in AY 2011-2012, having an adequate number of classrooms suitable for Math teaching may be an issue.

d) **Internet courses.** Over the past five years, the number of online Math/Statistics courses/FTEs have grown dramatically, but there hasn't been a systematic review of those courses by the Math department. One ongoing issue is proctoring of tests (or lack of it) for online students.

Action Plan: 2012.4 (see Section IIIC)

Section IIIC: Action Plan for Math and Statistics

We hereby submit a 2-year plan. We believe that developing action plans for 3 years or longer is unrealistic.

First Year: 2010-2011			
Task or Action	Purpose	Measure of Success	Who is Responsible?
2011.1 Continue with the redesign/assessment of Math 0920/0930, including tracking of student success.	Improve learning outcomes in developmental Math	Make decisions about what is working well, and what should be changed in 2011-2012, for Math 0920 and 0930	Sarah Pauley, Chuck Newberg, Bud Chew
2011.2 Investigate the potential for improvement of Math/Statistics classrooms.	Maintain and/or improve quality of Math and Statistics instruction (see Sections IIB and IIIB3c)	Develop a plan to make classroom spaces more conducive to student learning	Susan Heyborne, Chuck Newberg
2011.3 Investigate the potential for improving student preparedness for Math 1400 and Math 2200, by examining the feeder courses.	Maintain and/or improve quality of Math instruction (See Sections IIIB3b and Appendix C3)	Develop a plan for making any appropriate changes to the feeder courses for Math 1400 and Math 2200	Susan Heyborne, Dragan Skropanic, Sarah Pauley
2011.4 Re-examine Math department minimum educational standards for instructors of Statistics. Change current standards if that's the appropriate measure.	Maintain quality of Statistics instruction	Minimum educational standards for Statistics instructors that are consistent with reliably providing college-level instruction	Dragan Skropanic, Dave Metz, Jerry Thomas
2011.5 Investigate and implement means of improving communication/interaction with Math and Statistics adjuncts, particularly those who are not teaching at the Rock Springs campus.	Maintain and/or improve quality of Math and Statistics instruction	Adjuncts perceive they are more connected to the Math/Statistics department	Dave Metz, Jerry Thomas, Stephen Schutten, Sarah Pauley
2011.6 Investigate the possibility for compensation for the Math Department Coordinator and/or person responsible for communication/coordination with Math/Stat adjuncts	Maintain and/or improve quality of Math and Statistics instruction	Develop a plan	Dave Metz, Bud Chew
Tasks Dependent on Funding	Data to Justify Need, and Consequence of Not Funding		Who is Responsible?
2011.7 Continue to develop the physical space of the new Math Advancement Center. Estimated Cost: \$25,000	See Section IIIB3a		Sarah Pauley, Chuck Newberg, Bud Chew

Second Year: 2011-2012			
Task or Action	Purpose	Measure of Success	Who is Responsible?
2012.1 Continue with the ongoing redesign/assessment of our developmental Math courses, including tracking of student success.	Improve learning outcomes in developmental Math	1. Improved success rates in Math 0920 and 0930. 2. Good success rates for students when they go from 0920/030 to subsequent WWCC Math/Stat courses.	Sarah Pauley, Chuck Newberg, Bud Chew
2012.2 Follow up on 2010-2011 plan for improving student preparedness for Math 1400 and Math 2200, by examining the feeder courses.	Improve quality of Math instruction	Improved success rates in Math 1400 and/or Math 2200	Susan Heyborne, Dragan Skropanic, Sarah Pauley
2012.3 Articulate with other Wyoming community colleges to standardize names, numbering, and placement scores for all developmental math courses	Improve consistency among the state's community colleges, to reduce confusion for all stakeholders	Common names, numbering, and placement scores for all developmental math courses in Wyoming community colleges	Sarah Pauley, Chuck Newberg, Susan Heyborne
2012.4 Review and assess Math and Statistics internet courses offered at WWCC.	Maintain and/or improve quality of Math and Statistics instruction (Section IIIB3d)	1. Assessment of current state of online Math/Stat courses 2. Plan for the future	Dragan Skropanic, Dave Metz, Jerry Thomas
2012.5 Update and improve Math department web pages.	Improve internal and external communication (Section IIIC)	Web pages that we judge are more useful to internal and external stakeholders	Stephen Schutten
2012.6 Continue to investigate, implement, and evaluate means of improving communication/interaction with Math and Statistics adjuncts.	Maintain and/or improve quality of Math and Statistics instruction	Adjuncts perceive they are more connected to the Math/Statistics department	Dave Metz, Jerry Thomas, Stephen Schutten, Sarah Pauley
Tasks Dependent on Funding	Data to Justify Need, and Consequence of Not Funding		Who is Responsible?
2012.7 Secure the creation of a new full-time Math position, specializing in developmental Math. Cost: \$\$ for additional full-time faculty position	Data to be provided.		Sarah Pauley, Chuck Newberg, Bud Chew
2012.8 Follow up on 2010-2011 plan to improve Math/Statistics classrooms. Cost: Unknown until plan is developed.	Unknown until plan is developed.		Susan Heyborne, Chuck Newberg
2012.9 Follow up on 2010-2011 plan for compensation for the Math Department Coordinator and/or person responsible for communication/coordination Cost: Unknown until plan is developed.	Unknown until plan is developed.		Dave Metz, Bud Chew

Second Year: 2011-2012 (continued)		
2012.10 Investigate means to provide increased Enhanced Professional Development funds. Cost: \$2000-3000 per year for combined Math/Statistics faculty.	Funds should be made available to allow each full time Math/Statistics faculty member to travel to a professional conference once every two years. Current Professional/Enhanced Professional funds will not cover the total costs.	Dave Metz, Bud Chew, Sarah Pauley

Appendix A: Enrollment Data

1. MATH/STAT Enrollment Totals

	04-05		05-06		06-07		07-08		08-09	
	FTE	%	FTE	%	FTE	%	FTE	%	FTE	%
RSC/GR	149.13	66.67%	145.98	64.15%	127.38	62.75%	120.38	60.24%	123.45	54.07%
Internet	54.62	24.42%	61.04	26.82%	59.08	29.10%	62.29	31.17%	86.54	37.90%
Outreach	18.92	8.46%	19.54	8.59%	15.30	7.54%	16.55	8.28%	14.54	6.37%
Concurrent	1.00	0.45%	1.00	0.44%	1.25	0.62%	0.63	0.32%	3.79	1.66%
Total Math	223.67	1.00	227.56	1.00	203.01	1.00	199.85	1.00	228.32	1.00
Total College	2111.00		2215.00		1973.00		2041.00		2244.00	

2. MATH 0920 and MATH 0930 Enrollment

Semester	Math 0920	Math 0930	Both
Fall 2004	192	80	272
Spring 2005	134	78	212
Fall 2005	197	90	287
Spring 2006	114	77	191
Fall 2006	173	66	239
Spring 2007	121	71	192
Fall 2007	183	65	248
Spring 2008	116	73	189
Fall 2008	195	72	267
Spring 2009	150	70	220
Fall 2009	206	88	294
Spring 2010	172	67	239
Fall 2010	254	77	331
Spring 2011	182	113	295

Source: Kay Leum; March 2011

Appendix B: Math/Statistics Professional Development in the Last Five Years

Susan Heyborne:

- Took six semesters of MATH 2490 (Math Seminar)
- Took one semester of LIBS 2280, a course offered on-line, taken to build familiarity with the on-line learning experience
- Took one semester of EDCI 2490, Facilitating On-Line Learning
- Member of MAA

Dave Metz:

- Took COSC 1010 (Intro. Computer Science)
- Took COSC 1030 (Computer Science I)
- Took CMAP 2630 (Presentation Graphics: Powerpoint)
- Took EDCI 2526 (Facilitating Online Learning)
- Took COSC 2360 (Web Page Dynamics and Scripting)
- Attended 3-day NSF-sponsored workshop, "Using Research-Based Curricula and Tools to Promote Active Learning in Introductory Physics Courses"
- Attended the WyDEC Distance Education Conference, three times, and gave a talk, "Teaching and Learning Mathematics Online" at one
- Attended the Wyoming Engineering Articulation meeting three times
- Attended 4-day NSF-sponsored workshop, "Creating Flash-based Math Applets"
- Attended Summer meeting, MAA
- Attended Wyoming Math Articulation meeting two times
- Attended annual meeting, AAPT (American Association of Physics Teachers)
- Attended annual meeting, National Collegiate Honors Council

Dragan Skropanic

- Took 13 credits of graduate-level courses in statistics from Colorado State University
- Currently working on a PhD in Epidemiology and Biostatistics at Walden University
- Obtained a graduate certificate in statistics from Colorado State University
- Attended a conference on teaching with R (programming language for statistics) in Denver, CO
- Attended a few articulation meetings (2005, 2006?, 2007, 2008) – presented a paper via compressed video
- Took 10 credits of math seminar at WWCC

Charles Newberg

- Served as President of WYMATYC 2005-2006
- Served on the WCTM board 2005-2006
- Completed 9 graduate credits from Converse College, Fall 2006, during academic leave
- Presented at the WCTM annual meeting, January 2007

Jerry Thomas

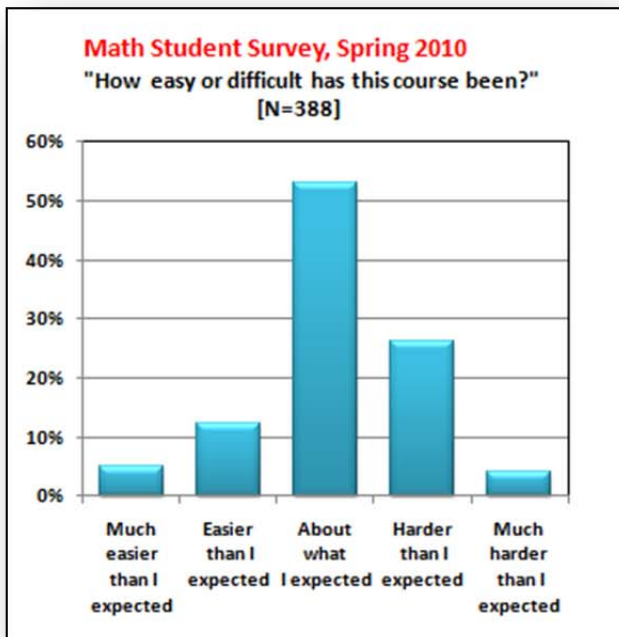
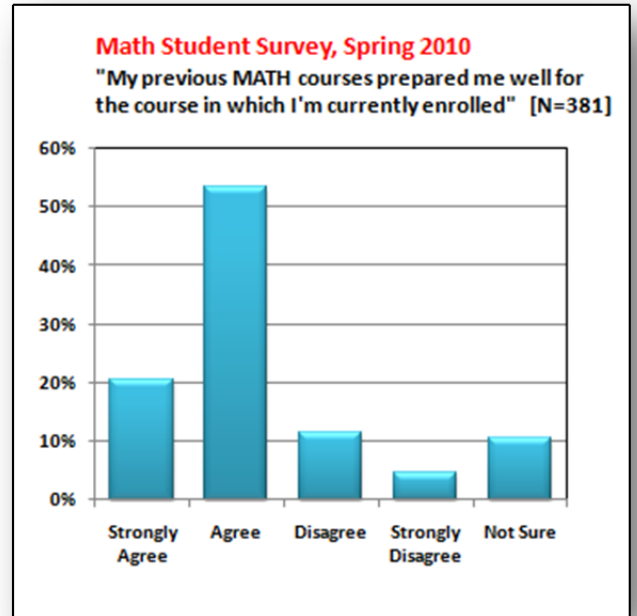
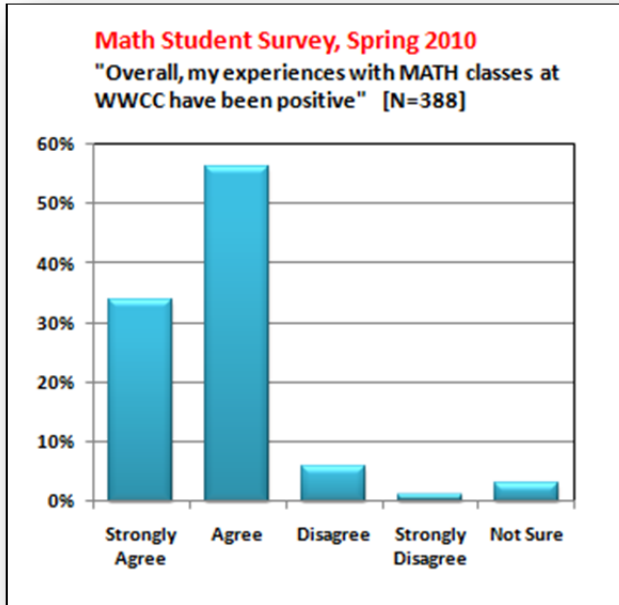
- Took EDCI 2490, a course for prospective online instructors
- Took four semesters of MATH 2490

Sarah Pauley

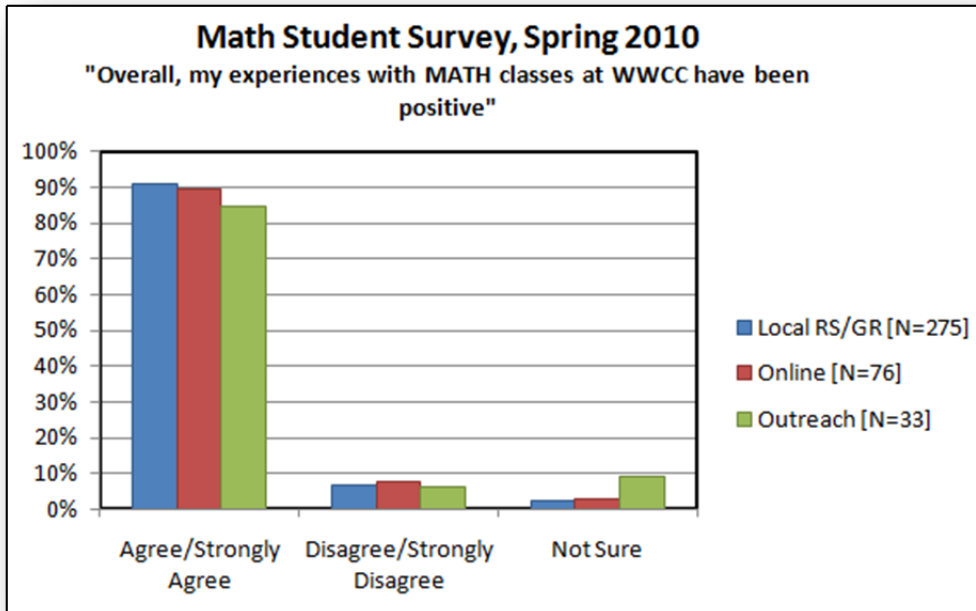
- Project ACCESS Fellow (2005 – 2006)
- Member of AMATYC (2003 – Present)
- Member of MAA (2002 – Present)
- Vice Chair of the Rocky Mountain Section of the MAA (2007 – Present)
- Member of WYMATYC (2004 – Present)
- Took seven semesters of MATH 2490
- Have attended 4 national AMATYC conferences, 3 MAA section meetings (will attend each this year)

Appendix C: Summary of MATH/STAT student survey

1. Student perceptions

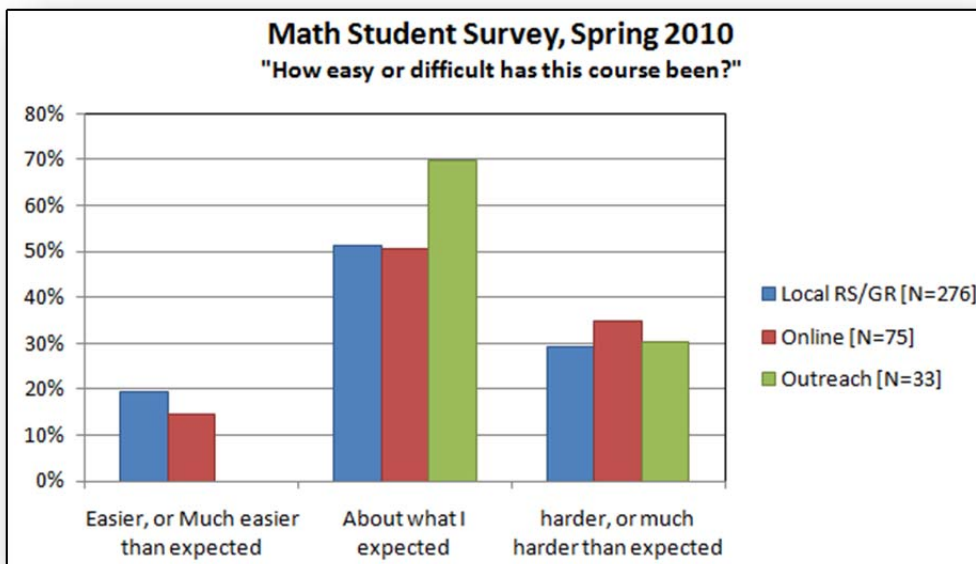


2. Comparisons by Delivery Method.



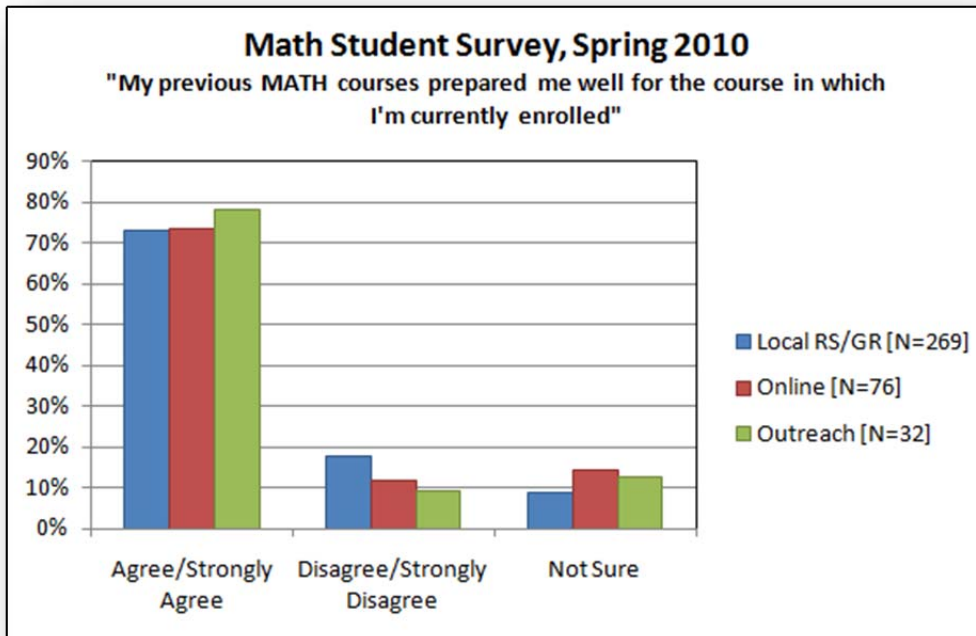
Observations.

The Outreach group had the lowest “agree/strongly agree” response (85% vs. 90% and 91% for Online and Local, respectively). However, this group did not differ significantly from the other two groups in the “disagree/strongly disagree” category.



Observations.

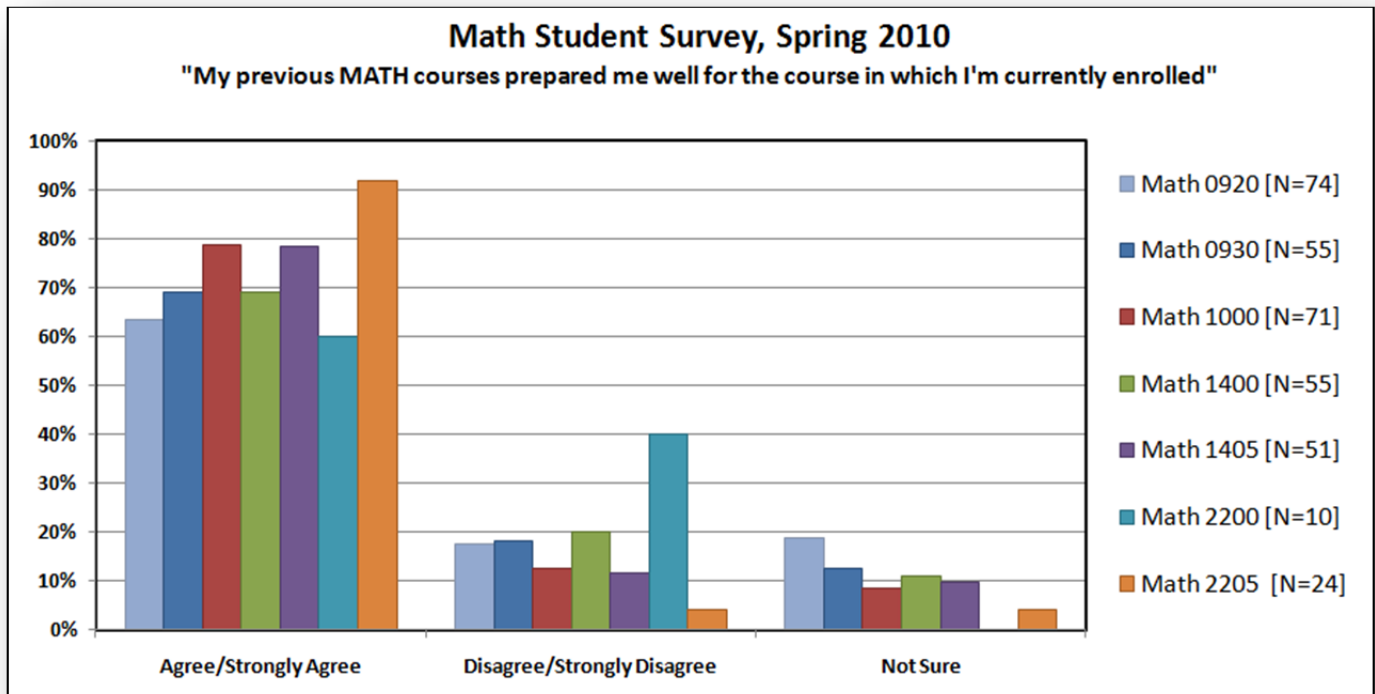
In all three groups, approximately 30% indicated that their current course was “harder/much harder” than expected. A closer look at the survey responses shows that only 4% of all 384 respondents chose “much harder than expected”. At the other end of the spectrum, only 5% of all respondents chose “much easier than expected.” Overall, the results are consistent with an appropriate level of challenge for our students.



Observations.

18%, or nearly 1 in 5 of the Local group indicated their previous math courses did not prepare them well for their current course. This is of some concern. On the following graph and discussion, this question is investigated course-by-course.

3. Comparisons by Course



Observations: Comparisons by Course

1. A red flag is raised by the relatively large percentage of Math 2200 students who did not feel their previous math courses prepared them well for Math 2200. But with only 10 students in this Math 2200 group, we can only conclude that further study is warranted. A closer look at the surveys reveals that of the 10 students in this group, 9 indicated that Math 1405 was their previous math course, and 1 indicated Math 2200 was his/her previous math course.
2. Another concern is the 20% of Math 1400 students who did not feel their previous math courses prepared them well for this course.

Filtering the responses to include only those students who indicated Math 0930 was their “immediately prior” math course (N=29) revealed:

- 26% of this group felt Math 0930 did not prepare them well for Math 1400. (This percentage stayed the same when online and outreach students’ responses were excluded).
 - 86% of these 29 students took Math 0930 in the prior semester (Fall 2009), 14% in the previous year.
 - 21% chose “Disagree” or “Strongly disagree” when asked if their overall experiences with Math classes at WWCC have been positive. (This number was even higher, 24%, when online and outreach students’ responses were excluded).
3. 18%, or nearly 1 in 5 of the Math 0930 group did not feel their previous math courses prepared them well for this course.

Filtering the responses to include only those students who indicated Math 0920 was their “immediately prior” math course (N=32) revealed:

- 16% of this group felt Math 0920 did not prepare them well for Math 0930.
- 72% of these 32 students took Math 0920 in the prior semester (Fall 2009), 16% in the previous year.
- Only 3% chose “Disagree” or “Strongly disagree” when asked if their overall experiences with Math classes at WWCC have been positive.

Action Plans: 2011.3, 2012.2 (see Section IIIC)

Appendix D: CAAP Results, AY 2006-2008

2007-2008 MATHEMATICS		
National Mean = 56.2	WWCC Mean =57.0	A.S. Graduates' Mean = 58.09
N = 29796	n = 126	n = 53
SD = 3.5	SD = 3.6	SD = 3.8
	P = .005	$p_{\text{national}} = .000004^{**}$ $p_{\text{wwcc}} = .039^*$

* A.S. degree students' mean was significantly greater than the WWCC mean.

** A.S. degree students' mean was significantly greater than the national mean.

2006-2007 MATHEMATICS		
National Mean = 56.1	WWCC Mean =56.8	A.S. Graduates' Mean = 58
N = 28764	n = 140	n = 63
SD = 3.6	SD = 3.6	SD = 4.3
	P = .01	$p_{\text{national}} = .000001^{**}$ $p_{\text{wwcc}} = .027^*$

* A.S. degree students' mean was significantly greater than the WWCC mean.

** A.S. degree students' mean was significantly greater than the national mean.

2005-2006 MATHEMATICS		
National Mean = 56.1	WWCC Mean =56.9	A.S. Graduates' Mean = 58
N = 28577	n = 146	n = 53
SD = 3.6	SD = 3.3	SD = 3.6
	P = .004	$p_{\text{national}} = .000006^{**}$ $p_{\text{wwcc}} = .029^*$

* A.S. degree students' mean was significantly greater than the WWCC mean.

** A.S. degree students' mean was significantly greater than the national mean.

Appendix E: MAAP Results, AY 2009

MAPP Summary: 08-09 Graduates				
	MAPP CT (Critical Thinking)	MAPP R (Reading)	MAPP W (Writing)	MAPP M (Math)
WWCC A.S. Mean	111.04	116.71	113.26	115.13
Standard Deviation	5.83	7.35	5.30	5.18
Number	77	77	77	77
WWCC Mean	111.89	117.49	114.07	113.78
Standard Deviation	5.69	6.58	4.75	4.89
Number	152	152	152	152
A.S. compared to WWCC mean	Ho: $\mu_{\text{A.S.}} = \mu_{\text{WWCC}}$ Ha: $\mu_{\text{A.S.}} < \mu_{\text{WWCC}}$ p = .147	Ho: $\mu_{\text{A.S.}} = \mu_{\text{WWCC}}$ Ha: $\mu_{\text{A.S.}} < \mu_{\text{WWCC}}$ p = .218	Ho: $\mu_{\text{A.S.}} = \mu_{\text{WWCC}}$ Ha: $\mu_{\text{A.S.}} < \mu_{\text{WWCC}}$ p = .130	Ho: $\mu_{\text{A.S.}} = \mu_{\text{WWCC}}$ Ha: $\mu_{\text{A.S.}} > \mu_{\text{WWCC}}$ p = .0299*
National Mean	110.30	117.80	113.80	112.40
Standard Deviation	6.10	6.80	4.80	5.60
Number	18559	18559	18559	18559
A.S. compared to national mean	Ho: $\mu_{\text{A.S.}} = \mu_{\text{N}}$ Ha: $\mu_{\text{A.S.}} > \mu_{\text{N}}$ p = .14389	Ho: $\mu_{\text{A.S.}} = \mu_{\text{N}}$ Ha: $\mu_{\text{A.S.}} < \mu_{\text{N}}$ p = .0806*	Ho: $\mu_{\text{A.S.}} = \mu_{\text{N}}$ Ha: $\mu_{\text{A.S.}} < \mu_{\text{N}}$ p = .16166	Ho: $\mu_{\text{A.S.}} = \mu_{\text{N}}$ Ha: $\mu_{\text{A.S.}} > \mu_{\text{N}}$ p = .000009*